

Final Engineer's Report

Faribault County Ditch No. 10

Faribault County, Minnesota

Date: November 11, 2020

ISG Project No.: 14-16609



Architecture
Engineering
Environmental
Planning
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SIGNATURE SHEET

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.

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Project Name Faribault County Ditch No. 10 Improvement

Faribault County, Minnesota

Engineer's Project Number: 14-16690

Dated this 11 day of November, 2020

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EXECUTIVE SUMMARY

Faribault County Ditch No. 10 (CD 10) drains a watershed of 1,294 acres through public tiles and public and private open ditches. The petitioned project includes the addition of private open ditch located in NE ¼ of Section 26 of Barber Township of Faribault County into the public CD 10 system and abandoning the public Branch 1 tile. The private open ditch hydraulically replaced portions of the public 12-inch Branch 1 tile, however this public tile was never legally abandoned as part of the CD 10 drainage system and can be repaired. The 2,935-feet of private open ditch in referenced within report as “Branch 1A” open ditch.

Branch 1A open ditch was privately constructed in the 1940’s and has had limited maintenance since its construction. The ditch provides an outlet for the public Lateral A tile. Branch 1A open ditch has accumulated sediment, is shallow, and does not provide enough depth for Lateral A tile to gravity drain into the ditch; therefore backfall is present on the public tile branches. The private ditch has sloughing, bank instabilities, and vegetation growth in the ditch. Branch 1A open ditch outlets into CD 10 Branch 1 public open ditch.

Three improvement options are outlined within the Final Engineers Report (FER). All the improvement options will acquire the private open ditch and buffer area into the CD 10 system and address maintenance items to the ditch such as open ditch cleaning, slough repairs, tile outlet repairs, and installation of alternative side inlets (ASIs). The improvement will also establish a legal ditch grade that can be repaired in the future and also serve as a gravity outlet for the public tiles draining into the ditch. Improvement Option 1 included acquiring Branch 1A open ditch and its buffer areas in the CD 10 system, cleaning the open ditch, addressing maintenance, and replacing one field crossing. Improvement Option 2 will fill a portion of Branch 1A open ditch, replacing it with a 24-inch tile to convey water between the two portions of open ditch, and removing a field crossing. Improvement Option 3 cleans a majority of Branch 1A open ditch expect for the most upstream portion, and installation of a 24-inch tile have primarily route water through a tile rather an open ditch. Improvement Option 2 and 3 consider the installation of tile to reduce land acquisition for the open ditch and buffer area. The portion of open ditch to be replaced by tile in Improvement Option 2 and 3 contains peat soils susceptible to erosion, sloughing, and bank instabilities. A project alternative for repair to Branch 1 tile is also included as separable maintenance applies to the project.

The total estimated improvement costs to Branch 1A open ditch ranges from \$181,640 to \$199,626. The currently private ditch serves as the outlet for public and private tiles. For maintenance efforts the open ditch would be best served and maintained under the drainage system. The separable maintenance cost for repairing the Branch 1 tile is estimated at \$157,242. When separable maintenance is considered, all improvement options are practical and feasible as the net costs do not exceed the benefits of \$75,000 as determined by the viewers. Given the size of the improvement, the amount of watershed benefitted, and the net cost when considering separable maintenance, the project is cost effective.

ORDER TO PROCEED

On October 7, 2019, the Faribault County Drainage Authority, in regular session, made an Order to proceed in which it appointed ISG to prepare a Final Engineer’s Report (FER) and associated construction plans. It further ordered the engineer to add discussed options and not proceed with Option 3 as presented in the Preliminary Engineers Report (PER). A copy of the order has been placed in Appendix B.

ADDENDUMS TO PRELIMINARY ENGINEER’S REPORT

Three addendums were issued following preliminary hearing and subsequent continued hearing dates.

Addendum 1 investigated the existing conditions of Branch 1 Lateral A tile. Lateral A tile outlets into private Branch 1A open ditch. Lateral A tile outlet was unable to be located during site investigation and was believed to be under water. Lateral A consists of 3,780-linear feet of 8-inch tile and has a drainage coefficient of 0.03 in/day. Lateral A tile was repaired in 2017. Based on the shallow private Branch 1A open ditch and the 2017 design profiles, there is backfall on the tile that impedes drainage.

Addendum 2 separated the repair of the current CD 10 open ditches and culverts and the improvement to Branch 1A open ditch. This allowed for repairs to CD 10 to continue to move forward while improvement proceedings continue on the improvement portion of project. The culvert replacements included Crossings B-1 (CR 90 / 150th Street on Branch 1 open ditch), M-2 (CR 321 / 480th Avenue on the Mainline open ditch), and M-3 (field crossing on the Mainline open ditch). The culverts were bid and installed in the fall of 2019 and the CD 10 open ditch was cleaned at that time.

Addendum 3 includes updates to repair and improvement cost estimates and provide alternative options for improvement to Branch 1A open ditch from information received and discussed at informational landowner meeting on March 29th, 2019. Additional field work was completed to verify the elevations Lateral A tile. It was verified that there is backfall on the tile. Two repair options for Lateral A included the installation of new tile to follow new alignment and outlet into at the end of Branch 1 open ditch to allow for adequate grade on the tile. The second repair option included the installation of a lift station to pump water on the tile that has backfall. Alternative improvement options were presented that included cleaning Branch 1A open ditch, filling a portion of Branch 1A open ditch and replacing with tile, and replacing Branch 1A open ditch with a 30-inch tile.

After the preliminary hearing and subsequently continued hearing dates, informational meetings with landowners, and input from landowners, county staff, drainage authority, the final engineering project scope includes three improvement options to Branch 1A open ditch as outlined within this report. Lateral A tile will be will addressed as separate repair or improvement project at a later date, if requested by landowners.

SYSTEM WATERSHED

Location

Faribault County Ditch No. 10 (CD 10) watershed is located in Sections 22-27 in Barber Township in Faribault County. The Mainline open ditch runs generally northeast from its end in the NW ¼ of the SE ¼ of Section 23 of Barber Township to its outlet in the NE ¼ of the SW ¼ of Section 24 of Barber Township to Section 24 into Faribault County Ditch No. 3. The watershed is drained by a combination of public and private open ditches and subsurface tile drains.

The petitioned project pertains to the addition of private open ditch south of Branch 1 to be added into the CD 10 system. The private open ditch will legally replace the public Branch 1 tile and provide an adequate outlet to the Lateral A tile. The private ditch will be referenced herein as "Branch 1A". Branch 1A open ditch flows for 2,935-feet generally north to its outlet into the terminus of Branch 1 open ditch of CD 10 located directly south of County Road 90 / 150th Street and approximately 450 -feet west of 480th Avenue. Branch 1A provides an outlet to the Lateral A tile.

Watershed Description

Faribault County Ditch No. 10 drains 1,294 acres. The existing CD 10 system consists of approximately 6,200 linear feet of open ditch and 11,725 linear feet of tile. Its watershed is characterized as relatively flat with elevation difference of approximately 85 -feet. Branch 1A open ditch drains 1,300-acres.

The hydrologic soil type in the system ranges from type "A" to "C/D" according to the Web Soil Survey (WSS). Type "A" soils have high infiltration rates and ability to drain while having low runoff potential. However, type "C/D" have low ability to drain and high runoff potential. A level 1 wetland delineation was completed and are identified on the plans. The improvement project does not increase drainage or fill areas identified in the level 1 wetland delineation.

See Appendix C for maps depicting the watershed's location, elevation, hydrologic soils, unified soil classification, and Level 1 Wetland Delineation.

HISTORY

Faribault County Ditch No. 10 was originally constructed in 1912. The system was expanded in 1945-1948 with the construction of buried tile Branches 2, 3, and Lateral A of Branch 1. The existing Mainline and Branch 1 open ditch has an as-constructed or subsequently improved condition (ACSIC) of a four-foot bottom at a grade of 0.05%. Minor repairs have occurred as needed throughout the ditch's existence until 2019 when the mainline open ditch was cleaned. The currently private Branch 1A open ditch was constructed privately in the 1940's. It is unknown if any repairs, abandonments, or reroutes were done to the Branch 1 tile during the time of the private ditch construction.

The Branch 1 Lateral A tile was originally constructed in 1948 with the improvements to CD 10. The original construction of the tile was very shallow and spanned through peat soils. Over time, the soil subsided and the tile started to come out of the ground. In the 1970s, a repair was made to the Lateral A tile installed the tile at a deeper depth as compared to the subsided tile and the tile was connected into a private lift station. This then outletted into the private Branch 1A where it flowed into Branch 1 of the CD 10 public system. In the 2010s, a repair was made to the Lateral A tile which disconnected the pump from the public tile and outletted the tile into the bottom of Branch 1A. Given the subsidence and deeper tile that was constructed; the current tile does not have positive drainage into the Branch 1A ditch and is a forced outlet into the bottom of the ditch.

Early Coordination and Feasibility Report

Prior to the Petition for this drainage project a landowner meeting was held and attended by the Engineer, county drainage staff, ISG staff, and CD 10 watershed landowners. In response, the Engineer prepared a feasibility report which included options for repair and improvement of Branch 1A. The feasibility report formed the basis for both the petition and PER report. Informational landowner meetings followed the preliminary hearing to further discuss options for final consideration.

Investigation of External Sources of Funding and Technical Assistance

Section 103E.015, Subd. 1a of the Drainage Code requires that an investigation of external sources of funding and technical assistance be conducted prior to an order on the engineer's preliminary survey report for a drainage project or the engineer's report for a repair. The funding can be used for wetland preservation or restoration or creation of water quality improvements, flood control, or alternative measures (per Section 103E.015, Subd. 1, clause (2)). The sources of funding authorized under this Section can be used outside the benefited area, but must be used in the watershed of the system.

A multipurpose drainage management (MDM) map is included in Appendix D. The MDM map shows potential locations for additional best management practices (BMPs) and will be proposed to landowners. Additional BMPs may be implemented independently by individual landowners for practices outside of 103E public drainage easement. These practices include nutrient management, conservation tillage, cover crops, blind rock inlets, and controlled drainage. The respective counties Soil and Water Conservation District (SWCD) representative can assist landowners with implementation and available funding.

PRESENT CONDITION OF SYSTEM BY OBSERVATION AND ANALYSIS

The information in this document has been prepared from the original CD 10 maps and profile drawings and applicable improvement maps and profile drawings from the 1945-48 improvement provided by Faribault County. A topographic survey was completed by ISG in February of 2017. Survey was completed in NAVD 1988 datum. A watershed boundary was provided by viewers from the redetermination of benefits completed in 2015.. Drone flights of Branch 1A open ditch as well as the Mainline and Branch 1 open ditches were completed in 2017. The following paragraphs are based on the results of those efforts.

Present Condition of Drainage Infrastructure

DITCHES

The Branch 1A open ditch consists of approximately 2,935-linear feet and was privately constructed in the 1940's. It has had limited maintenance since its construction. The side slopes on the Branch 1A open ditch have had many areas of sloughing and bank instabilities. The bottom of the open ditch has accumulated sediment since its construction that can promote vegetation growth and restrict flow. Figure 2 shows steep side slopes and vegetation growth in the open ditch. Straight pipe side inlets were observed within the open ditch buffers (see Figure 1 and Figure 5). Straight pipe side inlets promote sediment transport into the open ditch. Sediment in the open ditch can restrict flow and increases the need for maintenance and open ditch cleaning. Observations during large rain events have shown localized flooding around Branch 1A showing a need for additional drainage for to adequately farm area (See Figure 6).



Figure 1: Straight Pipe Side Inlet



Figure 2: Vegetation in Branch 1A open ditch



Figure 3: Submerged Tile Outlet



Figure 4: Private Lift Station



Figure 5: Straight pipe side inlet in the NE ¼ of the NE ¼ of Section 26 of Barber Township



Figure 6: Surface flooding in the NE ¼ of the NE ¼ of Section 26 of Barber Township



Figure 7: Branch 1A open ditch outlet into Branch 1 open ditch

CULVERTS

The Branch 1A open ditch has two culvert crossings, BR1A-1 and BR1A-2. BR1A-1 is at the beginning of the private ditch and consists of a 24-inch corrugated metal pipe (CMP) that conveys water from the upstream road ditch along 480th Avenue into the open ditch (see Figure 8). BR1A-2 is a field crossing that consists of a 36-inch CMP. The existing field crossing has backfall and is in poor condition with rusting and deterioration associated with a metal pipe (see Figure 9). Approximately 500-feet downstream of the Branch 1A outlet is a 48-inch reinforced concrete pipe (RPC) under 150th Street, BR1-1. The crossing was recently installed in fall of 2019 and is in good condition. The crossing is the hydraulic control for Branch 1A open ditch.



Figure 8: BR1A-1 Culvert – Existing 24-inch CMP Field Crossing



Figure 9: BR1A-2 Culvert – Existing 36-inch CMP Field Crossing

System Capacity

The following tables summarize the hydraulic analysis of the existing conditions of Branch 1A open ditch. The capacities listed in the tables reference the capacity of agricultural drainage which is expressed as a drainage coefficient (CD) and is defined as the depth of water over the entire area of the upstream watershed that a ditch can drain in a 24-hour period (inches per day (in/day)). For an open ditch like Branch 1A, a drainage coefficient 1.00 in/day is recommended for today's drainage needs.

TABLE 1. DITCH CULVERT CAPACITIES

Crossing #	Location	Existing Type	Existing Material	Existing Size (in)	Existing Slope (%)	Drainage Area (Acres)	Existing Drainage Coefficient (in/day)
B1A-1	Field Crossing	ROUND CULVERT	CMP	36	-0.44%	219	0.38
B1A-2	Field Crossing	ROUND CULVERT	CMP	24	2.76%	103	4.52

Nature of the Outlet

The outlet for Branch 1A open ditch is CD 10 Branch 1 open ditch with the junction located directly south of County Road 90 / 150th Street approximately 450 -feet west of 480th Avenue in NE ¼ of the NE ¼ of Section 26 of Barber Township in Faribault County. CD 10 Branch 1 open ditch is a 103E public drainage system, and it is not anticipated that a permit will be required for this project as it is not classified as a public watercourse. The CD 10 public Mainline open ditch outlet is County Ditch 3 of Faribault County.

STATUTE REQUIRED + SUGGESTED EFFORTS

Project Necessity

After assessing the necessity and feasibility of this drainage project on behalf of the Faribault County Drainage Authority in relation to the environmental, land use, and multipurpose water management criteria of Section 103E.015, Subd. 1, the engineer deems the proposed project to be both necessary and feasible.

Environmental, Land Use, and Multipurpose Water Management Considerations (Section 103E.015, Subd. 1)

The Drainage Code requires that the drainage authority assess the necessity and feasibility of a drainage project in relation to the environmental, land use, and multipurpose water management criteria of Section 103E.015, Subd. 1. To assist in providing thoroughness and clarity, the law will be used as the outline for this portion of the report.

103E.015 CONSIDERATIONS BEFORE DRAINAGE WORK IS DONE.

Subdivision 1. Environmental, land use, and multipurpose water management criteria. Before establishing a drainage project, the drainage authority must consider each of the following criteria:

(1) private and public benefits and costs of the proposed drainage project;

The project will provide a legal drainage outlet for the Lateral A tile and will also establish a legal ditch under MN Statute 103E in which the Drainage Authority will have jurisdiction over for future maintenance. Repairs to the Branch 1A are necessary and will provide adequate drainage for the benefitted properties.

Since the present project is on a public drainage system the financial cost will be borne by the benefitted landowners of CD 10. The only costs that might be paid by the public would be those that are provided through grants or loans.

(2) alternative measures, including measures identified in applicable state-approved and locally adopted water management plans, to:

The following water management plans were consulted to see what alternative measures might be applicable to the proposed drainage project:

Faribault County Local Water Management Plan 2018-2027

- (i) *conserve, allocate, and use drainage waters for agriculture, stream flow augmentation, or other beneficial uses;*
- (ii) *reduce downstream peak flows and flooding;*
- (iii) *provide adequate drainage system capacity;*
- (iv) *reduce erosion and sedimentation; and*
- (v) *protect or improve water quality;*

Faribault County water plan has goals to reduce the impacts of altered hydrology and calls out strategies which include implementation of wetland restorations, controlled drainage, storage basins, and other multipurpose drainage management practices. This project includes ASIs which were sized to temporarily store water up to 24-36 hours to allow for sedimentation.

Please refer to the multipurpose drainage management plan map in Appendix D for additional water quality and best management practices. The multi-purpose drainage management plan was shared with landowners for implementation of preventative, control, and treatment measures. The respective county Soil and Water Conservation Districts can assist landowners with implementation and funding as many of the practice are out of the jurisdiction of the drainage authority. Preventative practices can be incorporated throughout the watershed on a private landowner basis to further improve water quality and soil health.

(3) the present and anticipated land use within the drainage project or system, including compatibility of the project with local land use plans;

The present land use for the system is primarily agricultural. No land use change is expected.

(4) current and potential flooding characteristics of property in the drainage project or system and downstream for 5-, 10-, 25-, and 50-year flood events, including adequacy of the outlet for the drainage project;

The present and proposed improvement conditions were modeled with XP SWMM. XP SWMM is a fully dynamic modeling software that combines 1-dimensional flow calculations (open channel, pipe flow, etc.) with 2-dimensional flow calculations (floodplain, overland flow, etc.) to better analyze hydrologic and hydraulic conditions. The 1D aspect incorporates land use, soil type, topography, and the associated 2D components to simulate overland and floodplain flow associated with the runoff from a watershed.

Design storms and rainfall data used to generate Type II rainfall distributions for the project area were obtained from the National Oceanic and Atmospheric Administration (NOAA's) Atlas 14 precipitation frequency estimates. Runoff calculations in the model were performed using TR-55 method. Curve numbers for the project area were determined using GIS soil and land use data. A model was developed for the 2, 5, 10, 25, 50, and 100-year rainfall events for a 24-hour storm duration.

The XP SWMM model compares the existing condition to the proposed improvement for Branch 1A. Three improvement options are included for final consideration. Improvement Option 1 included acquiring Branch 1A open ditch and its buffer areas in the CD 10 system, cleaning the open ditch, addressing maintenance, and replacing one field crossing. Improvement Option 2 will fill a portion of Branch 1A open ditch, replacing it with a 24-inch tile to convey water between the two portions of open ditch, and removing a field crossing. Improvement Option 3 cleans a majority of Branch 1A open ditch except for the most upstream portion, and installation of a 24-inch tile have primarily route water through a tile rather than an open ditch. Improvement options are outlined in more detail later in the FER and preliminary plans are included for each option in Appendix A.

Each improvement option was modeled and compared to the existing condition. A summary of the results are shown in Table 2. Each improvement option maintains or reduces peak flow rates at the outlet of both Branch 1A open ditch outlet and at the outlet of the CD 10 system in Faribault County Ditch No. 3. Due to minimal changes in the system hydraulics, it is expected that the system will maintain peak flow rates throughout the system. For all improvement options peak flow rates were maintained or reduced at the outlet of Branch 1A open ditch and the overall outlet of the CD 10 system for the 2-, 5-, 10-, and 25-year storm events.

In Improvement Option 1 and 3, the model results showed an increase in peak flow rates at the outlet of Branch 1A open ditch, however flows are maintained by the culvert on the Mainline open ditch under 480th Avenue (M-2) resulting in an overall decrease in peak flows at the outlet of the CD 10 system in Faribault County Ditch No. 3.

In Improvement Option 2, the model results showed significant reductions of peak flow rates particularly for the 10-, 25-, 50-, and 100-year storm events. When filling a portion of the Branch 1A open ditch and routing water through a 24-inch tile flow capacity is reduced as compared to the existing conditions. During smaller rain events such as the 2-year and 5-year storm events, the impact is not greatly felt as the tile has capacity to convey the water produced by the storm event. During the larger rain event such as the 10-, 25-, 50-, and 100-year storm events, the tile does not have capacity to convey water and causes restriction resulting in a holding of water back in the system. The restriction and holding back of water results in a decrease in peak flow rates for Improvement Option 2.

An in-depth analysis of the XPSWMM model results are placed in Appendix E.

TABLE 2: PEAK FLOW RATE COMPARISONS

Option	Location	2-year			5-year			10-year			25-year			50-year			100-year		
		Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change	Existing (cfs)	Proposed (cfs)	% Change
Improvement Option 1	CD 10 Outlet	13.5	13.4	-1%	37.1	36.1	-3%	82.1	78.8	-4%	164.0	158.5	-3%	236.5	232.1	-2%	314.2	313.6	0%
	Branch 1A Outlet	5.2	5.1	-2%	15.9	15.1	-5%	36.8	34.1	-7%	64.1	63.4	-1%	85.4	87.0	2%	119.9	120.0	0%
Improvement Option 2	CD 10 Outlet	13.5	13.4	-1%	37.1	36.2	-2%	82.1	73.5	-10%	164.0	140.1	-15%	236.5	210.1	-11%	314.2	281.3	-10%
	Branch 1A Outlet	5.2	5.1	-2%	15.9	15.4	-3%	36.8	31.1	-15%	64.1	41.7	-35%	85.4	58.2	-32%	119.9	115.7	-4%
Improvement Option 3	CD 10 Outlet	13.5	13.4	-1%	37.1	36.3	-2%	82.1	79.6	-3%	164.0	160.5	-2%	236.5	234.6	-1%	314.2	314.6	0%
	Branch 1A Outlet	5.2	5.1	-2%	15.9	15.3	-4%	36.8	34.6	-6%	64.1	63.8	0%	85.4	87.7	3%	119.9	120.0	0%
Denotes peak flows less than or equal to existing																			

(5) the effects of the proposed drainage project on wetlands;

Drainage projects must comply with a variety of state and federal wetland regulations: USACOE 404, Minnesota Wetland Conservation Act, and USDA Swampbuster. A Level 1 wetland delineation was completed in areas where improvements are slated to take place. Potential wetlands are indicated on the plans, no drainage or fill impacts are anticipated with this project.

(6) the effects of the proposed drainage project on water quality;

Water quality issues pertinent to drainage projects can include erosion and sediment transport potential, and non-point pollution. After checking available TMDL information and the MPCA Impaired Waters listing, Faribault County Ditch No. 3 is not listed for any water quality impairments. The inclusion of Branch 1A open ditch into the CD 10 system will increase the water quality to downstream waters as repairs to the ditch will be made to stabilize sediment and sloughing ditch banks that are currently creating erosion. Including Branch 1A open ditch into the system will allow for future maintenance efforts to be managed by the county addressing any future bank failures and erosion problems in the future.

Please refer to the multipurpose drainage management plan map in Appendix D for additional water quality and best management practices. The multi-purpose drainage management plan was shared with landowners for implementation of preventative, control, and treatment measures. The respective county Soil and Water Conservation Districts can assist landowners with implementation and funding as many of the practice are out of the jurisdiction of the drainage authority. Preventative practices can be incorporated throughout the watershed on a private landowner basis to further improve water quality and soil health.

(7) the effects of the proposed drainage project on fish and wildlife resources;

The proposed drainage project will not have any impacts on fish and wildlife resources as no landscapes changes of this nature will occur.

(8) the effects of the proposed drainage project on shallow groundwater availability, distribution, and use; and

There is no anticipated effect of the proposed project shallow groundwater; the project should only impact the soil saturation levels. There are no known irrigation or personal wells located close enough to the ditch to be affected by open ditch cleaning.

(9) the overall environmental impact of all the above criteria.

The project will have negligible environmental impacts, as there are no land use changes, wetland impacts, fish and wildlife habitat changes or any adverse effects to water quality. The project as recommended will have negligible effects to downstream waters and downstream water quality.

Statement of Necessity and Feasibility, Section 103E.015, Subd. 1,

After assessing the necessity and feasibility of this drainage project on behalf of the Drainage Authority in relation to the environmental, land use, and multipurpose water management criteria of Section 103E.015, Subd. 1, the engineer deems the proposed project to be both necessary and feasible.

Response to DNR's PER Advisory Review and PER Hearing Questions and Comments

RESPONSE TO DNR'S PER ADVISORY REVIEW

Mr. Jim Seal, Assistant Regional Manager for the Ecological and Water Resources Division of the DNR, submitted a letter of Advisory Review of the Faribault County Ditch No. 10 Improvement Preliminary Engineers Report to the Faribault County Auditor, John Thompson, on July 18, 2017. The DNR's Preliminary Advisory Report is included in Appendix G.

The review included a lengthy discussion on effects on drainage improvements to downstream water resources, natural resources and property owners in regard to flooding and water quality. Several recommendations of BMPs and resources for the area were mentioned and recommended to be included in the proposed improvement. BMPs are included in this improvement including ASIs. Other off system, or upland BMPs such as controlled drainage can be implemented throughout the CD 10 watershed and interested landowners should contact the Faribault County Soil and Water Conservation District (SWCD) for assistance.

The Preliminary Advisory Report also included more project specific concerns. Each concern will be addresses below by first listing the specific concern in the Preliminary Advisory Report, followed with a response.

1. *Page 5 indicates the improvements to CD 10 will result in a slight change in outlet flows based on the XP Storm software and results should in Appendix D in PER. However, Appendix D in PER does not differentiate between the Repair Option or Improvement Option 1 & 2. Are the XP Storm results the same for each Option? Please clarify the XP Storm results in the Final Engineer's Report (FER).*

Options have evolved from further investigation of records and discussions with landowners, county staff, and the Faribault County Drainage Authority from continued and additional hearings and informational landowner meetings. The hydrologic and hydraulic model has been updated to reflect the updated repair and improvement options as presented in FER. The results are located and labeled with associated option in Appendix E.

2. *Improvement Options 1 & 2 propose adding Branch 1A (currently private) to the public drainage system as either an open ditch (existing) of as a new 30-inch diameter tile (3,315 feet) and lowering several existing culverts. The addition of Branch 1A to the system will have minimal impact but lowering several culverts by a foot or more will result in increased drainage throughout 1,308-acre watershed. Consideration should be given to not lower the culverts as much as proposed in order to retain some water during the more common storm events.*

Upon further investigation, records indicate that an existing public tile is present in the approximate location of Branch 1A open ditch. Therefore, replacing the tile to the ACSIC would constitute as a repair. This has been updated to be reflected in the FER report. One culvert is proposed to be lowered as a part of the improvement at the field crossing location at station 41+25. The 36-inch CMP field crossing will be lowered approximately 2.2-feet with a 30-inch RCP. In order to provide hydraulic gradient to the open ditch upstream of the culvert, it will need to be lowered. Without being lowered, it is expected to have approximately 2.2-feet of standing water in the open ditch upstream of the culvert. This will be "dead" storage of water since it will be continually full without the ability to drain therefore, no additional storage is expected during storm events.

3. *The improvement project includes 6,495 linear feet of channel cleanout and several culvert replacements that include small diameters and lowering flow inverts. For example, the construction profile show a 72-inch culvert at station 10+00 (Joseph Stevermer – Section 24) to be replaced with a 60-inch culvert with the invert lowered 1.0 foot. The project maps in the FER need to include the culvert replacement locations so they can easily be located by reviewers.*

The Mainline and Branch 1 open ditches were cleaned out as part of a repair project in fall of 2019 to the As Constructed or Subsequently Improved Condition (ACSIC) grade. Crossings B-1 (CR 90 / 150th Street on Branch 1 open ditch), M-2 (CR 321 / 480th Avenue on the Mainline open ditch), and M-3 (field crossing on the Mainline open ditch) were also replaced during repair work installed in fall of 2019. The proposed improvement includes the replacement of one culvert B1A-1. The Watershed Map in Appendix C shows the culvert locations for CD 10 with associated names as referenced within FER.

4. *The legal grade for CD 10 was determined by use of historical project profiles and the current channel bottom at the outlet into CD 3. The historical profiles should be added to the FER as an attachment to support this method of establishing the legal grade.*

The improvement no longer considers the repair or improvement of the Mainline or Branch 1 open ditches as this was completed as repair work in the fall of 2019. Branch 1A was privately constructed and does not have an established legal grade. The addition of the lateral will include the establishment of the legal grade to Branch 1A as shown in the preliminary construction plans. Historical profiles for the Mainline and Branch 1 open ditch are included for reference in Appendix I. Historical records, soil borings, and survey determined the legal grade for the Mainline and Branch 1 open ditch segments.

PROPOSED PROJECT

The following project has been proposed in response to the Petition with due regard to the results of the Preliminary Survey:

Project Design Parameters

While alternatives will be analyzed, there are certain things that will, by necessity, characterize any configuration of the proposed drainage project.

COEFFICIENT OF DRAINAGE

The capacity of agricultural drainage is expressed as a drainage coefficient which is defined as the depth of water over the entire area of the upstream watershed that a tile or ditch can drain in a 24-hour period (inches per day (in/day)). For a system like CD 10, drainage coefficients of 1.00 in/day for open ditches are recommended with timing further influencing design.

SYSTEM DEPTH

The depth of CD 10 is controlled by three criteria: 1. Provide a minimum of five feet of cover in low spots along public tile alignments, 2. Increase ditch or tile grades to improve capacity, and 3. Provide deeper outlets for private tile.

ALTERNATIVE SIDE INLETS

Early ditch systems were designed to allow water to enter the ditch by surface sheet flow or, as flows were concentrated, via field drainageways. However, the latter allowed for head cutting (erosion along the drainageways) up into the field. To remedy the head cutting, the original (traditional) side inlet (side inlet control per Chapter 103E) was designed as a pipe from the field through the ditch berm to the ditch. While this eliminated the head cutting, any sediment laden water from the surrounding field entering the pipe inlet was allowed to go directly through the pipe to the ditch.

In more recent years, Alternative Side Inlets (ASI) have been proposed for locations along the ditch where concentrated surface flows are encountered. While there are a number of different types of ASIs, they all are designed to reduce sediment transport from the field to the ditch. They are characterized by two things: 1. temporary ponding of water to settle out sediment (using one of many different intakes including rock filters), and 2. energy dissipation (some using drop structures and others using rock filters).

There are two types of ASIs that are proposed for the present project: an Alternative Side Inlet (ASI) or an Alternative Side Inlet with riprap overflow (ASIRO). Both types have their intakes located completely in the ditch buffer to reduce potential damage during field operations. The ditch berm with or without riprap along with a restricted intake creates a temporary pond. When large concentrations of flow are coming to a particular ASI, rip rap will be used to form an emergency overflow, or an ASIRO. A detail of the ASI can be seen in the preliminary plans in this report.

There are funding options available to aid in paying for ASI or ASIRO placement. See Investigation of Sources of External Funds.

EROSION CONTROL

Required temporary erosion control will consist of silt fence or bio-roll around all surface intakes and ditches until vegetation is established. The temporary erosion control will be maintained throughout the construction process according to the Minnesota Pollution Control Agency (MPCA) regulations.

Permanent erosion control will consist of riprap around all tile outlets into ditches as necessary, as well as at the upstream and downstream end of ditch culvert crossings. All disturbed vegetation throughout the project will be reseeded with the appropriate seed mix and mulch.

An Erosion Control Plan or a Storm Water Pollution Prevention Plan will be developed before final construction plans are complete and a National Pollution Discharge and Elimination System (NPDES) permit application will be filed before construction.

NEW RIGHT OF WAY

Right of Way (ROW) will be established for the additional lateral, Branch 1A open ditch. The ROW will be over the top of the open ditch encompassing the cross section of the open ditch and the 16.5-foot buffer on both sides of the open ditch. Temporary construction easements will be used during construction that include 50-foot temporary ROW on each side of the open ditch. Damages will be paid to affected landowners where used for accessing, excavation, and spreading of spoils. A detailed summary of estimated damages for each improvement option is included in Appendix H.

SYSTEM EASEMENT

An easement will be purchased over the top of the currently private ditch encompassing the cross section of the open ditch and 16.5-foot buffer on both sides of the open ditch. The landowners in which the ditch crosses over will be compensated for the permanent damages to their land. The system easement acquired will vary for each improvement option. Preliminary estimated permanent damages for open ditch and buffer areas are approximately 5.69-acres for Improvement Option 1, 4.59-acres for Improvement Option 2, and 3.85-acres for Improvement Option 3. A detailed summary of estimated damages for each improvement option to CD 10 by additional of Branch 1A open ditch is included in Appendix H.

Project Options

During the preliminary hearing, three improvement options were presented the Faribault County Drainage Authority and landowners. The Order proceed included the consideration of the three options. During final hearing, the Faribault County Drainage Authority will approve one option for preparation of construction documents for public bidding.

REPAIR OPTION

A repair would consist of replacing the tile generally along the Branch 1A open ditch alignment to its as-constructed or subsequently improvement condition (ACSIC). The repair to Branch 1A tile would consist of approximately 2,800-feet of 12-inch tile. The tile would be installed to the ACSIC depth with an average of 4-feet and grades of 0.05% and 0.10%. The replacement of the 12-inch tile provides a drainage coefficient of 0.04 in/day to the upstream watershed without considering the drainage provided by the currently private Branch 1A open ditch. The private open ditch would remain in place and would remain private in which maintenance to the private open ditch would be paid for by individual landowners.

IMPROVEMENT OPTION 1

Improvement Option 1 consists of cleaning the 2,775-linear feet of petitioned Branch 1A open ditch. The open ditch would be cleaned to a 4-foot bottom width at 0.05% grade and side slopes would be flattened to 2:1 side slopes for bank stability. The 36-inch CMP field crossing on Branch 1A would be replaced and lowered to the proposed legal grade elevation with a 30-inch RCP. The open ditch cross section and proposed culvert replacement meet the 1.00 in/day drainage coefficient design parameter. The preliminary construction plans in Appendix A includes plan and profile designs for Improvement Option 1, and the Proposed Option 1 map in Appendix C displays the concept.

Improvement Option 1 will acquire the land (permanent damages) consisting of the proposed open ditch cross section and 16.5-foot buffers on each side of the open ditch for the entirety of the 2,775-linear feet of currently private open ditch. Estimated permanent damages for land acquisition of open ditch and buffer areas consists of 5.69-acres. Temporary damages include areas and crops disturbed from construction traffic and for placement of spoils from open ditch cleaning and side slope flattening and is estimated to be 5.26-acres for Improvement Option 1. Permanent and temporary damages will be paid to affected landowners after construction is completed outlining the actual damages ensued by construction. An estimated damage summary for Option 1 is outlined in Appendix H.

IMPROVEMENT OPTION 2

Due to the poor condition of Branch 1A open ditch along stations 35+00 to 46+00, Branch 1A open ditch would only be cleaned from the outlet of Branch 1A for 1,725-feet continuing upstream until the open ditch routes to the south. The open ditch will be cleaned to a 4-foot bottom width at 0.05% grade. The open ditch would be filled from station 34+60 to 41+50. From survey data, there are no tile outlets in the open ditch that would be filled. The field crossing culvert will be removed and filled in. The remaining 410-feet upstream of Branch 1A open ditch will not be filled or cleaned (Stations 41+50 to 46+00). The remaining upstream portion of Branch 1A open ditch has multiple private tile intakes, a side inlet, and a road ditch culvert that outlet into the open ditch. 545-linear feet of 24-inch tile at 0.10% grade will be installed to connect the two remaining portions of Branch 1A open ditch. The 24-inch tile will be placed approximately 1-foot off the proposed open ditch bottom of Branch 1A open ditch to transport water between the two open ditch segments. The 24-inch tile provides a drainage coefficient of 0.78 in/day. The proposed tile alignment will be installed diagonally through the parcel to minimize the amount of tile installation and maximize the grade on the tile. The preliminary construction plans in Appendix A includes plan and profile designs for Improvement Option 2, and the Proposed Option 2 map in Appendix C displays the concept.

Improvement Option 2 will acquire the land (permanent damages) consisting of the proposed open ditch cross section and 16.5-foot buffers on each side of the open ditch for 1,725-feet of the currently private open ditch and the remaining 410-feet portion of open ditch south of the proposed filled open ditch. The portions of open ditch with land acquisition will become a part of the legal CD 10 system. No land acquisition will take place where the ditch is proposed to be filled. Estimated permanent damages for land acquisition for open ditch and buffer areas consists of 4.59-acres. Temporary damages include areas and crops disturbed from construction traffic and for placement of spoils from open ditch cleaning and side slope flattening and is estimated to be 6.28-acres for Improvement Option 2. Permanent and temporary damages will be paid to affected landowners after construction is completed outlining the actual damages ensued by construction. An estimated damage summary for Option 2 is outlined in Appendix H.

IMPROVEMENT OPTION 3

For Improvement Option 3, Branch 1A open ditch would only be cleaned from the outlet of Branch 1A for 1,725-feet continuing upstream. The open ditch will be cleaned to a 4-foot bottom width at 0.05% grade. The remaining upstream portion of Branch 1A open ditch will not be filled, cleaned, or become a part of the legal CD 10 system (Stations 34+60 to 46+00). A 24-inch drop intake would be installed at most upstream portion of Branch 1A. The intake would primarily take water from the road ditch and its associated watershed to the south. A 24-inch tile would connect the drop intake to the open ditch. The tile will be the primary route of water south of the open ditch and reduce erosion flows through portion of tile with existing bank instabilities and sloughing issues. The tile installation consists of 860-linear feet of 24-inch tile at 0.10% grade. The 24-inch tile provides a drainage coefficient of 0.78 in/day. The proposed tile alignment will be installed diagonally through two landowners' parcels to minimize the amount of tile installation and maximize the grade on the tile. The preliminary construction plans in Appendix A includes plan and profile designs for Improvement Option 3, and the Proposed Option 3 map in Appendix C displays the concept.

Improvement Option 3 will acquire the land (permanent damages) consisting of the proposed open ditch cross section and 16.5-foot buffers on each side of the open ditch for 1,725-feet of the currently private open ditch and become a part of the legal CD 10 system. The remaining 1,050-feet of the open ditch will remain private open ditch. Estimated permanent damages for land acquisition for open ditch and buffer areas consists of 3.85-acres. Temporary damages include areas and crops disturbed from construction traffic and for placement of spoils from open ditch cleaning and side slope flattening and is estimated to be 5.91-acres for Improvement Option 3. Permanent and temporary damages will be paid to affected landowners after construction is completed outlining the actual damages ensued by construction. An estimated damage summary for Option 3 is outlined in Appendix H.

PRELIMINARY COST ESTIMATES

Separable Maintenance

When proposing to do an improvement and a separable portion of a larger system needs repair, the drainage statute, Section 103E.215, Subd. 6, allows the separation of the cost of repair from the cost of the improvement project. Separable maintenance can be applied to the portions of the existing system that will be replaced or improved by the proposed project. For the CD 10 improvement project, separable maintenance applies to the Branch 1 tile, as this portion of the system is still public and can be repaired to restore the drainage function that the private open ditch is providing. Detailed cost estimates of the potential repair and potential improvement costs have been included in Appendix F which is summarized below in Table 3.

Other Project Related Costs

All drainage projects have indirect costs that must be accounted for in project cost estimates and used in cost benefit analyses. They include costs related to drainage authority administration; topographic survey; reports, plans and specifications; and construction staking and administration.

Cost Estimates

The Table 3 summarizes the estimated cost for repair and each improvement option. Detailed cost estimates of the repair and improvement options have been included in Appendix F.

TABLE 3: COST ESTIMATE SUMMARY

Area	Repair Cost	Improvement Cost	Net Cost	Viewers Benefits	Net Benefit
BRANCH 1 TILE	\$ 157,242	N/A	N/A	N/A	N/A
IMPROVEMENT OPTION 1	\$ -	\$ 188,045	\$ 30,803	\$ 75,000	\$ 44,197
IMPROVEMENT OPTION 2	\$ -	\$ 199,626	\$ 42,384	\$ 75,000	\$ 32,616
IMPROVEMENT OPTION 3	\$ -	\$ 181,640	\$ 24,397	\$ 75,000	\$ 50,603

Preliminary estimated construction cost for Faribault CD 10 improvement by additional lateral is approximately \$188,045 for Improvement Option 1, \$199,626 for Improvement Option 2, and \$181,640 for Improvement Option 3.

The total separable maintenance cost for Branch 1 tile is estimated at \$157,242. The net cost is \$30,803 for Improvement Option 1, \$42,384 for Improvement Option 2, and \$24,397 for Improvement Option 3. Given the size of the improvement, the amount of watershed benefitted, and the net cost when considering separable maintenance, the engineering finds all improvement options practical and feasible.

SUMMARY OF FINDINGS, CONCLUSIONS + RECOMMENDATIONS

The currently private Branch 1A open ditch conveys water from the Branch 1 tile and serves as an outlet for the public Lateral A tile. The open ditch was constructed during the 1940's and has limited maintenance since its construction. Branch 1A open ditch has sedimentation, sloughing, vegetation growths, straight pipe side inlets that promote erosion, and unprotected private tile outlets.

The improvement by addition of a lateral includes acquiring Branch 1A open ditch into the CD 10 system to replace and abandon the Branch 1 tile. The improvement project includes acquiring the land for the open ditch and buffer areas, cleaning of open ditch, slough repairs, side slope flattening for bank stability, tile outlet repairs, installation of ASIs, a field crossing culvert replacement, seeding, and erosion control. Three improvement options have been presented and a project alternative to repair Branch 1 tile. Improvement Option 1 maintains the open ditch while Improvement Option 2 and 3 fill a portion of the ditch that is in poor condition and replaces it with conveyance through a tile. The existing and proposed conditions have been modeled and show minor changes in peak flow rates for all improvement options. When separable maintenance is considered, all improvement options are practical and feasible as determined by the viewers with \$75,000 of benefits provided by the improvement.

In accordance with Section 103E.285. 1: Whereas the engineer has determined the proposed drainage project is necessary and feasible with reference to the environmental, land use, and multipurpose water management criteria in section 103E.015, Subd. 1, and whereas the engineer has determined the project to be of Public Utility, Benefit or Welfare, and whereas the engineer has determined that the proposed drainage project does not substantially affect Public Waters, and whereas the engineer has created construction plans and provided tile specifications, and whereas the engineer has provided construction cost estimates, and whereas the engineer has found the project to be cost effective related to system benefits, and whereas the engineer has responded to the DNR's Preliminary Engineers Report Advisory Review and questions and comments not responded to at the Preliminary Hearing, therefore the engineer recommends the proposed project to the Faribault County Drainage Authority for final approval. The engineer recommends improvement Option 1 to maintain the conveyance that has historically been provided to the watershed.

PRELIMINARY PLANS

Since the engineer finds the proposed drainage project in the petition is feasible and complies with the environmental, land use, and multipurpose water management criteria in section 103E.015, Subdivision 1, the engineer has in accordance with Section 103E.245, Subd. 4 included a set of preliminary plans of the drainage project in Appendix A. They are preliminary plans and are unsigned at this time as signed final construction plans for bidding are not required by law at this time.

Appendix A: Preliminary Plans

ISG PROJECT # 14-16609



OF 19

GENERAL PROJECT NOTES:

1. DURING CONSTRUCTION, CONTRACTOR SHALL MAINTAIN A DRAINAGE OUTLET FOR THE ENTIRE CD 10 PROJECT AREA.
2. ALL PIPE DIMENSIONS REFERENCED IN THE PLANS REFER TO THE INSIDE DIAMETER.
3. ALL ROAD SIGNAGE, COORDINATION, AND TRAFFIC CONTROL SIGNAGE SHALL BE INCIDENTAL TO ROAD RESTORATIONS.
4. ALL DEWATERING FOR THE PROJECT IS INCIDENTAL.
5. PRODUCT MATERIAL SHLL BE AS SPECIFIED IN THE PLANS. IF NO SPECIFIC MATERIAL IS CALLED OUT, MATERIAL SHALL CONFORM TO THE APPROVED PRODUCT LIST IN THE SPECIFICATIONS.
6. ALL EFFORTS SHALL BE MADE DURING CONSTRUCTION TO SEPARATE SOIL TYPES. BACKFILL SHALL BE COMPACTED PRIOR TO PLACEMENT OF TOPSOIL, EXCEPT THE TOP TWO (2) FEET, FOR WHICH COMPACTION SHALL BE MINIMIZED TO THE EXTENT POSSIBLE. TOPSOIL SHALL BE PLACED TO A MINIMUM DEPTH OF 18", OR UNIFORM TO THE TOPSOIL DEPTH OF THE SURROUNDING AREA. EXCAVATED SPOILS SHALL BE SPREAD EVENLY IN CONSTRUCTION AREA AS TO NOT IMPEDE DRAINAGE. ALL EFFORTS SHALL BE MADE TO KEEP TOPSOIL ON TOP AND SEPARATED. NO TOPSOIL SHALL BE PLACED IN THE TRENCH BELOW 2' FROM EXISTING GROUND UNLESS APPROVED BY THE ENGINEER.
7. TOPSOIL IS ASSUMED TO BE APPROXIMATELY ONE (1) FOOT IN DEPTH THROUGHOUT THE WATERSHED.
8. ALL SPOIL LEVELING, GRADING, AND RESTORATION OF DISTURBED AREAS SHALL BE IN ACCORDANCE TO THE CONTRACT DOCUMENTS AND SHALL BE INCIDENTAL TO THE WORK.
9. CONTRACTOR MUST NOTIFY ENGINEER OF ANY CULVERT SECTIONS DEEMED NOT SALVAGEABLE PRIOR TO REMOVAL AND SHALL BE ADDRESSED BEFORE CULVERT WORK IS DONE.
10. HEAVY VEGETATIVE CLEARING WITH TREE REMOVAL SHALL ONLY BE COMPLETED AS NECESSARY FOR SAFE CONSTRUCTION PRACTICES AND WITHIN THE ALLOWED CONSTRUCTION EASEMENT. TREE REMOVAL SHALL BE PAID FOR BY THE ACRE UNDER THE HEAVY VEGETATIVE CLEARING WITH TREE REMOVAL BID ITEM UNLESS THE INDIVIDUAL TREE IS CALLED OUT AS "REMOVE TREE."
11. TREES CALLED OUT AS "REMOVE TREE" SHALL BE PAID FOR BY EACH UNDER THE REMOVE TREE BID ITEM.
12. ALL UTILITIES SHOWN ON THE PLAN ARE APPROXIMATE. LOCATION, SIZE, AND ELEVATIONS ARE TO BE VERIFIED AS PART OF TILE INVESTIGATION, IN COORDINATION WITH THE UTILITY OWNER.
13. AGGREGATE SURFACE IS INCIDENTAL TO CROSSING OR ROAD RESTORATION.
14. RIPRAP QUANTITIES ARE ESTIMATED. ADDITIONAL QUANTITY MAY BE REQUIRED BY ENGINEER. ALL RIPRAP QUANTITIES SHALL BE PAID BY CY INSTALLED, UNLESS RIPRAP IS INCIDENTAL TO A SEPARATE PAY ITEM.

UTILITY NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY LEVEL C. THUS UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CIASCE 38-02, ENTITLED :STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA.
2. THE CONTRACTOR IS RESPONSIBLE FOR ALL GOPHER ONE CALLS FOR UTILITY LOCATIONS.

GENERAL TILE INSTALLATION NOTES:

1. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITY TO WITHIN A 100-FOOT WIDE SWATH ALONG PROPOSED TILE ALIGNMENTS FOR 24" TILE OR LESS, AND A 150-FOOT SWATH ALONG PROPOSED TILE ALIGNMENTS FOR TILES LARGER THAN 24". THE SWATH NEED NOT BE CENTERED ON THE PROPOSED TILE ALIGNMENT. ALL ACCESS ROADS SHOULD FOLLOW THE PROPOSED ALIGNMENTS. THE SWATH SHALL NOT DISTURB ANY NON-AGRICULTURAL PRIVATE PROPERTY. DISTURBANCE THROUGH ROAD CROSSINGS, ROAD DITCHES, AND GRASS BUFFERS SHALL BE LIMITED TO THE WIDTH OF A TRENCH NECESSARY FOR SAFE CONSTRUCTION PRACTICES, AND MUST BE RE-SEEDDED WHERE NEEDED.
2. MISCELLANEOUS TREE CLEARING SHALL BE INCIDENTAL TO TILE INSTALLATION, UNLESS SPECIFIED IN THE PLANS.
3. ALL PIPE BEDDING AND ENCASEMENT IS INCIDENTAL TO STANDARD TILE INSTALLATION. REFER TO SPECIFICATIONS FOR DEFINITIONS. FOUNDATION MATERIAL SHALL BE USED IF UNSUITABLE OR UNSTABLE SOILS ARE PRESENT. THE USE OF FOUNDATION MATERIAL SHALL BE APPROVED BY THE ENGINEER BEFORE PLACEMENT.
4. UNLESS OTHERWISE NOTED, ALL HDPE BENDS AND FITTINGS SHALL BE INCIDENTAL TO THE TILE PAY ITEMS, MUST BE BANDED, WRAPPED IN FABRIC, AND SURROUNDED WITH CRUSHED ROCK.
5. ALL TILE ENDS MUST BE CAPPED TO NOT TAKE SEDIMENT UNLESS ANOTHER TILE (PRIVATE OR PUBLIC) IS CONNECTED INTO THE PROPOSED TILE. CAPPING SHALL BE INCIDENTAL TO TILE INSTALLATION.
6. ALL BENDS MUST BE CONSTRUCTED AS PRE-FABRICATED BENDS. ANY BENDS LARGER THAN 45" MUST BE CONSTRUCTED WITH MULTIPLE BENDS WITH AT LEAST 10 FEET IN BETWEEN EACH BEND.
7. UNLESS SPECIFICALLY NOTED, HDPE AND RCP WILL BE THE ONLY ACCEPTABLE MATERIALS FOR ALL PROPOSED BURIED TILE. REFER TO SPECIFICATIONS FOR PROPER INSTALLATION REQUIREMENTS.
8. VERIFY EXISTING TILE LOCATIONS AND ELEVATIONS PRIOR TO CONSTRUCTION, PAID FOR AS TILE INVESTIGATION. ANY ALIGNMENT CHANGES MADE DUE TO TILE INVESTIGATION SHALL BE APPROVED BY THE ENGINEER DURING CONSTRUCTION. ALL EFFORTS WILL BE MADE TO UTILIZE THE SAME FITTINGS AS DESIGNED AND CONTRACTOR SHALL BE COMPENSATED FOR ADDITIONAL BENDS AND FITTINGS, IF NEEDED.
9. DROP INTAKES WILL BE PAID FOR BY EACH AND NO ADDITIONAL COMPENSATION WILL BE MADE FOR IN-FIELD ELEVATIONS THAT VARY FROM THE PLANS. MINOR SHAPING AROUND DROP INTAKES AND CULVERT INLETS SHALL BE INCIDENTAL TO THEIR RESPECTIVE PAY ITEMS.
10. DROP INTAKES THAT ARE NOT INTENDED TO TAKE SURFACE FLOW MAY BE CAPPED, AS DETERMINED BY THE ENGINEER. INTAKES MAY BE CUT DOWN AND BURIED AFTER FINAL TELEVISING, PER LANDOWNER REQUEST, AND WILL BE PAID FOR AS "CAP DROP INTAKE".
11. DROP INTAKES THAT ARE DESIGNED TO BE ON PROPERTY LINES SHALL BE ADJUSTED IN THE FIELD TO MATCH ACTUAL LOCATION OF PROPERTY LINE.
12. AT CROSSINGS OF EXISTING TILE, ONLY THE UPSTREAM SIDE NEED BE CONNECTED, UNLESS OTHERWISE DEEMED NECESSARY. EACH CROSSING WILL BE PAID FOR AS ONE CONNECTION. ALL BENDS, TEES, CONNECTING TILE, AND OTHER FITTINGS NECESSARY FOR CONNECTION SHALL BE INCIDENTAL TO CONNECTION BID ITEM.
13. ALL TILE CONNECTIONS MUST BE CONNECTED ON THE SIDE OF THE RECEIVING PIPE. TILE CONNECTIONS CANNOT BE MADE COMPLETELY VERTICAL TO PIPE.
14. EXISTING BRANCH CONNECTIONS SHALL BE CONSTRUCTED ONE SIZE LARGER THAN THE EXISTING SIZE, UNLESS OTHERWISE SPECIFIED, WITH DUAL WALL HDPE AND APPROPRIATE FITTINGS, (SINGLE WALL PE TILE WILL NOT BE ALLOWED)
15. ALL PRIVATE TILE CONNECTIONS SHALL BE CONSTRUCTED WITH INSERT-A-TEE CONNECTIONS OR APPROVED EQUAL, WHERE POSSIBLE. CONNECTING TILE SHALL MATCH EXISTING SIZE AND SLOPE. (PE TILE WILL BE ALLOWED FOR PRIVATE TILE CONNECTIONS ONLY)
14. MAJOR UTILITY CROSSING IS ONLY APPLICABLE TO RURAL WATER LINES UNLESS OTHERWISE APPROVED BY THE ENGINEER PRIOR TO CROSSING. ALL OTHER UTILITY CROSSINGS ARE INCIDENTAL TO TILE INSTALLATION.

ALTERNATIVE SIDE INLET (ASI)								
Description			Bid Item			Bid Item		
ID	BRANCH (LOCATION)	STATION	INTAKE TYPE	RISER SIZE (in)	RISER DEPTH (LF)	OUTLET SIZE (in)	OUTLET LENGTH (LF)	OUTLET GRADE (%)
ASI-1	BRANCH 1A (N)	21+50	TRASH GRATE	12	6	12	30	2.00%
ASI-2	BRANCH 1A (N)	42+75	TRASH GRATE	12	8	12	30	2.00%

GENERAL OPEN DITCH NOTES:

1. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITY TO WITHIN A 33-FOOT WIDE AREA ALONG TOP OF DITCH ALIGNMENTS. DISTURBANCE THROUGH ROAD CROSSINGS, ROAD DITCHES, AND GRASS BUFFERS SHALL BE LIMITED TO THE TRENCH WIDTH NECESSARY FOR SAFE CONSTRUCTION PRACTICES.
2. A 16.5-FOOT GRASS STRIP SHALL BE ESTABLISHED IN AREAS THAT DO NOT HAVE AN EXISTING 16.5-FOOT GRASS STRIP. SEEDING SHALL OCCUR AFTER ALL WORK HAS BEEN COMPLETED IN THE AREA AND SHALL COMPLY WITH THE CONTRACT DOCUMENTS. THESE AREAS WILL BE DETERMINED BY THE ENGINEER.
3. DITCH CLEANING SHALL BE PERFORMED ON THE SIDE OF THE DITCH THAT IS THE LOWEST FOR THE GREATEST DISTANCE ALONG THE OPEN DITCH SEGMENT. DITCH CLEANING SPOILS SHALL BE PLACED WITHIN 16.5-FOOT WIDE GRASS STRIP FROM THE TOP OF DITCH SLOPE UNLESS OTHERWISE DETERMINED BY THE ENGINEER.
4. TOPSOIL IN TOPSOIL STRIP AREAS DESIGNATED ON THE PLANS SHALL BE STRIPPED PRIOR TO THE PLACEMENT OF FILL MATERIAL FROM DITCH EXCAVATION. TOPSOIL STRIP AREAS MAY ADJUST BASED ON ACTUAL TOPSOIL THICKNESS.
5. SHAPING AROUND SIDE INLETS, ASIS, ASIROS, AND CULVERT INLETS SHALL BE INCIDENTAL TO THEIR RESPECTIVE PAY ITEMS.
6. ALL EXISTING TILE OUTLETS INTO THE OPEN DITCH, INCLUDING ANY NOT SHOWN ON THE PLANS, SHALL BE REPAIRED. UNLESS SPECIFICALLY NOTED, HDPE OR PVC SHALL BE ACCEPTABLE MATERIAL FOR ALL TILE REPAIRS (SEE DETAILS).
7. EXISTING TILE OUTLETS MAY BE SALVAGED, REUSED, AND PROTECTED WITH RIPRAP IF THE OUTLET IS DETERMINED TO BE IN GOOD CONDITION BY THE ENGINEER. TILE REPAIR AT THESE LOCATIONS SHALL BE PAID FOR AS PAY ITEM "ARMOR TILE OUTLET" (SEE DETAILS).
8. MISCELLANEOUS TREE CLEARING SHALL BE INCIDENTAL TO DITCH CLEANING PAY ITEM(S), UNLESS SPECIFICALLY CALLED OUT IN THE PLANS.
9. TREE CLEARING AND HEAVY VEGETATION REMOVAL IS REQUIRED ON DITCH SIDE SLOPES AND WITHIN THE 1-ROD BUFFER AND WILL BE PAID FOR BY THE ACRE. APPROXIMATE LOCATIONS ARE INCLUDED ON THE MAP FOR REFERENCE. TREES SHALL BE CLEARED AND GRUBBED AND SPRAY THE AREA AROUND TREE AFTER COMPLETE.
10. ALL MISCELLANEOUS MATERIALS FOUND WITHIN THE DITCH ARE TO BE REMOVED AND DISPOSED OF OFF-SITE BY THE CONTRACTOR. THE REMOVAL AND DISPOSAL IS INCIDENTAL TO OPEN DITCH CLEANING.

GENERAL CULVERT NOTES:

1. ALL ROAD CROSSING REPAIRS SHALL BE CONSTRUCTED WITH CLASS III RCP ONLY, UNLESS OTHERWISE SPECIFIED ON PLANS OR APPROVED BY THE ENGINEER. TIE ALL PIPE SECTIONS UNDER ROAD CROSSINGS (INCIDENTAL).
2. CONTRACTOR MUST NOTIFY ENGINEER OF ANY CULVERT SECTIONS DEEMED NOT SALVAGEABLE PRIOR TO REMOVAL AND SHALL BE ADDRESSED BEFORE CULVERT WORK IS DONE.
3. OPEN DITCH CULVERTS MUST BE WATERTIGHT, GASKETED, AND TONGUE AND GROOVE DESIGN CONFORMING TO MNDOT 3006G.
4. AGGREGATE SURFACE IS INCIDENTAL TO CROSSING OR ROAD RESTORATION.
5. ENGINEER IN THE FIELD SHALL VERIFY PROPER POSITIONING OF THE CULVERT PRIOR TO COMMENCEMENT OF CONSTRUCTION. IF THE CULVERT POSITIONING IS NOT COMPATIBLE WITH THE STREAM WHEN STAKING IS COMPLETED, THE ENGINEER SHALL BE NOTIFIED.

OPTION #1:

Item No.	Item	Unit	Quantity
101	MOBILIZATION	LS	1
102	INSTALL 12-INCH ASI RISER ASSEMBLY W/TRASH GRATE	EA	2
103	INSTALL 12-INCH ASI OUTLET ASSEMBLY	EA	2
104	DITCH DEEPENING (4' WIDE DITCH BOTTOM)	LF	1796
105	DITCH WIDENING (4' WIDE DITCH BOTTOM)	LF	978
106	TOP SOIL STRIP & PLACE SPOILS	AC	1.6
107	SLOUGH REPAIR	LF	300
108	STRUCTURE REPLACEMENT SLOUGH REPAIR	LF	100
109	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2
110	15-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
111	12-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2
112	10-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
113	8-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
114	ARMOR TILE OUTET (RIPRAP & GEOTEXTILE FABRIC)	EA	3
115	30-INCH CLASS III RCP PIPE	LF	56
116	OPEN CUT & RESTORE FIELD CROSSING	EA	1
117	REMOVE EXISTING SIDE INTAKE	EA	2
118	REMOVE CMP CULVERT	EA	1
119	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	2.11
120	STANDARD SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH)	AC	1.28
121	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	175
122	BUFFER STRIP MOWING	AC	4.22
123	WEED SPRAYING	AC	5.50

OPTION #2:

Item No.	Item	Unit	Quantity
101	MOBILIZATION	LS	1
102	INSTALL 12-INCH ASI RISER ASSEMBLY W/TRASH GRATE	EA	2
103	INSTALL 12-INCH ASI OUTLET ASSEMBLY	EA	2
104	DITCH DEEPENING (4' WIDE DITCH BOTTOM)	LF	1156
105	DITCH WIDENING (4' WIDE DITCH BOTTOM)	LF	978
106	TOP SOIL STRIP & PLACE SPOILS	AC	0.5
107	SLOUGH REPAIR	LF	300
108	STRUCTURE REPLACEMENT SLOUGH REPAIR	LF	100
109	FILL EXISTING OPEN DITCH	CY	4480
110	24-INCH AGRICULTURAL TILE	LF	525
111	INSTALL DROP INTAKE (18-INCH)	EA	1
112	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	3
113	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	4
114	15-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
115	12-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2
116	10-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
117	8-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
118	ARMOR TILE OUTET (RIPRAP & GEOTEXTILE FABRIC)	EA	3
119	REMOVE EXISTING SIDE INTAKE	EA	1
120	REMOVE EXISTING SIDE INTAKE	EA	2
121	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	1.62
122	STANDARD SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH)	AC	0.98
123	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	145
124	BUFFER STRIP MOWING	AC	3.24
125	WEED SPRAYING	AC	4.22

OPTION #3:

Item No.	Item	Unit	Quantity
101	MOBILIZATION	LS	1
102	INSTALL 12-INCH ASI RISER ASSEMBLY W/TRASH GRATE	EA	1
103	INSTALL 12-INCH ASI OUTLET ASSEMBLY	EA	1
104	DITCH DEEPENING (4' WIDE DITCH BOTTOM)	LF	747
105	DITCH WIDENING (4' WIDE DITCH BOTTOM)	LF	978
106	TOP SOIL STRIP & PLACE SPOILS	AC	1.0
107	SLOUGH REPAIR	LF	300
108	STRUCTURE REPLACEMENT SLOUGH REPAIR	LF	100
109	24-INCH AGRICULTURAL TILE	LF	860
110	INSTALL DROP INTAKE (18-INCH)	EA	2
111	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	4
112	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	4
113	15-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
114	12-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2
115	10-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
116	8-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1
117	ARMOR TILE OUTET (RIPRAP & GEOTEXTILE FABRIC)	EA	3
118	REMOVE EXISTING SIDE INTAKE	EA	1
119	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	1.31
120	STANDARD SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH)	AC	0.80
121	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	145
122	BUFFER STRIP MOWING	AC	2.62
123	WEED SPRAYING	AC	3.42



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PROJECT

FARIBAUT COUNTY
COUNTY DITCH
No. 10 BRANCH 1A

BARBER TOWNSHIP MINNESOTA

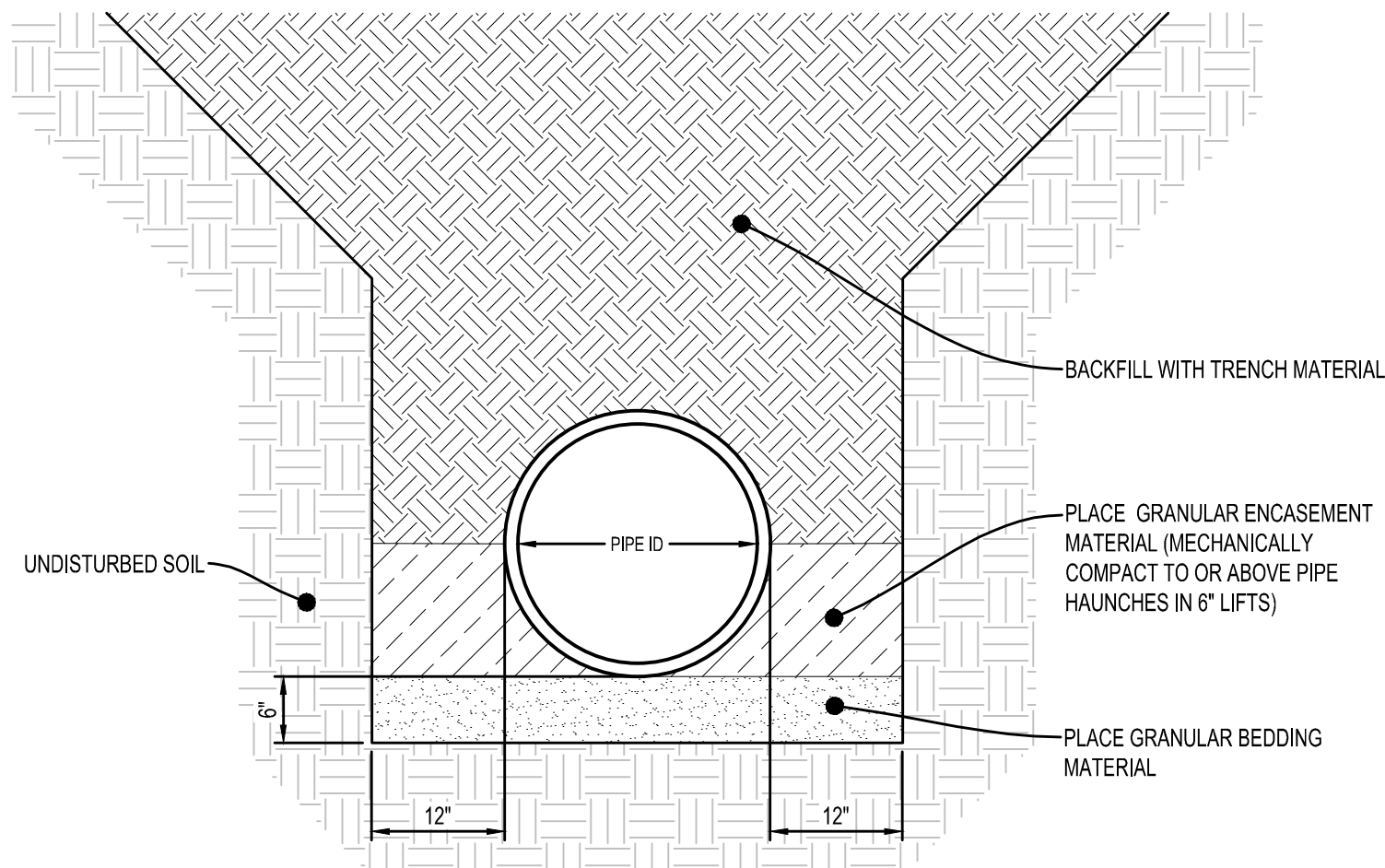
REVISION SCHEDULE		
DATE	DESCRIPTION	BY

PROJECT NO.	14-16609
FILE NAME	16609 NOTES-DETAILS
DRAWN BY	SMW, TLS
DESIGNED BY	BPG, TLS
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--
CLIENT PROJECT NO.	-

TITLE

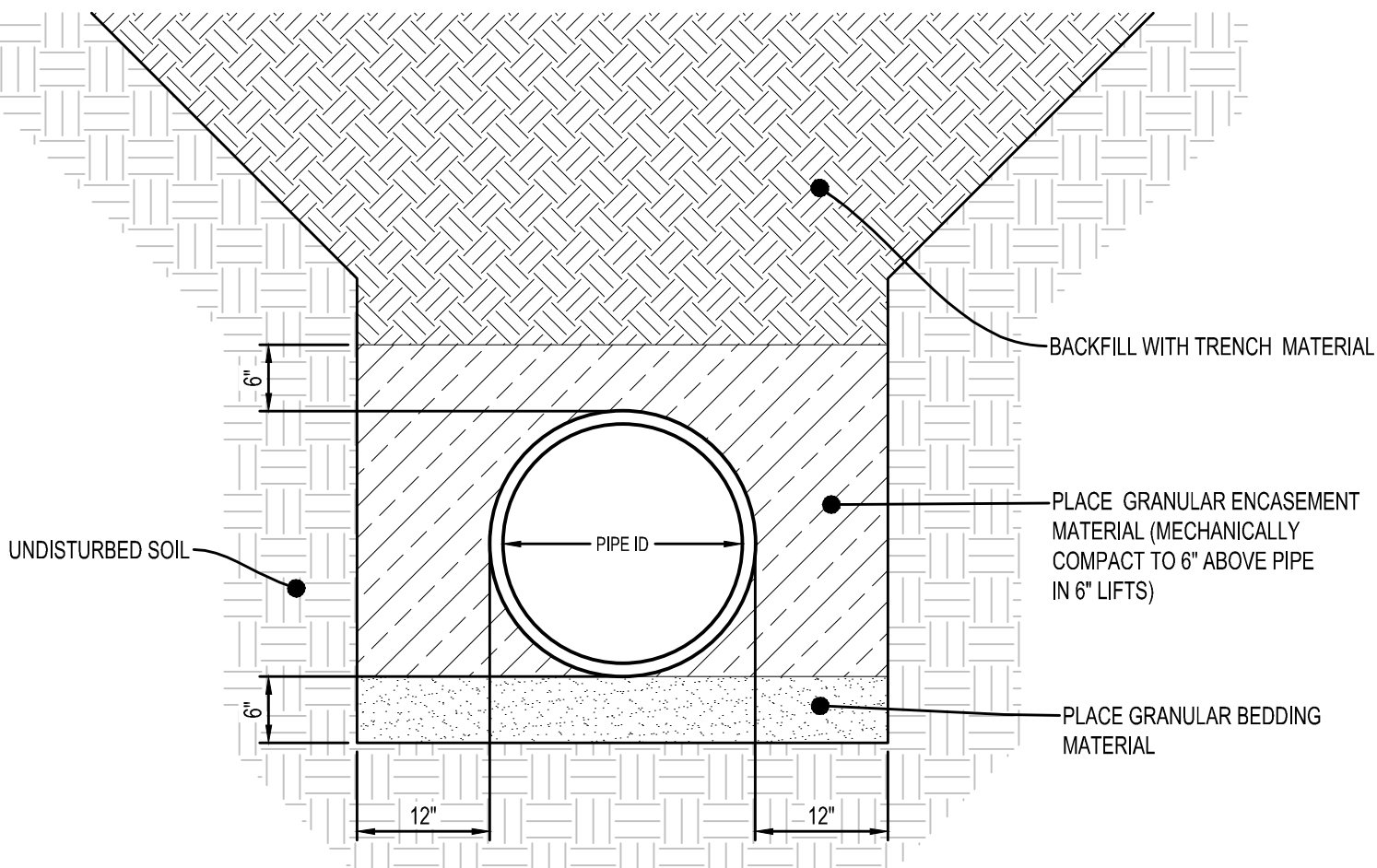
NOTES &
QUANTITIES

SHEET



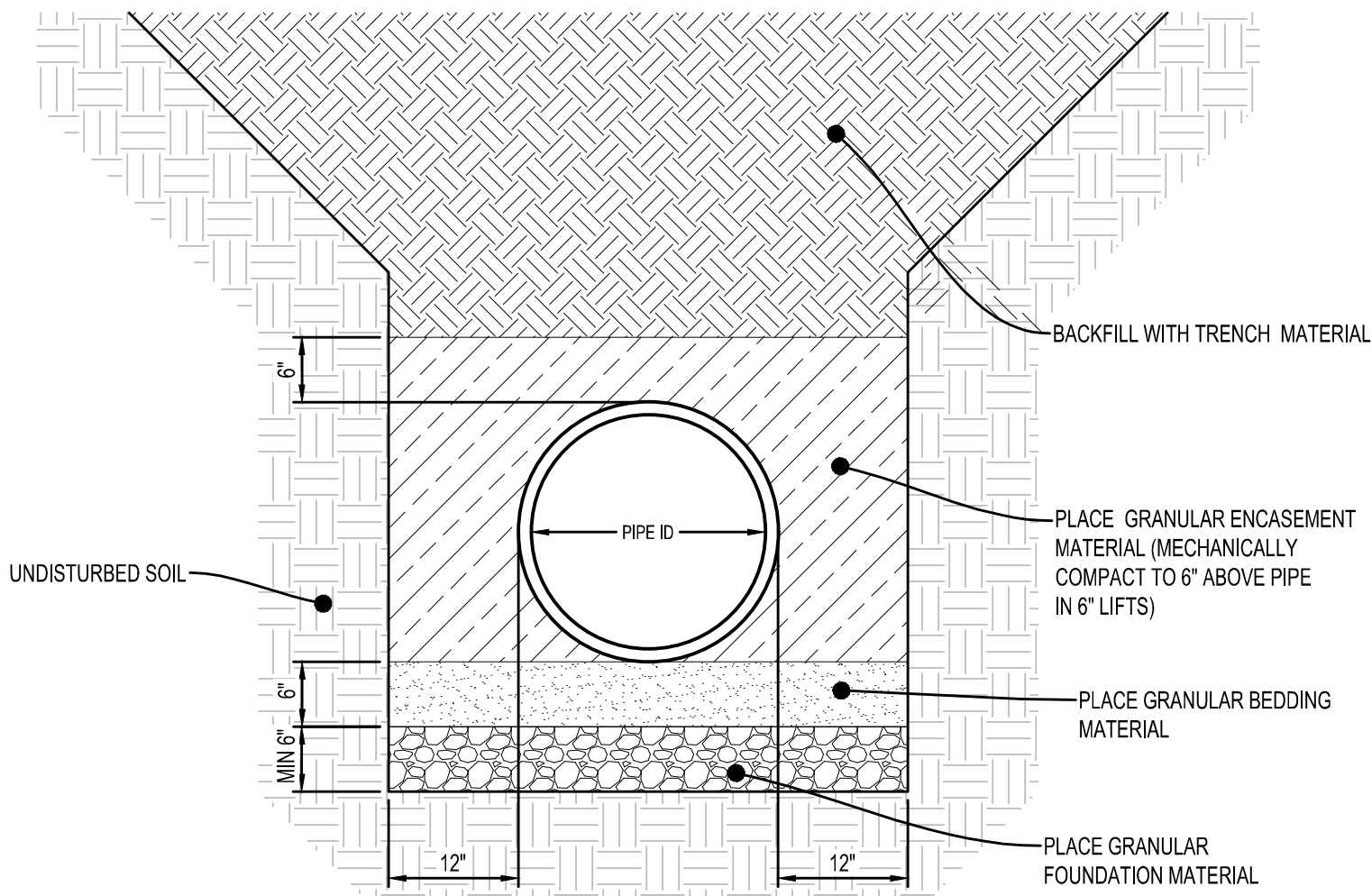
NOTE:
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**RCP FLAT BOTTOM
TRENCH BEDDING**
NTS AG100



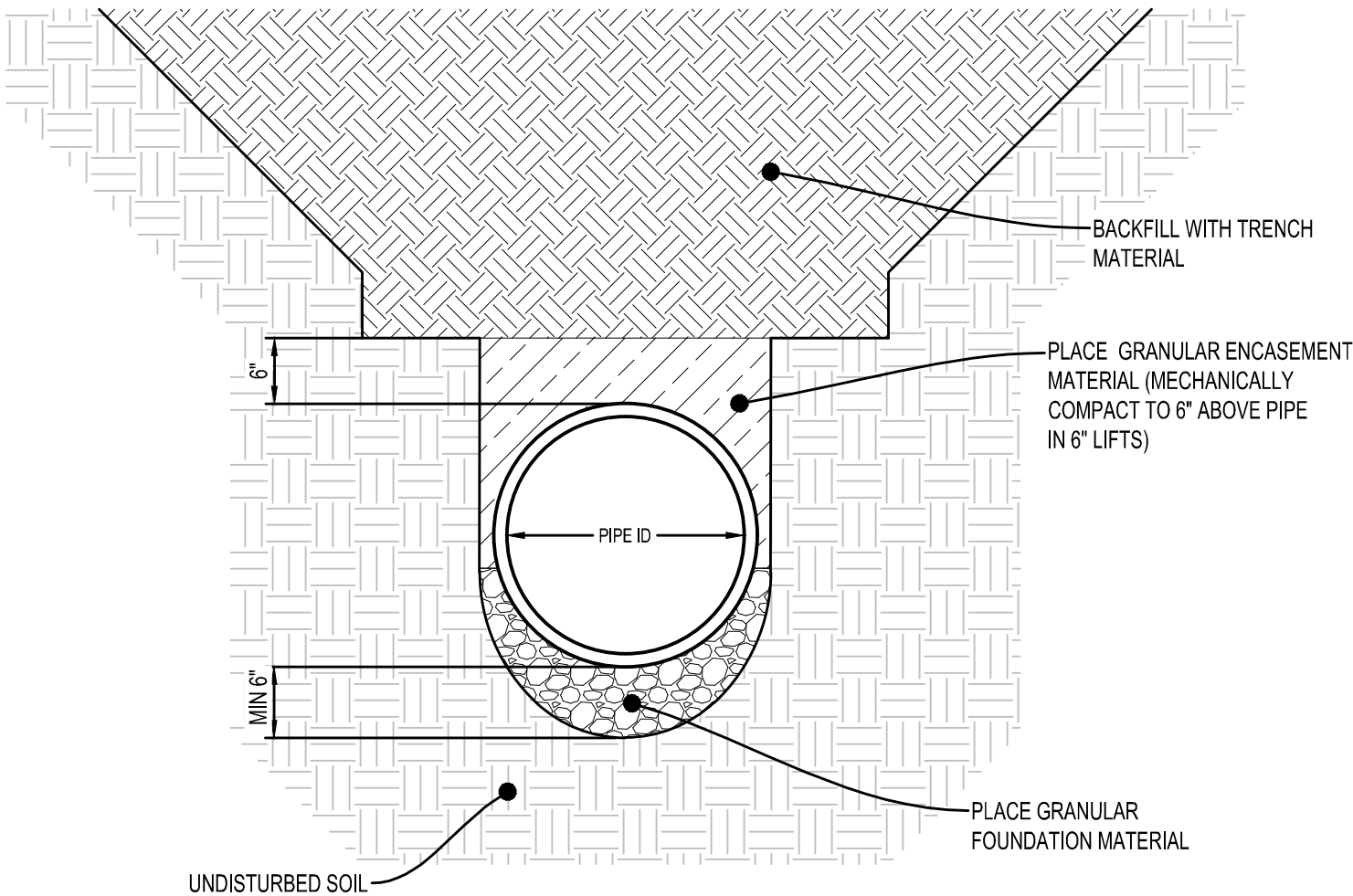
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**HDPE FLAT BOTTOM
TRENCH BEDDING**
NTS AG105



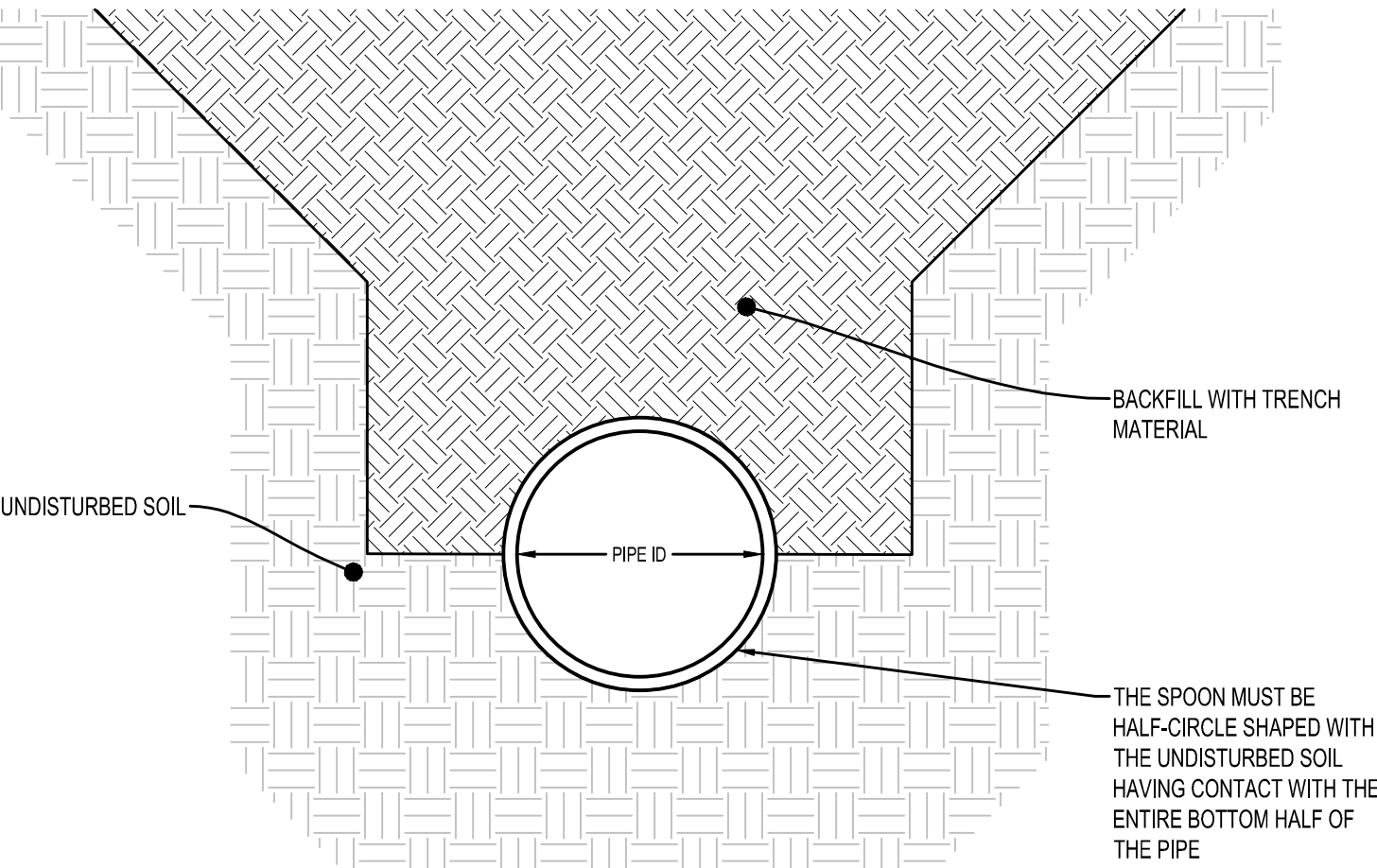
NOTES:
GRANULAR BEDDING, GRANULAR ENCASEMENT, AND BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.
GRANULAR FOUNDATION BELOW THE PIPE PAID FOR BY CUBIC YARD ONLY WHERE NEEDED AND APPROVED BY ENGINEER.

**HDPE FLAT BOTTOM TRENCH
WITH GRANULAR FOUNDATION**
NTS AG110



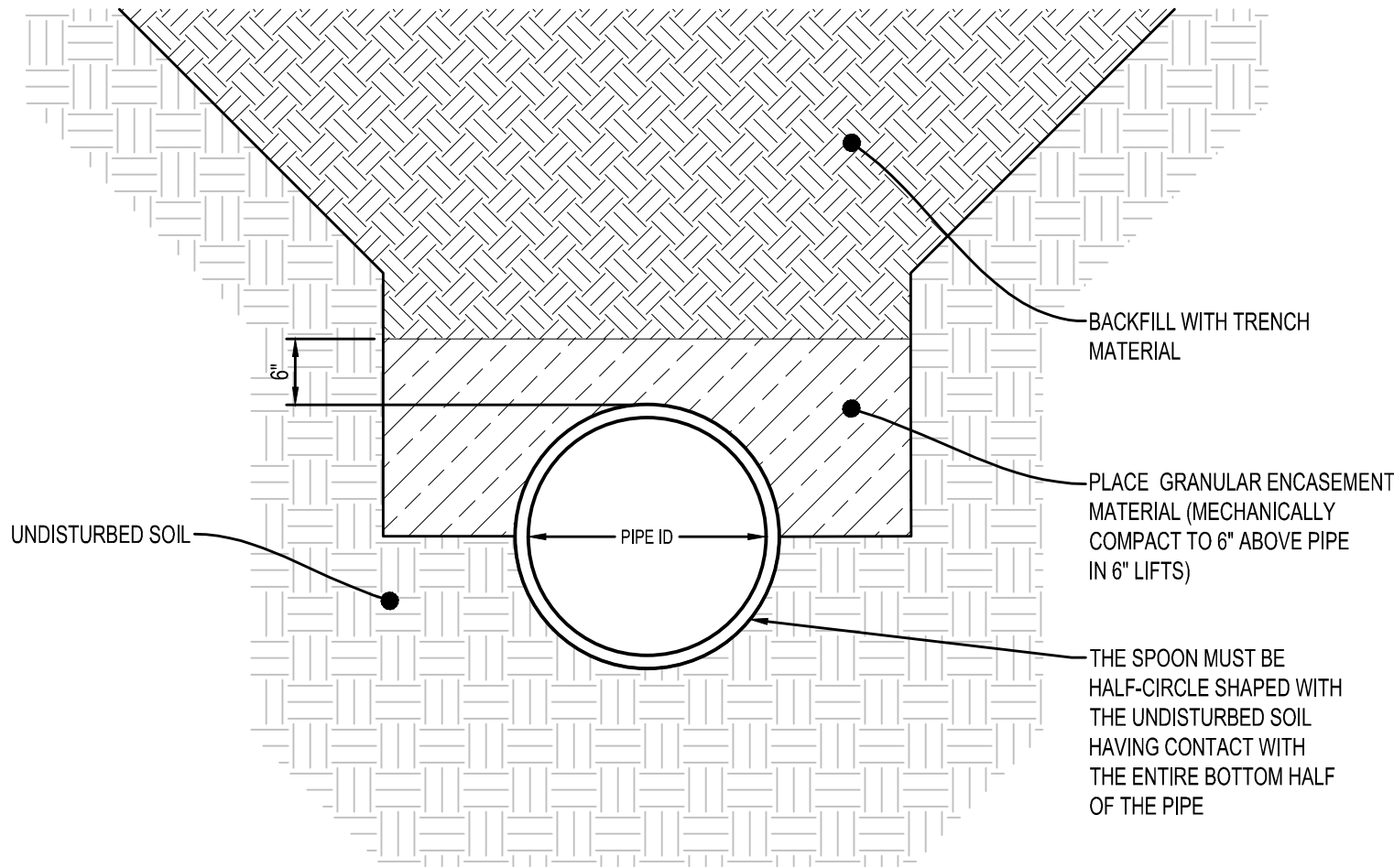
NOTES:
BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.
GRANULAR FOUNDATION BELOW THE PIPE PAID FOR BY CUBIC YARD ONLY WHERE NEEDED AND APPROVED BY ENGINEER.

**SPOON TRENCH
WITH GRANULAR FOUNDATION**
NTS AG115



NOTES:
BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.
SPOON DIMENSIONS SHALL COMPLY WITH PIPE MANUFACTURER SPECIFICATIONS.

**RCP SPOON
TRENCH BEDDING**
NTS AG120



NOTES:
GRANULAR ENCASEMENT AND BACKFILL SHALL BE INCIDENTAL TO CONSTRUCTION.
SPOON DIMENSIONS SHALL COMPLY WITH PIPE MANUFACTURER SPECIFICATIONS.

**HDPE SPOON
TRENCH BEDDING**
NTS AG125



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PROJECT

FARIBAUT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

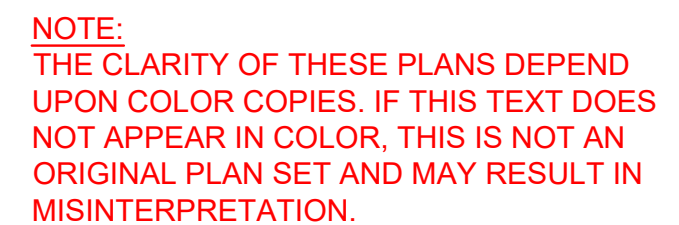
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DETAILS

4 OF 19



ALL TILE CONNECTIONS SHALL BE CONSTRUCTED WITH APPROPRIATE FITTINGS (INCIDENTAL TO CONNECTION).

ALL TILE CONNECTIONS SHALL NOT BE INSTALLED COMPLETELY VERTICAL FROM TOP OF PIPE.

NTS

AG200



AG220



ALL APPROPRIATE FITTINGS ARE INCIDENTAL TO INTAKE CONSTRUCTION.

ALL INTAKES SHALL BE CONNECTED TO SUBSURFACE TILE BY MEANS OF APPROPRIATE ELBOWS, TEES, OR CONNECTED BY APPROPRIATE FITTINGS.

ALL VERTICAL RISERS SHALL BE WRAPPED WITH MD60 TYPE 1 GEOTEXTILE FABRIC (INCIDENTAL TO EACH INTAKE)

VERTICAL RISERS MAY BE CUT DOWN AND BURIED AT 3' BELOW GRADE AFTER FINAL TELEVISION, PER LANDOWNER REQUEST. (SHALL BE PAID FOR AS "CAP DIRT INTAKE")

INTAKE CAPS SHALL BE SUBSTITUTED FOR TRASH GRATES IN AREAS THAT WILL NOT TAKE SURFACE FLOW, AS APPROVED BY THE ENGINEER.

NTS

AG320



STRIP ORGANIC MATERIAL BEFORE FILLING OPEN DITCH.
USE PIPE SPOILS & NEARBY OPEN DITCH SPOILS BEFORE HAULING IN FILL MATERIAL.
COMPACT BACKFILL MATERIAL IN 24" LIFTS.

NTS

AG430



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PROJECT

FARIBAUT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

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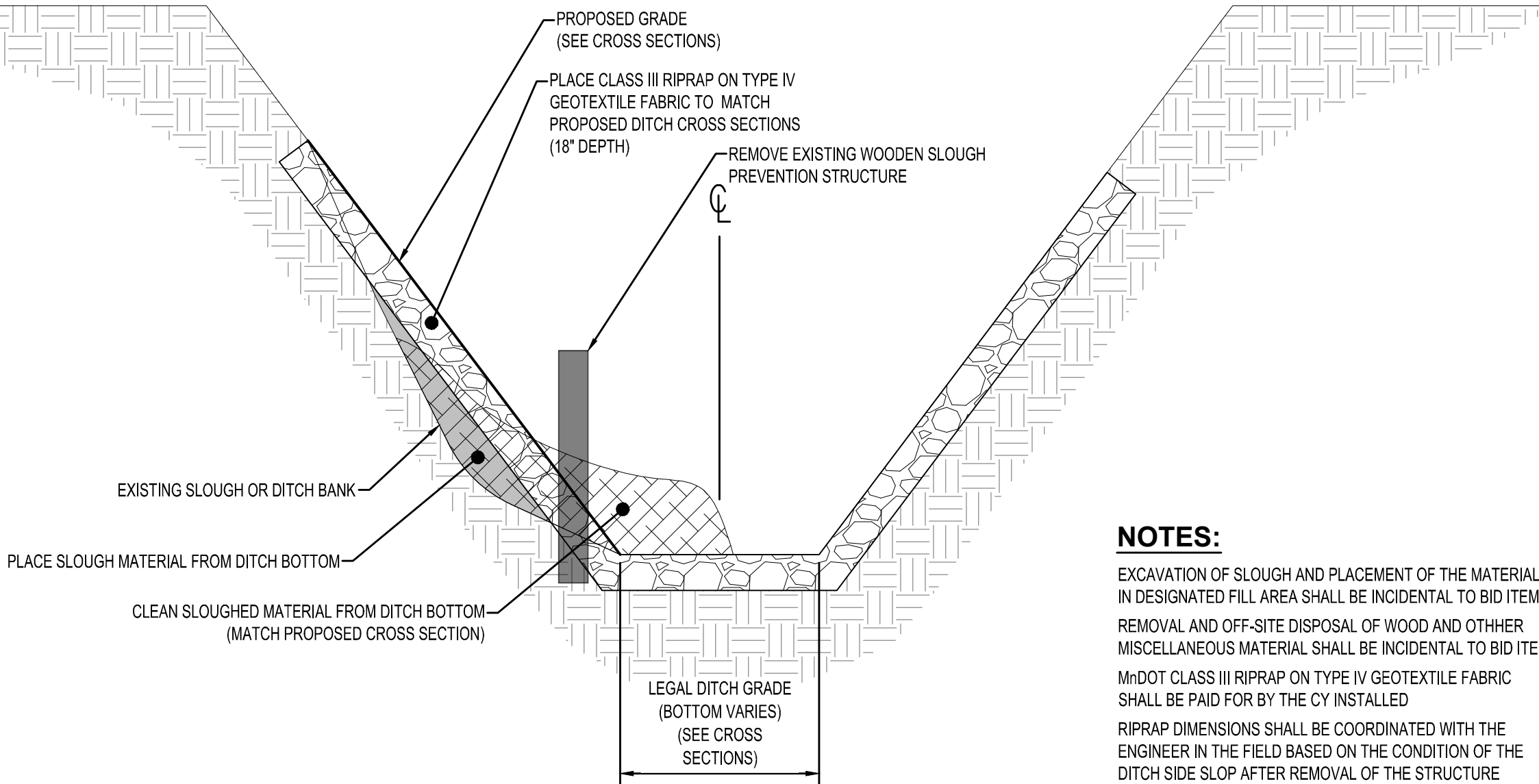
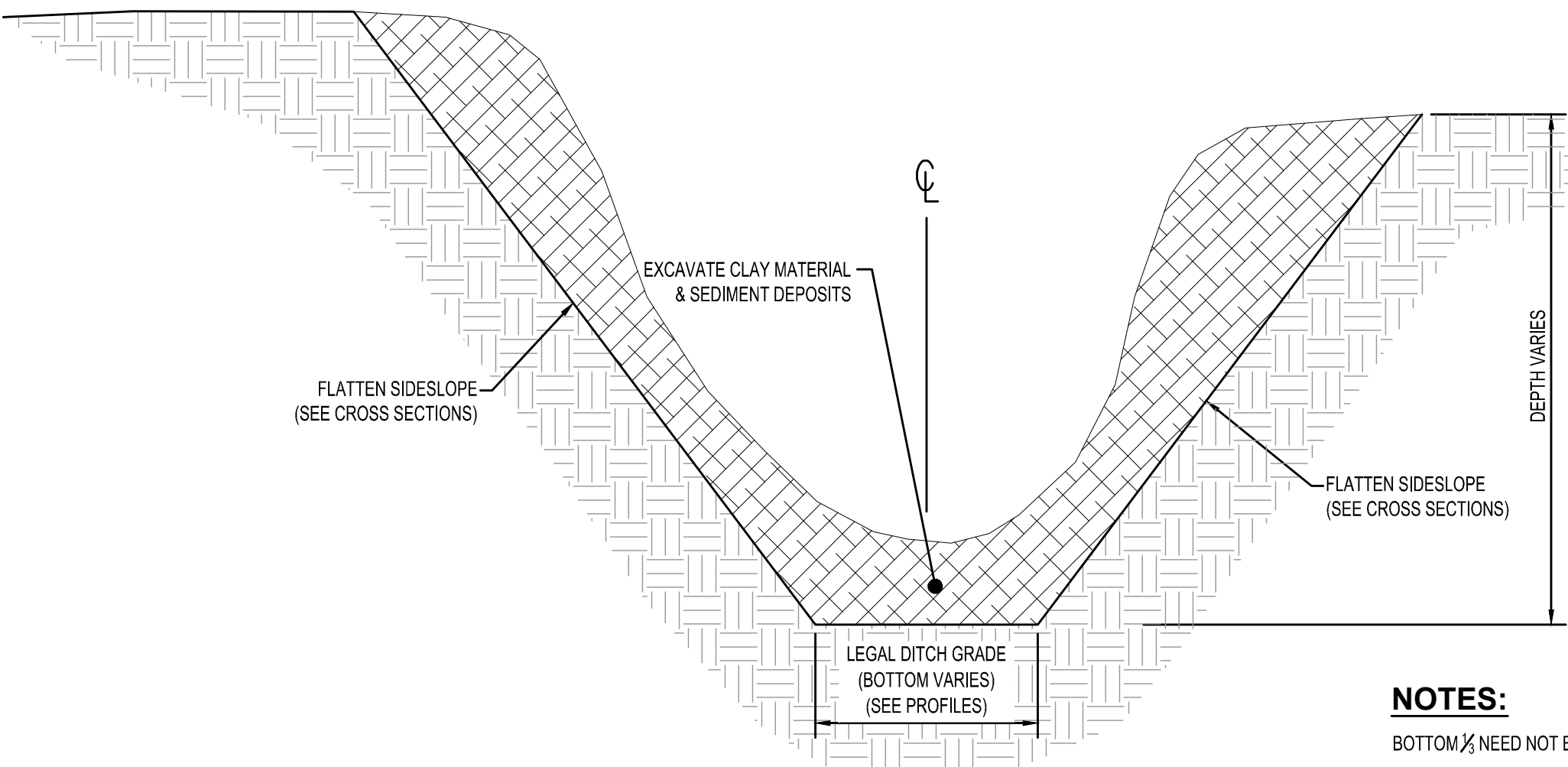
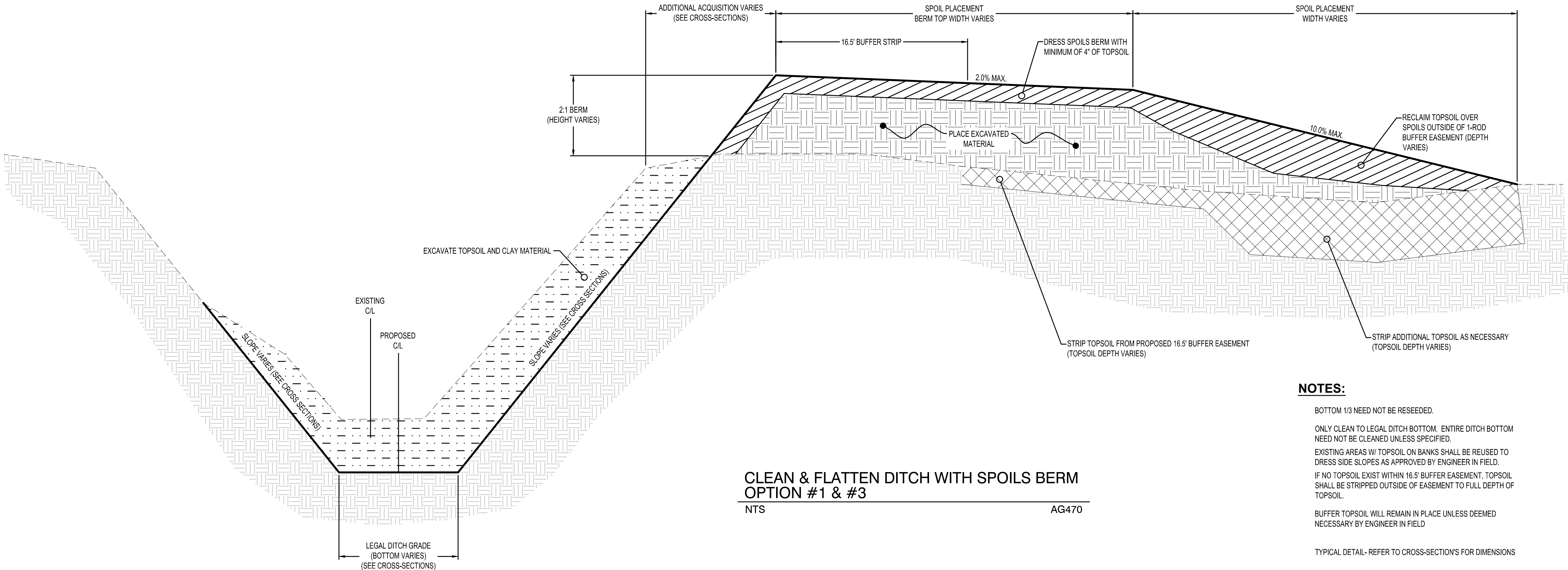
TITLE

DETAILS

SHEET

5

OF 19





NOTES:

INTAKE TYPE & TILE SIZE VARIES PER ASI. (SEE SCHEDULE)

RISER ASSEMBLY SHALL BE A SEPARATE PAY ITEM THAN THE OUTLET ASSEMBLY.

ALL DISTURBED AREAS WITHIN BUFFER EASEMENT SHALL BE SEEDDED WITH BUFFER BLEND SEED MIX ON CATEGORY III EROSION CONTROL BLANKET.

ALL EFFORTS SHALL BE MADE TO SEPARATE SOIL TYPES. BACKFILL SHALL BE COMPACTED PRIOR TO PLACEMENT OF TPOISOL, EXCEPT THE TOP TWO (2) FEET, FOR WHICH COMPACTION SHALL BE MINIMIZED TO THE EXTENT POSSIBLE. TPOISOL SHALL BE PLACED TO A MINIMUM DEPTH OF 6", OR UNIFORM TO THE TPOISOL DEPTH OF THE SURROUNDING AREA. ALL EFFORTS SHALL BE MADE TO KEEP TPOISOL ON TOP AND SEPARATED. NO TPOISOL SHALL BE PLACED IN THE TRENCH BELOW 2' FROM EXISTING GROUND UNLESS APPROVED BY THE ENGINEER.

ALL INTAKES SHALL BE WRAPPED WITH NON-WOVEN GEOTEXTILE FABRIC. (INCIDENTAL TO RISER ASSEMBLY)

ALL SLITS CUT INTO RISER ARE INCIDENTAL TO RISER ASSEMBLY.

ALL 3/4" CLEAN ROCK IS INCIDENTAL TO RISER ASSEMBLY.

ALL OUTLET RIPRAP IS INCIDENTAL TO OUTLET ASSEMBLY

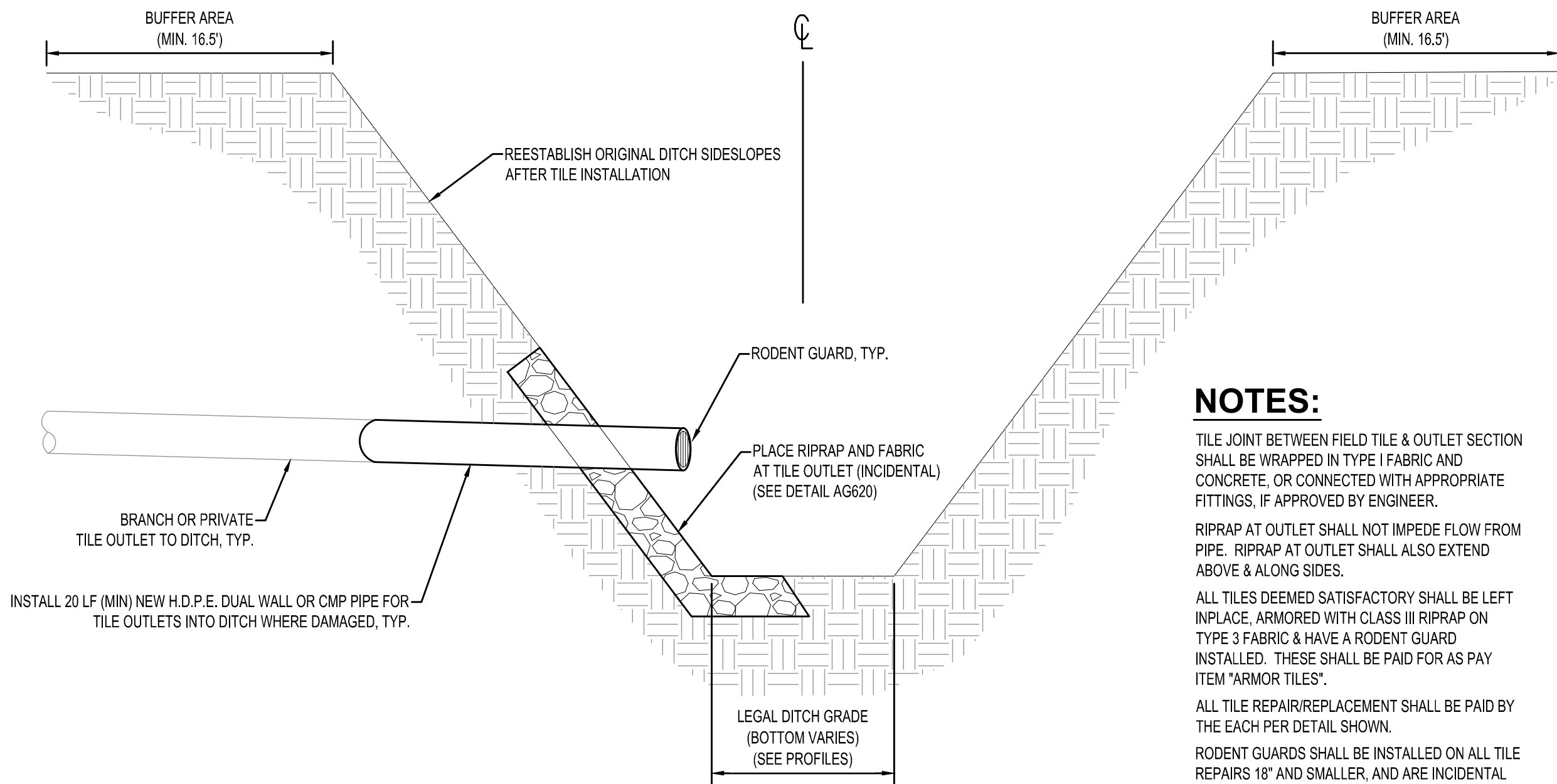
INTAKES SHALL BE FIELD ADJUSTED BASED ON ACTUAL LOCATION OF LOW AREAS, AS DETERMINED BY THE ENGINEER.

TILE OUTLET ASSEMBLY SHALL CONFORM TO STANDARD TILE INSTALLATION.

SHAPING OF LOW AREA TO GRADE TO DROP INTAKE SHALL BE INCIDENTAL TO PAY ITEM



NOTE: ALL TILE OUTLETS AND FIELD INTAKES SHALL BE REPAIRED OR PROTECTED



NOTES:

TILE JOINT BETWEEN FIELD TILE & OUTLET SECTION SHALL BE WRAPPED IN TYPE I FABRIC AND CONCRETE, OR CONNECTED WITH APPROPRIATE FITTINGS, IF APPROVED BY ENGINEER.

RIPRAP AT OUTLET SHALL NOT IMPEDE FLOW FROM PIPE. RIPRAP AT OUTLET SHALL ALSO EXTEND ABOVE & ALONG SIDES.

ALL TILES DEEMED SATISFACTORY SHALL BE LEFT IN PLACE. ARMORED WITH CLASS III RIPRAP ON TYPE 3 FABRIC & HAVE RODENT GUARD INSTALLED. THESE SHALL BE PAID FOR AS PAY ITEM "ARMOR TILES".

ALL TILE REPAIR/REPLACEMENT SHALL BE PAID BY THE EACH PER DETAIL SHOWN.

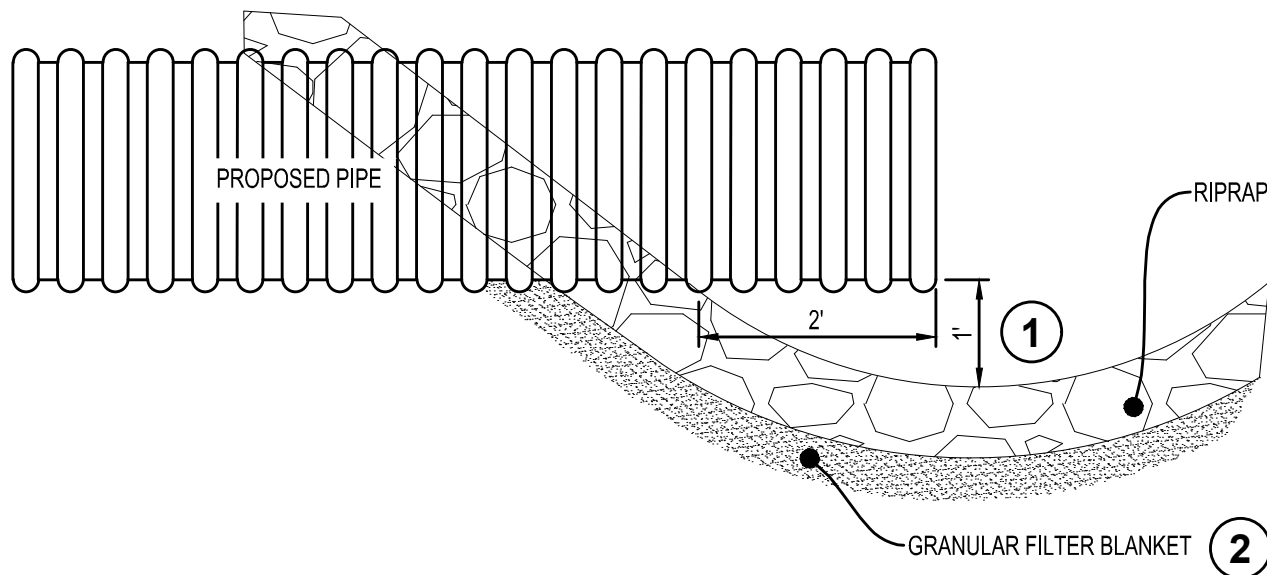
RODENT GUARDS SHALL BE INSTALLED ON ALL TILE REPAIRS 18" AND SMALLER, AND ARE INCIDENTAL TO THE PAY ITEM.

ALL FITTINGS TO CONNECT EXISTING TILE SHALL BE INCIDENTAL TO TILE OUTLET REPAIR.

TYPICAL TILE OUTLET REPAIR

NTS AG450

DIMENSIONS	
PIPE DIA	RIPRAP
12" TO 18"	4 CY CLASS III
21" TO 27"	8 CY CLASS III
30" TO 36"	12 CY CLASS III
42" TO 48"	16 CY CLASS III
54" & UP	20 CY CLASS IV



NOTES:

- ① 1' MIN. ABOVE RIPRAP. FOR PIPES GREATER THAN OR EQUAL TO 30", USE 1.5' - 2'.
② THE CONTRACTOR, AS AN OPTION, MAY SUBSTITUTE A GEOTEXTILE FABRIC, SPEC. 3601 FOR THE GRANULAR FILTER BLANKET. THE FABRIC SHOULD EXTEND BEYOND THE RIPRAP BY 3' IN ALL DIRECTIONS.
- FOR PIPES LESS THAN 18", INSTALL RODENT GUARD (INCIDENTAL TO TILE OUTLET)
- RIPRAP AT OUTLET SHALL NOT IMPEDE FLOW FROM PIPE, OR RECEIVING BODY. RIPRAP AT OUTLET SHALL ALSO EXTEND ABOVE AND ALONG SIDES OF PIPE.
- ADDITIONAL RIPRAP MAY BE NECESSARY BASED ON ELEVATIONS (PAID FOR BY CY)

RIPRAP AT TILE OUTLET

NTS AG620



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PROJECT

FARIBAULT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

[illegible]

PROJECT NO.	14-16609
FILE NAME	16609 NOTES-DETAILS
DRAWN BY	SMW, TLS
DESIGNED BY	BPG, TLS
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--/--

CLIENT PROJECT NO.

TITLE

DETAILS

SHEET



Legend

- Open Ditch
- Tile
- Private Open Ditch
- Watershed CD 10
- Parcels



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FARIBAUT COUNTY

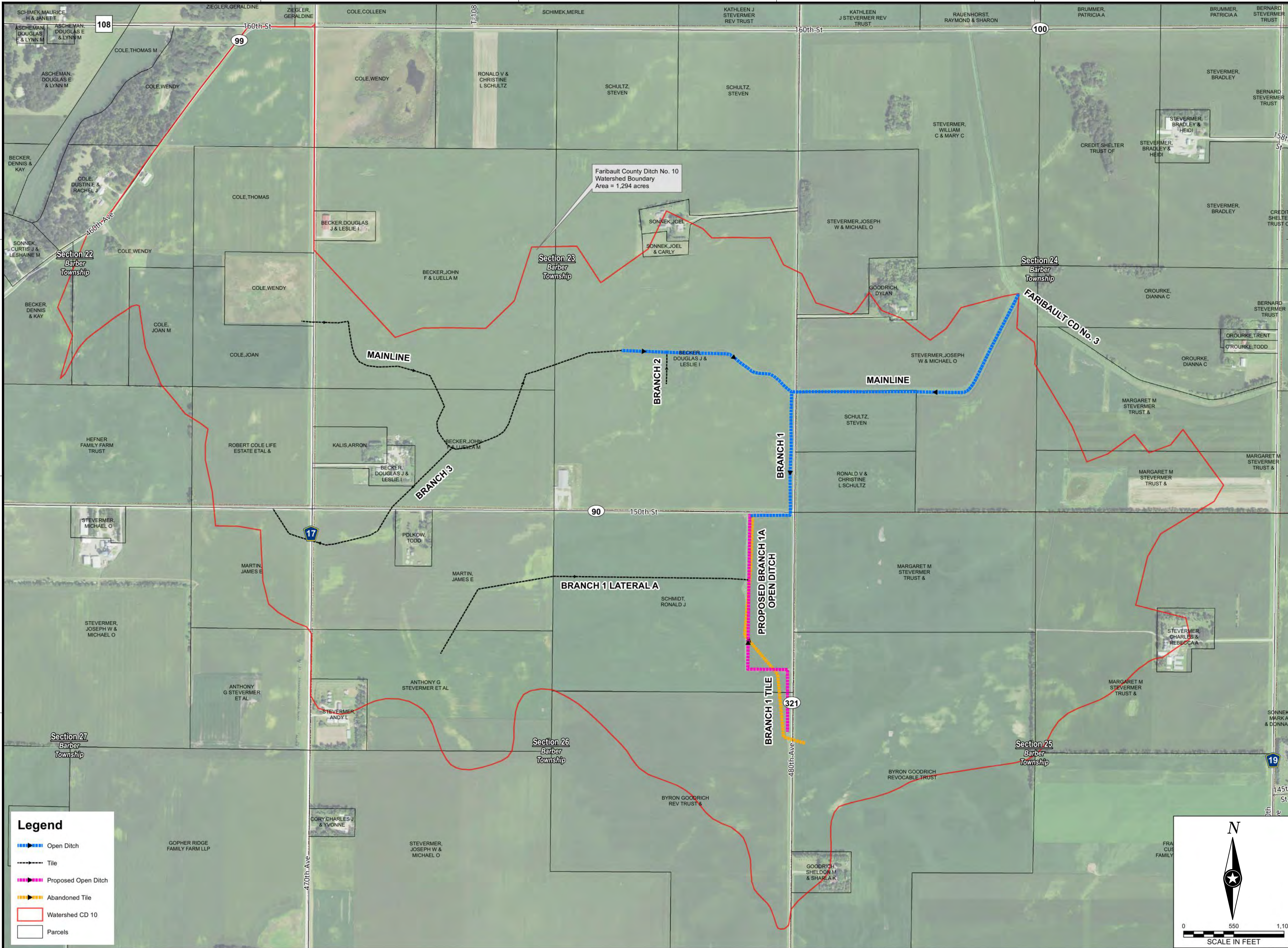
**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

REVISION SCHEDULE		
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CLIENT PROJECT NO.	

TITLE
**EXISTING
WATERSHED**



Legend

Open Ditch

Tile

Proposed Open Ditch

Abandoned Tile

Watershed CD 10

Parcels



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FARIBAULT COUNTY

COUNTY DITCH
No. 10 BRANCH 1A

BARBER TOWNSHIP MINNESOTA

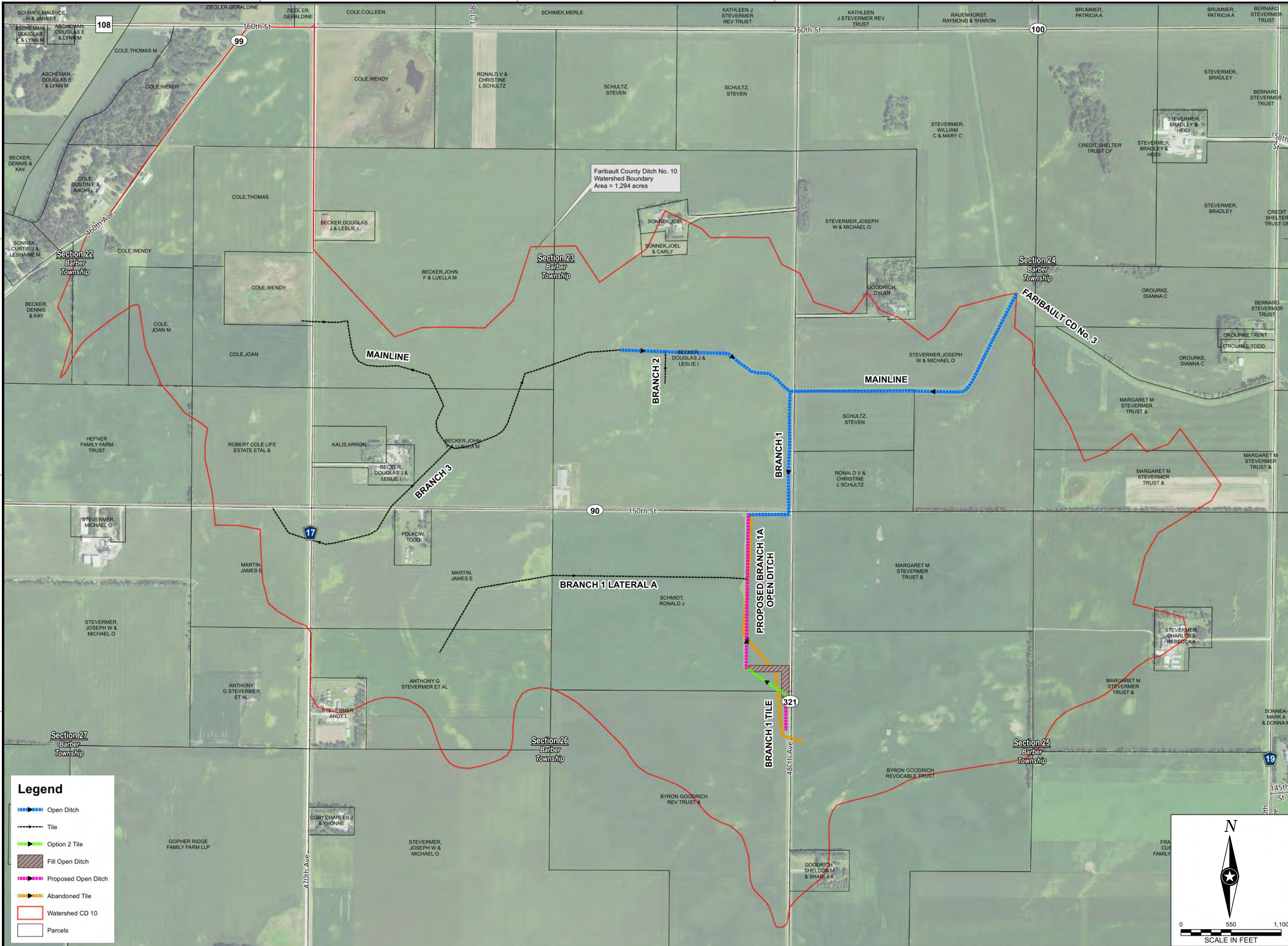
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TITLE

**PROPOSED
WATERSHED
(OPTION #1)**

SHEET



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FARIBAUT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

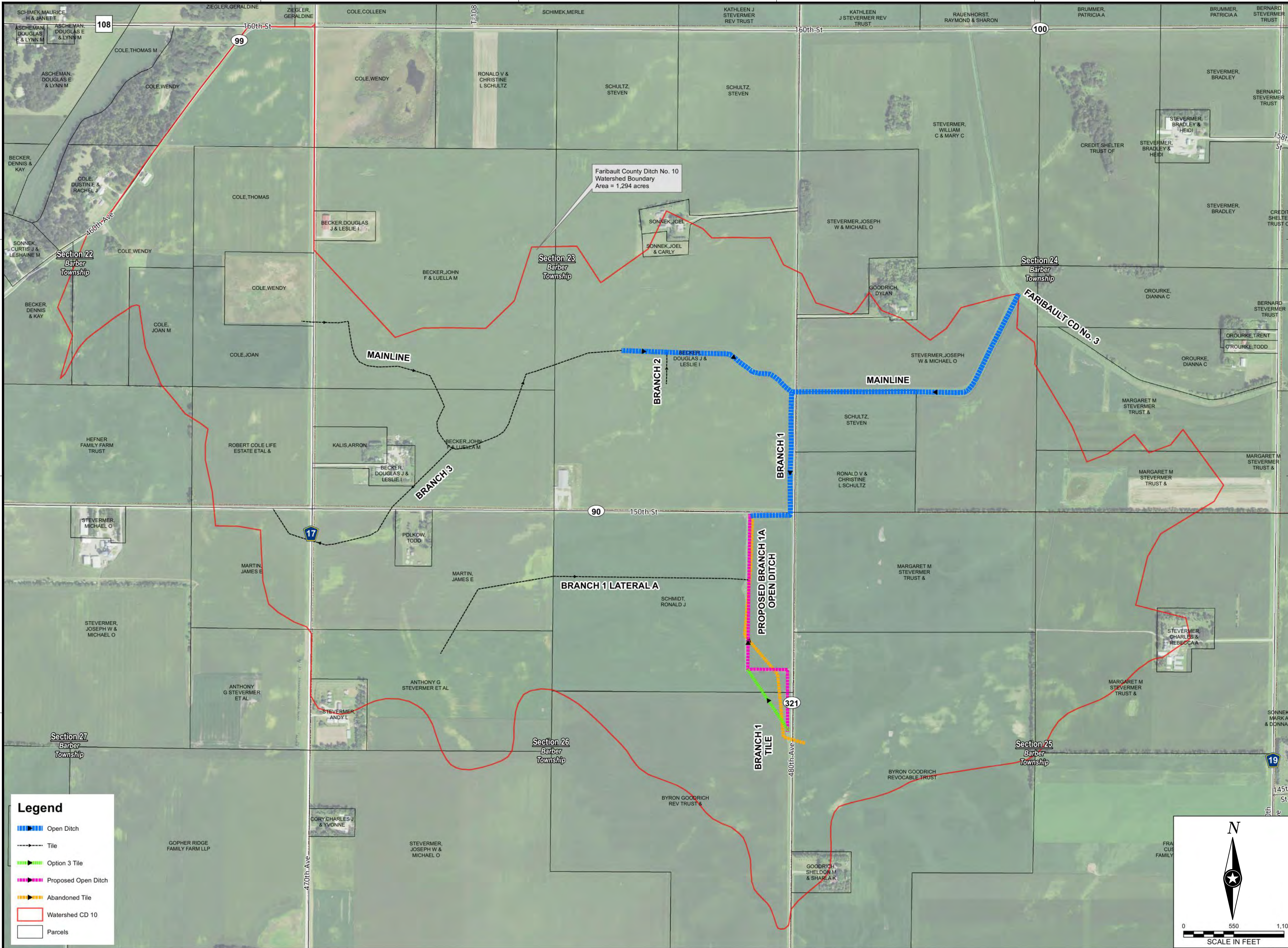
BARBER TOWNSHIP MINNESOTA

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TITLE
**PROPOSED
WATERSHED
(OPTION #2)**

SHEET



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FARIBAUT COUNTY

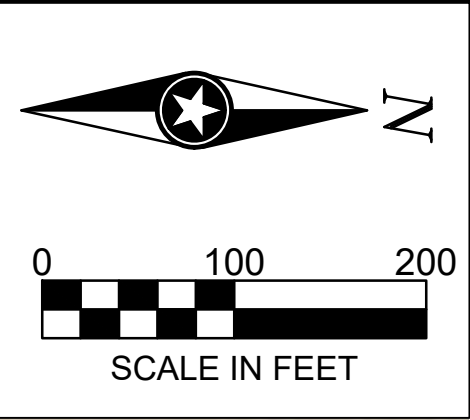
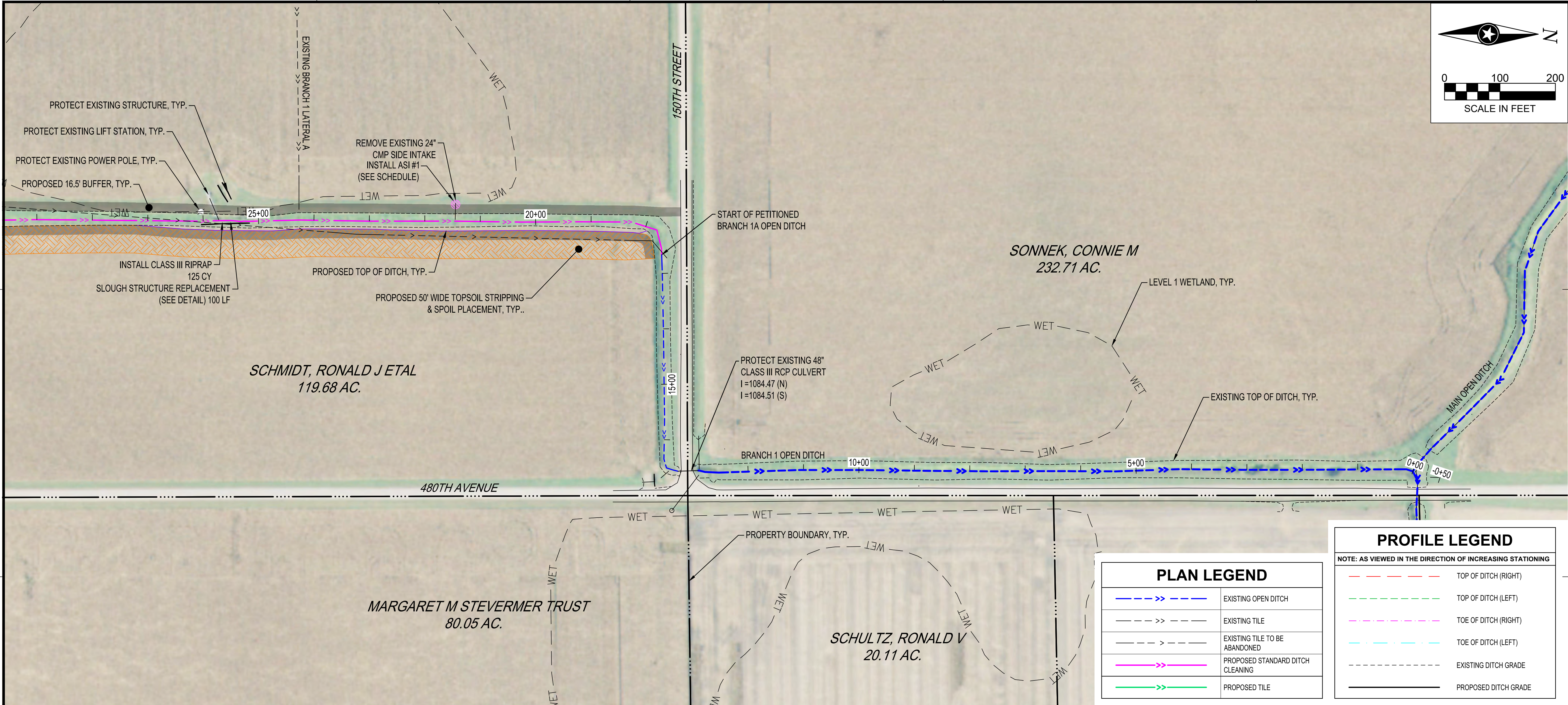
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TITLE
**PROPOSED
WATERSHED
(OPTION #3)**



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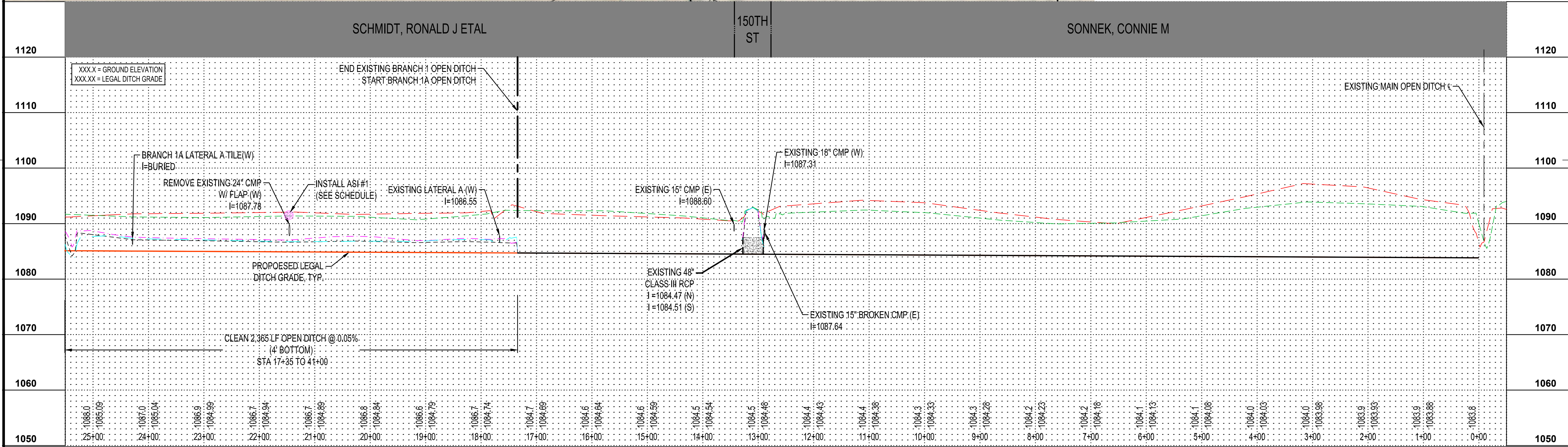
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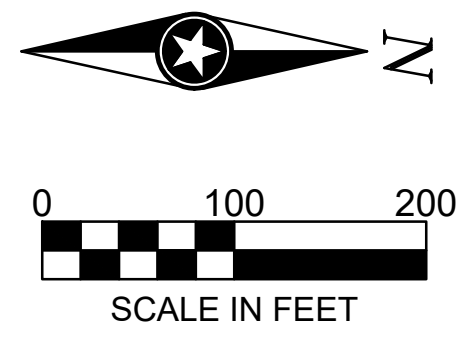
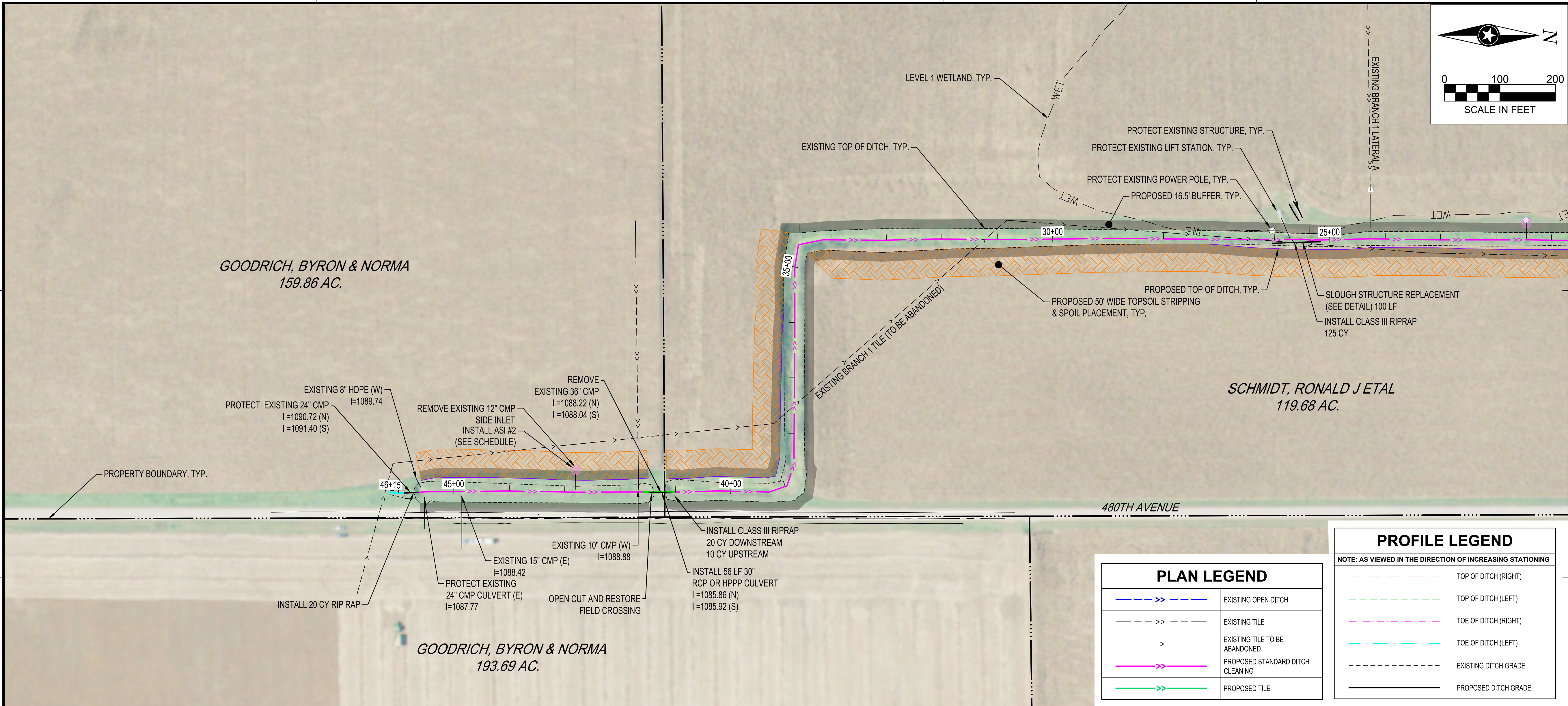
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TITLE
**BRANCH 1A OPEN
DITCH PLAN AND
PROFILE (OPTION #1)**

SHEET





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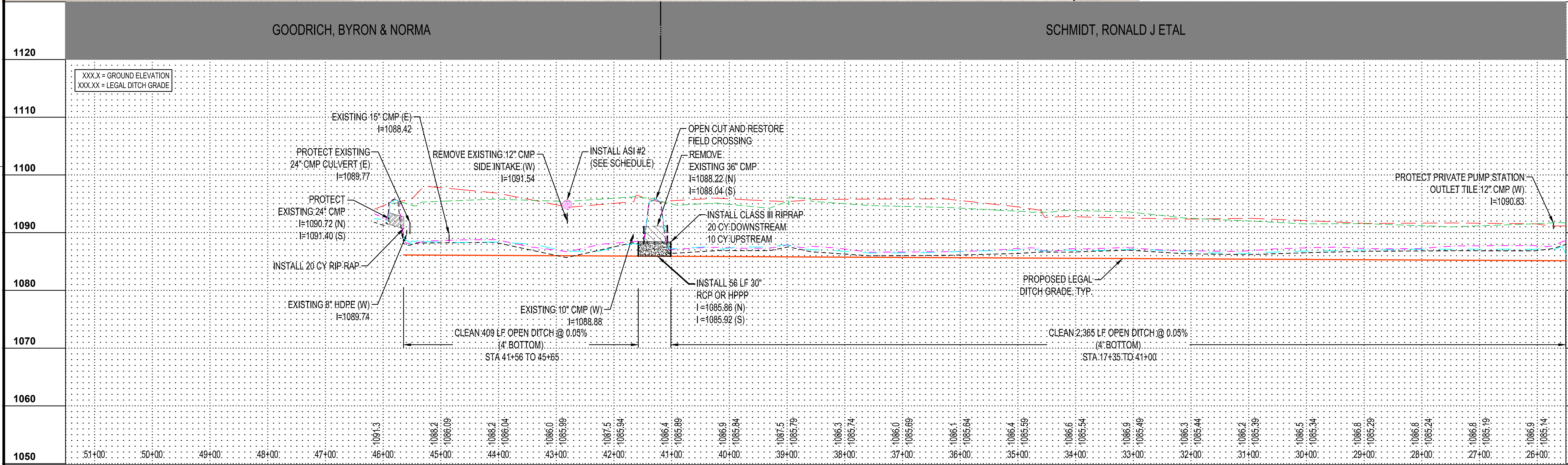
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PLAN LEGEND	
	EXISTING OPEN DITCH
	EXISTING TILE
	EXISTING TILE TO BE ABANDONED
	PROPOSED STANDARD DITCH CLEANING
	PROPOSED TILE

PROFILE LEGEND	
NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATIONING	
	TOP OF DITCH (RIGHT)
	TOP OF DITCH (LEFT)
	TOE OF DITCH (RIGHT)
	TOE OF DITCH (LEFT)
	EXISTING DITCH GRADE
	PROPOSED DITCH GRADE



PROJECT
FARIBAUT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

REVISION SCHEDULE		
DATE	DESCRIPTION	BY

PROJECT NO.	14-16609
FILE NAME	16609 PROFILES BRANCH 1A
DRAWN BY	SMW, TLS
DESIGNED BY	BPG, TLS
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--
CLIENT PROJECT NO.	--/--

TITLE
**BRANCH 1A OPEN
DITCH PLAN AND
PROFILE (OPTION #1)**

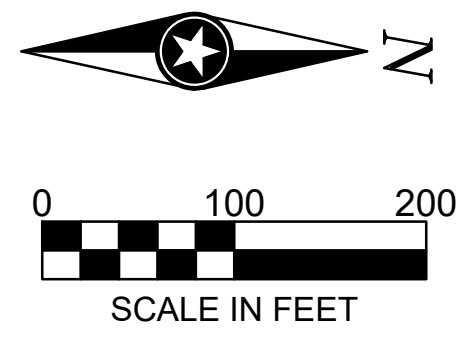
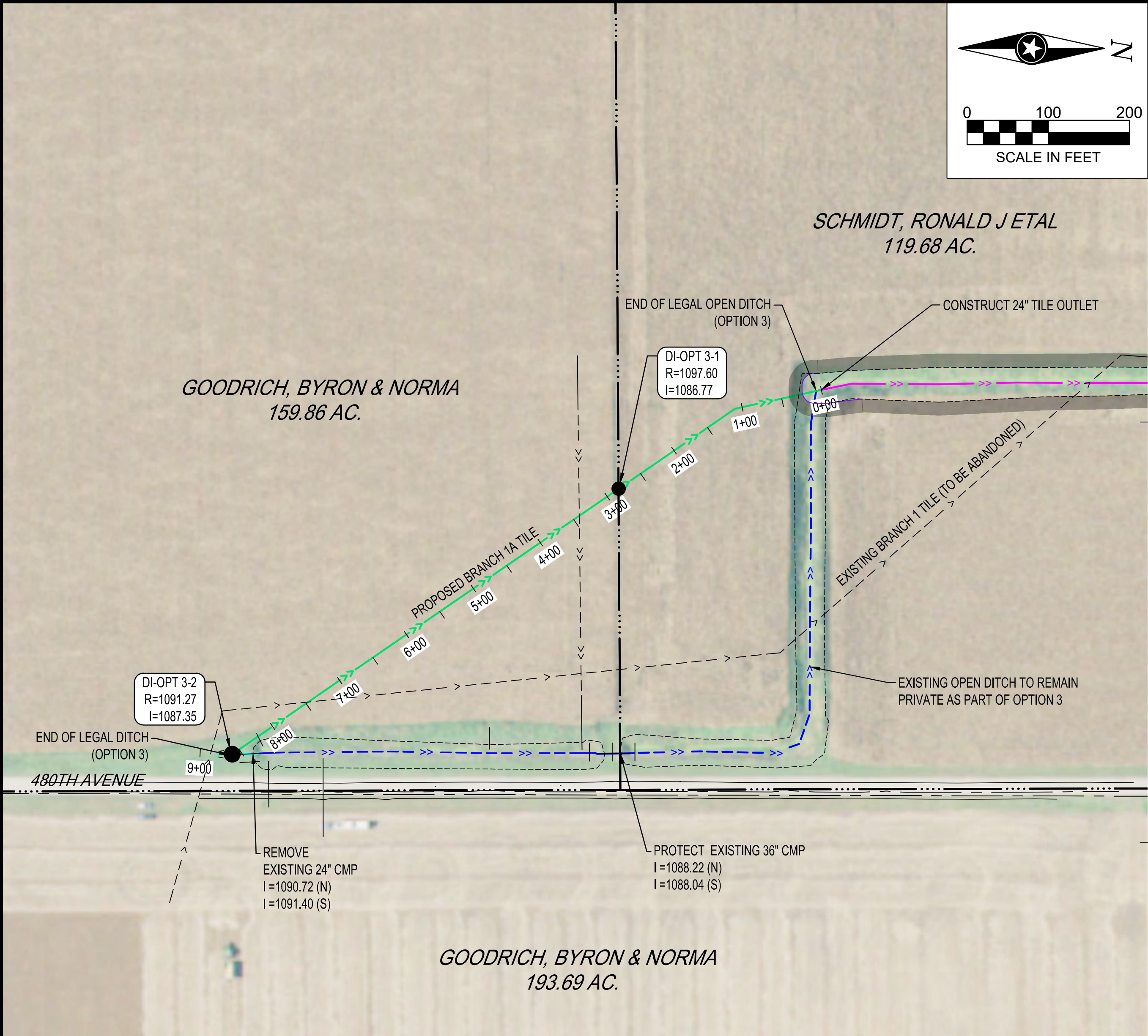
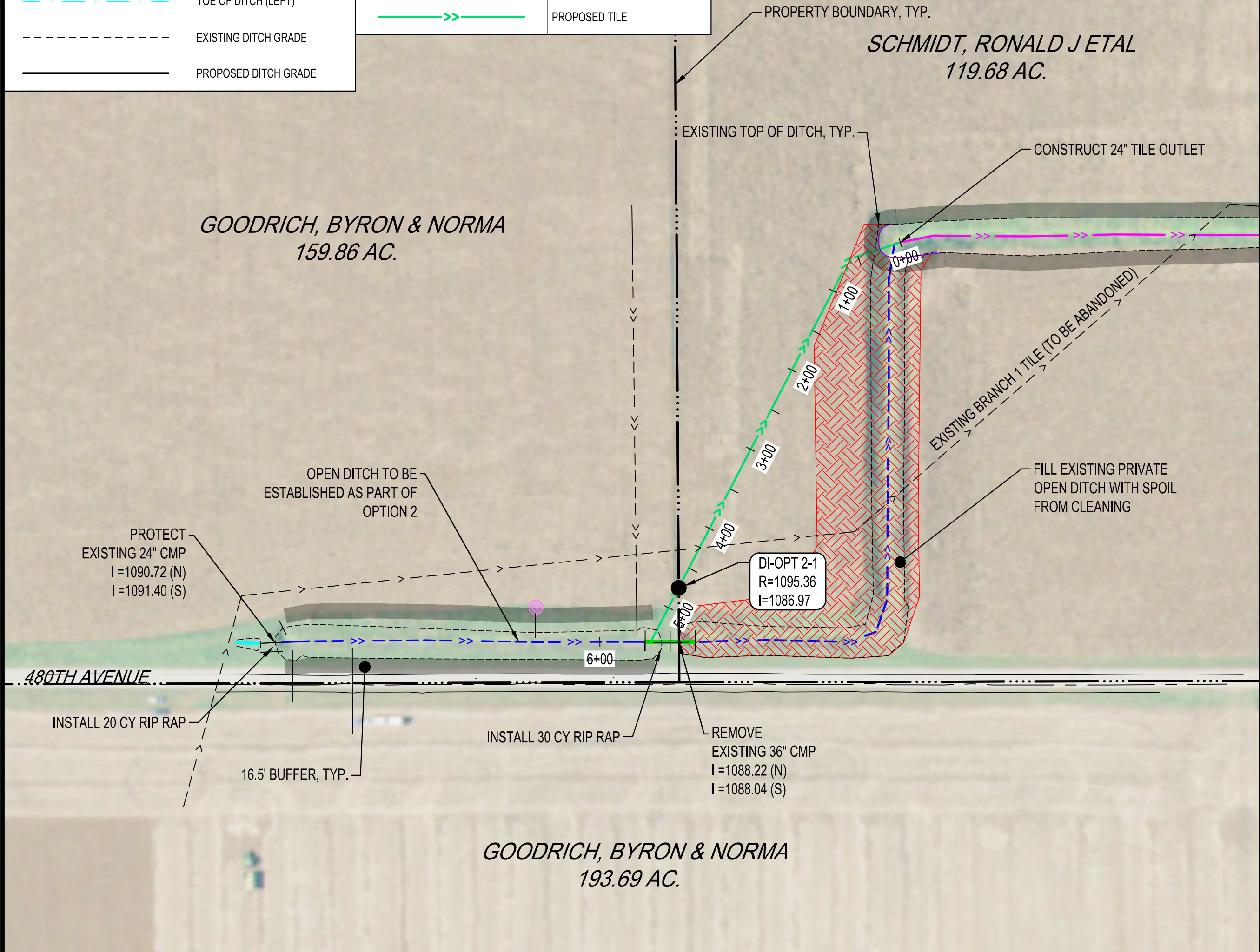
PROFILE LEGEND

NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATIONING

- TOP OF DITCH (RIGHT)
- TOP OF DITCH (LEFT)
- TOE OF DITCH (RIGHT)
- TOE OF DITCH (LEFT)
- EXISTING DITCH GRADE
- PROPOSED DITCH GRADE

PLAN LEGEND

- EXISTING OPEN DITCH
- EXISTING TILE
- EXISTING TILE TO BE ABANDONED
- PROPOSED STANDARD DITCH CLEANING
- PROPOSED TILE



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CHARLES J. BRANDEL

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FOR CONSTRUCTION**

DATE _____ LIC. NO. 43359

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PROJECT

FARIBAUT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

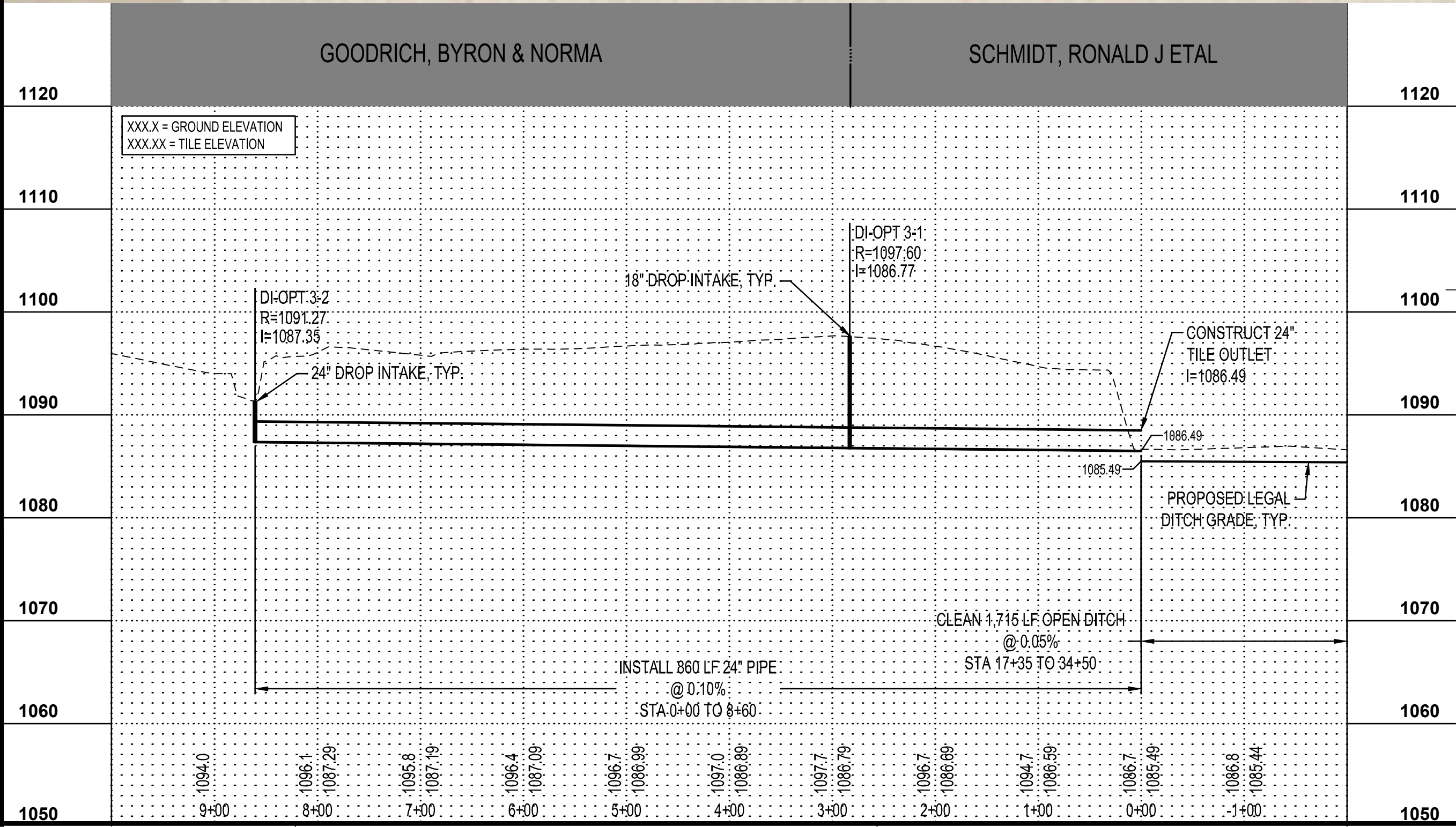
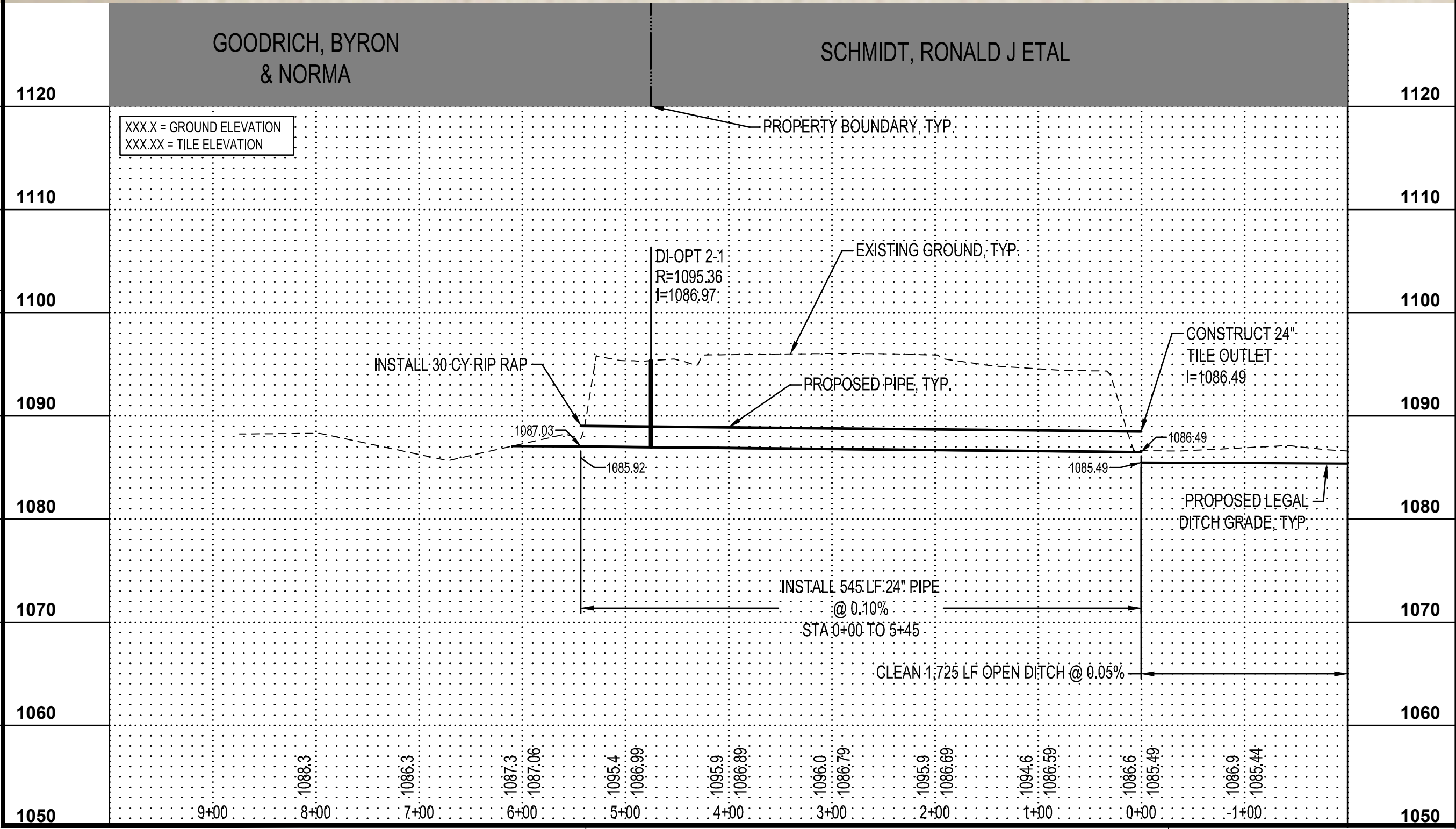
BARBER TOWNSHIP MINNESOTA

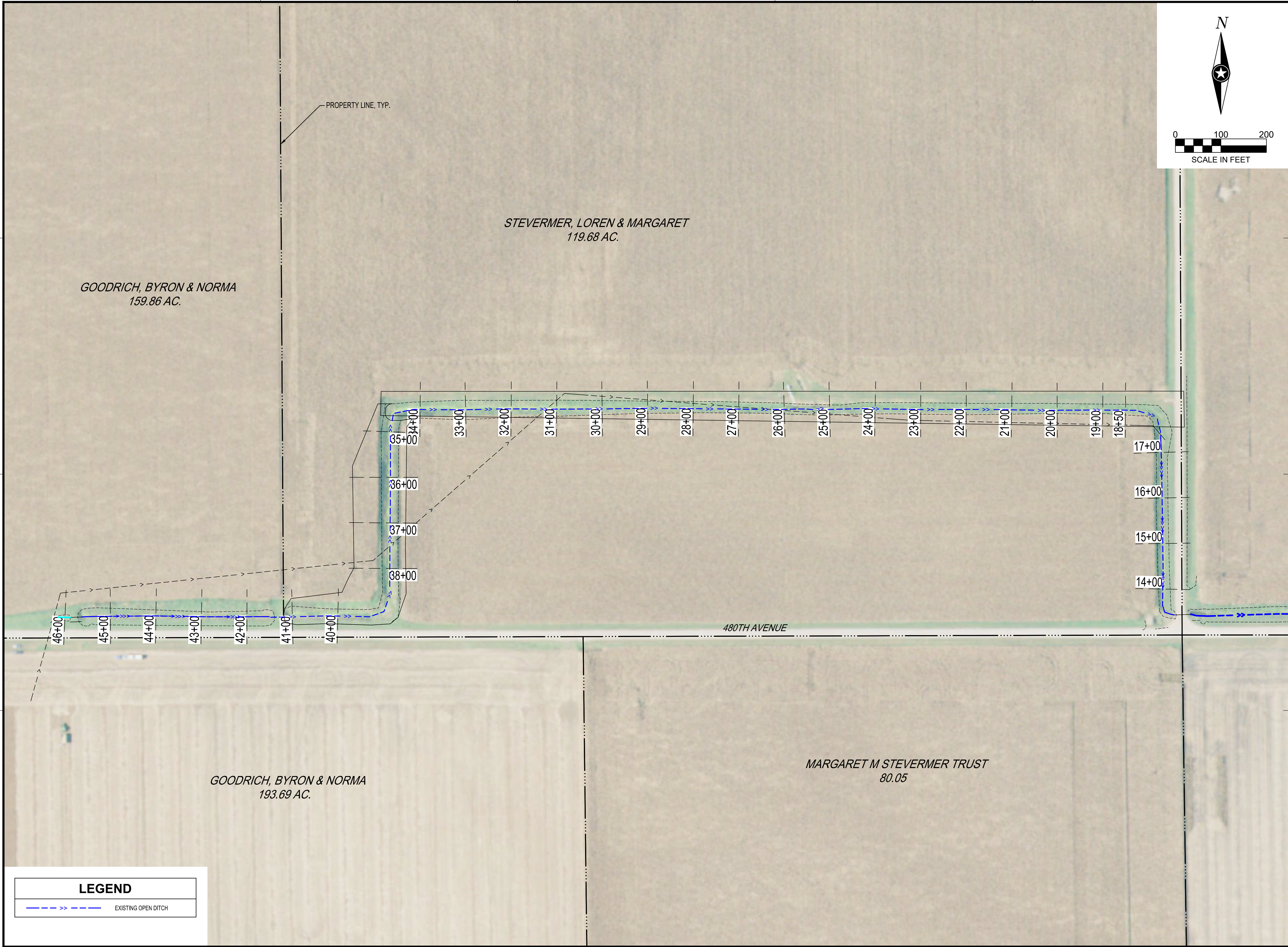
REVISION SCHEDULE		
DATE	DESCRIPTION	BY

PROJECT NO.	14-16609
FILE NAME	16609 PROFILES BRANCH 1A
DRAWN BY	SMW, TLS
DESIGNED BY	BPG, TLS
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--
CLIENT PROJECT NO.	--

TITLE
**BRANCH 1A TILE
PLAN AND PROFILE
(OPTION #2 AND #3)**

SHEET
13 OF 19





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PROJECT _____

FARIBAULT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

REVISION SCHEDULE		
DATE	DESCRIPTION	BY

PROJECT NO.	14-16609
FILE NAME	16609-OVERALL SECTION VIEW PLAN
DRAWN BY	SMW, TLS
DESIGNED BY	BPG, TLS
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--
CLIENT PROJECT NO.	-

TITLE

**OVERALL SECTION
VIEW PLAN**

SHEET

14

OF 19

CROSS SECTIONS AS VIEWED IN THE DIRECTION OF INCREASING STATIONING.
PROPOSED CENTERLINE OFFSET MEASURED FROM CENTERLINE OF EXISTING DITCH.

The profile view shows the proposed road cross-section with the following details:

- 50' WIDE TOPSOIL STRIPPING AND SPOIL PLACEMENT (OPTION #1 & #3):** Indicated by a horizontal dimension line from station -60 to -15.
- ADDITIONAL BUFFER ACQUISITION:** Indicated by a horizontal dimension line from station -15 to -5.
- Proposed Road Profile (Red Line):** Shows the road elevation starting at 1090.0 at station -15, dipping to a minimum of 1084.8 at station 0, and rising to 1091.5 at station 15.
- Existing Ground Profile (Dashed Line):** Shows the natural ground elevation, which is relatively flat at 1090.0 from station -60 to -15, then dips to a minimum of 1086.8 at station 0, and rises to 1091.5 at station 15.
- Stationing:** The horizontal axis represents stationing from -60 to 60.
- Elevation Labels:** The vertical axis represents elevation in feet, ranging from 1080 to 1105.
- Grades:** The proposed road has a 2% grade from station -15 to 0 and a 2% grade from station 0 to 15.
- Existing Ground Labels:** The existing ground has a 2% grade from station -15 to 0 and a 2% grade from station 0 to 15.

Figure 1: Proposed Section 1. The diagram shows a cross-section of a proposed road profile and existing ground. The horizontal axis represents stationing from -60 to 60, and the vertical axis represents elevation from 1080 to 1105 feet. The existing ground is shown as a dashed line, and the proposed road profile is shown as a solid line. The road profile includes a 50' wide topsoil stripping and spoil placement area (Option #1 & #3) and an additional buffer acquisition area. The road profile is labeled with '2:1' slopes on both sides. The elevation of the road profile at station 0 is 1084.79 feet, and the elevation of the existing ground at station 0 is 1086.6 feet. The elevation of the existing ground at station -15 is 1083.00 feet.

The diagram illustrates a cross-section of a proposed road project. The vertical axis represents elevation in feet, ranging from 1080 to 1105. The horizontal axis represents the proposed centerline offset in feet, ranging from -60 to 60. The diagram shows the existing ground profile (dashed line), the proposed ground profile (solid line), and the proposed centerline offset elevation (solid line). Key features include a 50' wide topsoil stripping and spoil placement area (Option #1 & #3), an additional buffer acquisition area, and a proposed centerline offset elevation of 1086.7 feet. The proposed ground profile is shown with a 2:1 slope on both sides of the centerline. The proposed centerline offset elevation is shown as a solid line with a 2:1 slope on both sides of the centerline. The existing ground profile is shown as a dashed line. The diagram also includes labels for 'EXISTING GROUND, TYP.', 'OPTION #1 & #3 CROSS SECTION, TYP.', 'PROPOSED GROUND, TYP.', 'PROPOSED CENTERLINE OFFSET ELEVATION, TYP.', and 'PROPOSED CENTERLINE OFFSET, TYP.'.

[illegible]

NOTE:
XXX.X - EXISTING GROUND CL
XXX.XX - PROPOSED GRADE CL



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CHARLES J. BRANDEL

DATE _____ LIC. NO. 43359

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PROJECT

FARIBAULT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

[illegible]

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FILE NAME	16609-SECTIONS
DRAWN BY	SMW, TLS
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ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

CROSS-SECTIONS

SHEET
15
OF 19

CROSS SECTIONS AS VIEWED IN THE DIRECTION OF INCREASING STATIONING.
PROPOSED CENTERLINE OFFSET MEASURED FROM CENTERLINE OF EXISTING DITCH.

50' WIDE TOPSOIL STRIPPING AND SPOIL PLACEMENT (OPTION #1 & #3)

EXISTING GROUND, TYP.

OPTION #1 & #3 CROSS SECTION, TYP.

PROPOSED GROUND, TYP.

PROPOSED CENTERLINE OFFSET, TYP.

PROPOSED CENTERLINE OFFSET ELEVATION, TYP.

1087.0
1085.04

2:1

2:1

08.91
ELEV 1086.10

Figure 1: Proposed Section 1. The diagram shows a cross-section of a road profile. The horizontal axis represents stationing from -60 to 60, and the vertical axis represents elevation from 1080 to 1105. A dashed grey line represents the existing ground, and a solid red line represents the proposed road profile. The proposed profile starts at station 1086.8, dips to a minimum of 1085.24 at station 0, and rises to a peak of 1089.24 at station 15. A 50' wide topsoil stripping and spoil placement area is indicated between stations -60 and -15. The diagram includes a grid with stationing from -60 to 60 and elevation from 1080 to 1105.

Figure 1: Proposed Section 1. The diagram shows a cross-section of a proposed road profile (solid red line) and existing ground (dashed grey line). The profile starts at a 50' wide topsoil stripping and spoil placement area (Option #1 & #3) on the left. The proposed profile has a 2:1 slope down to a base level of 1085.19, then a horizontal section, and another 2:1 slope up to a peak at 1091.19. The existing ground is shown as a dashed line. A vertical line indicates the 50' wide topsoil stripping and spoil placement area. A note indicates "OS 105" and "2:1" for the slope.

NOTE:
XXX.X - EXISTING GROUND CL
XXX.XX - PROPOSED GRADE CL



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PROJECT

FARIBAUT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

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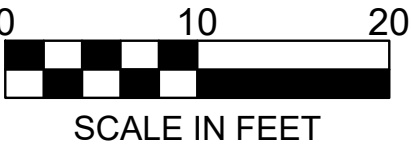
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ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

CROSS-SECTIONS

SHEET

NOTE:
CROSS SECTIONS AS VIEWED IN THE DIRECTION OF INCREASING STATIONING.
PROPOSED CENTERLINE OFFSET MEASURED FROM CENTERLINE OF EXISTING DITCH.

NOTE:
XXX.X - EXISTING GROUND ζ
XXX.XX - PROPOSED GRADE ζ



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PROJECT

FARIBAULT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

REVISION SCHEDULE

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TITLE

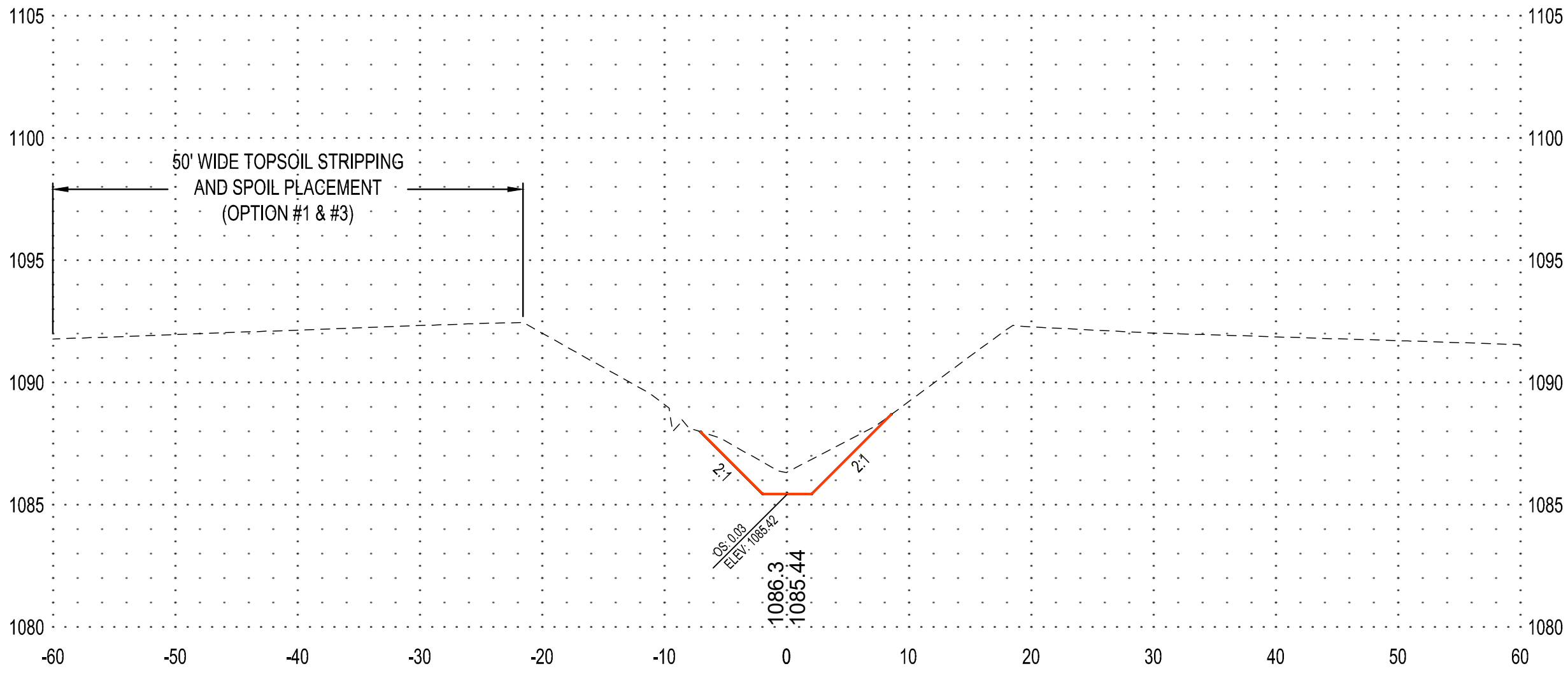
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SHEET

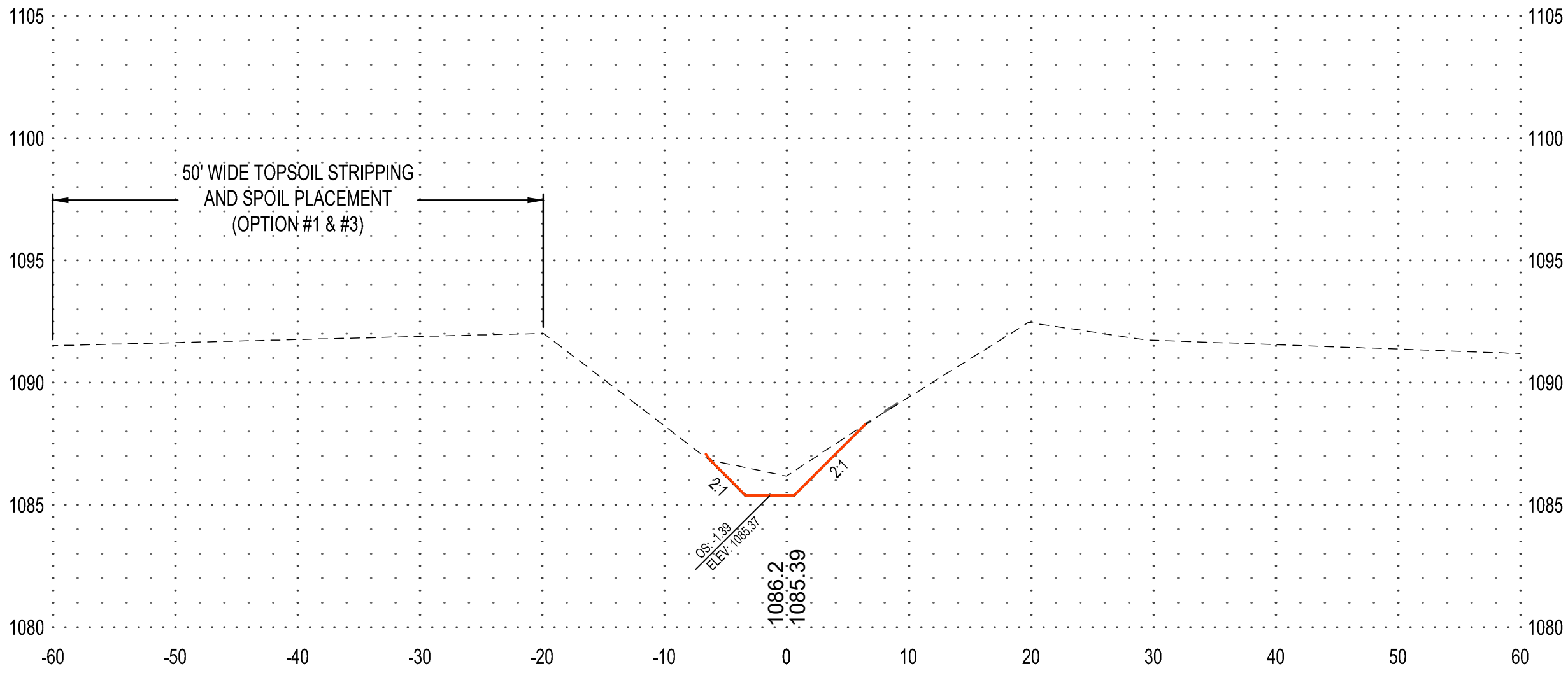
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OF 19

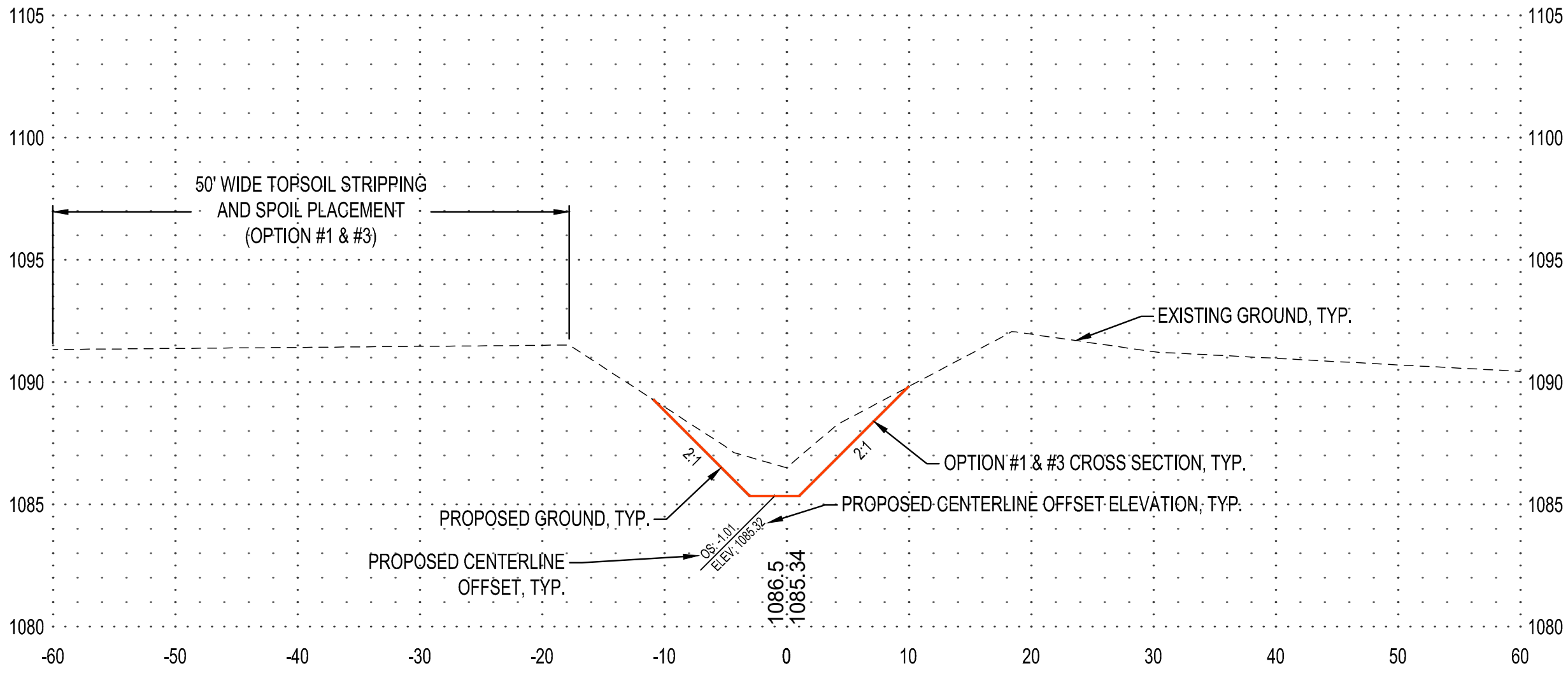
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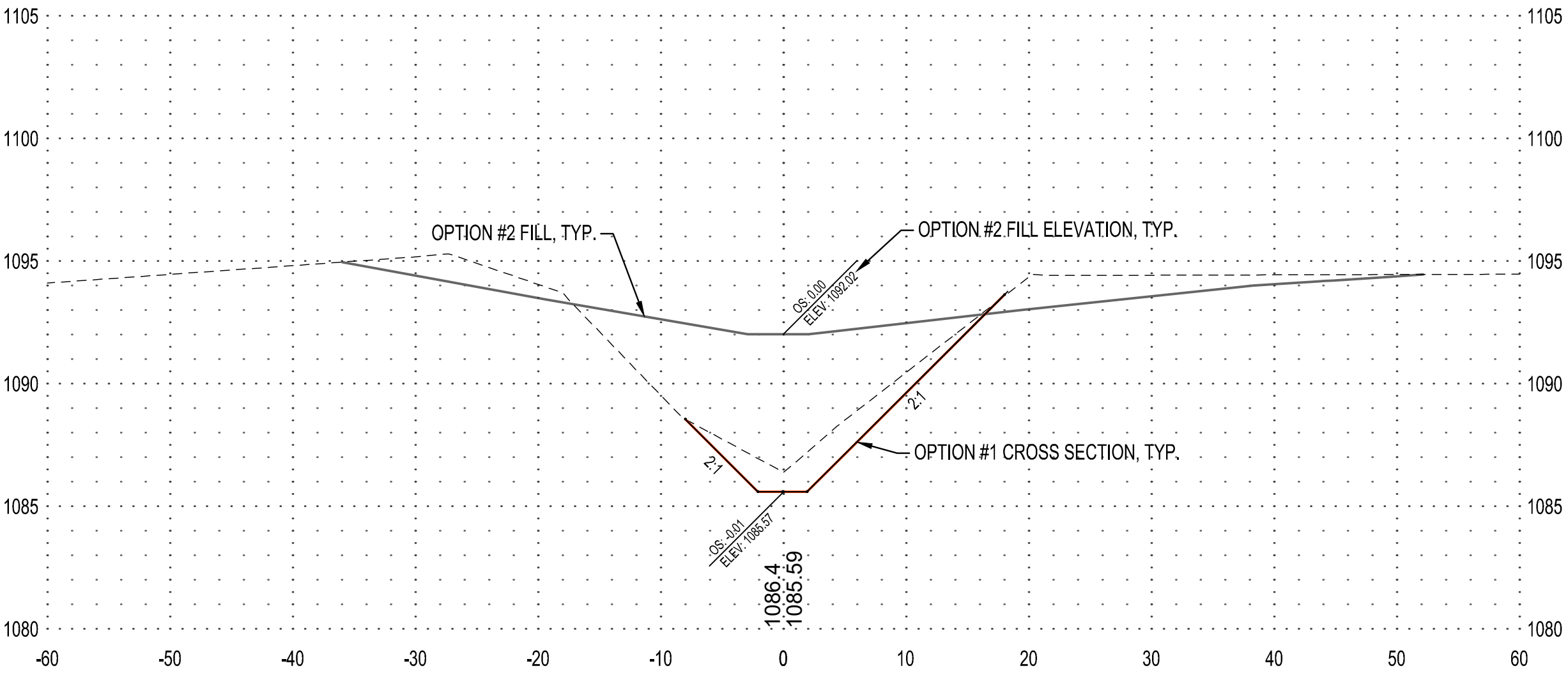
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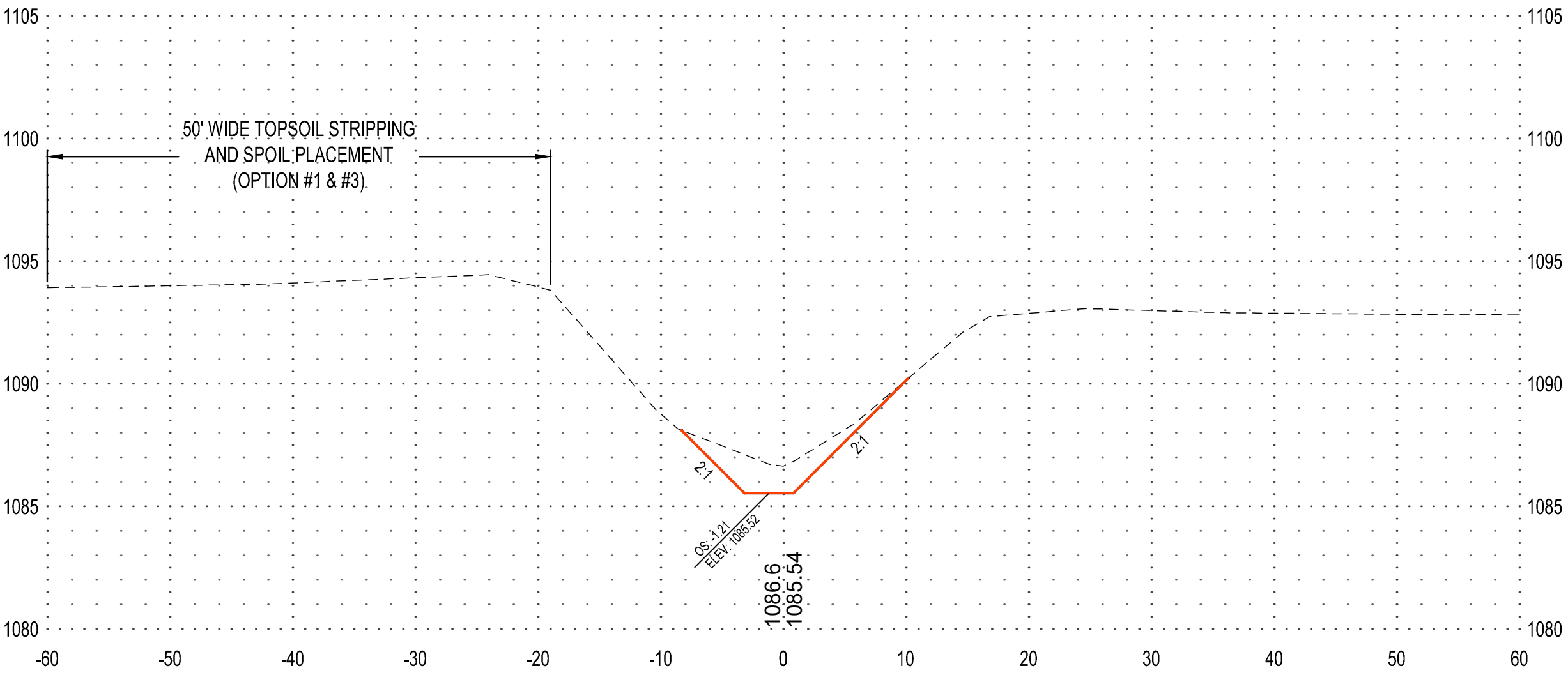
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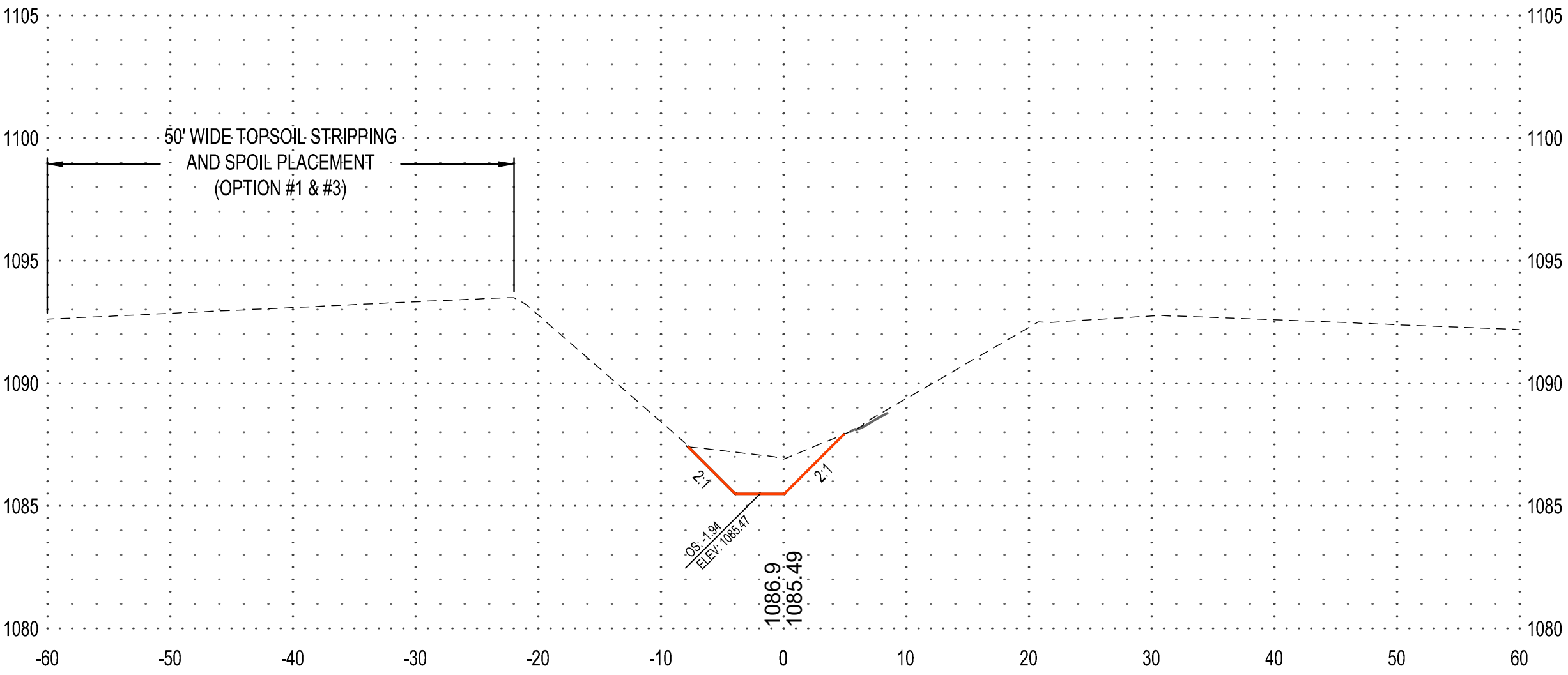
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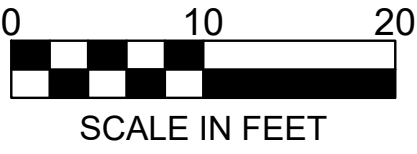


33+00



NOTE:
CROSS SECTIONS AS VIEWED IN THE DIRECTION OF INCREASING STATIONING.
PROPOSED CENTERLINE OFFSET MEASURED FROM CENTERLINE OF EXISTING DITCH.

NOTE:
XXX.X - EXISTING GROUND ζ
XXX.XX - PROPOSED GRADE ζ



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PROJECT

FARIBAULT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

REVISION SCHEDULE		
DATE	DESCRIPTION	BY

PROJECT NO.	14-16609
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REVIEWED BY	MAO
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CLIENT PROJECT NO.	-

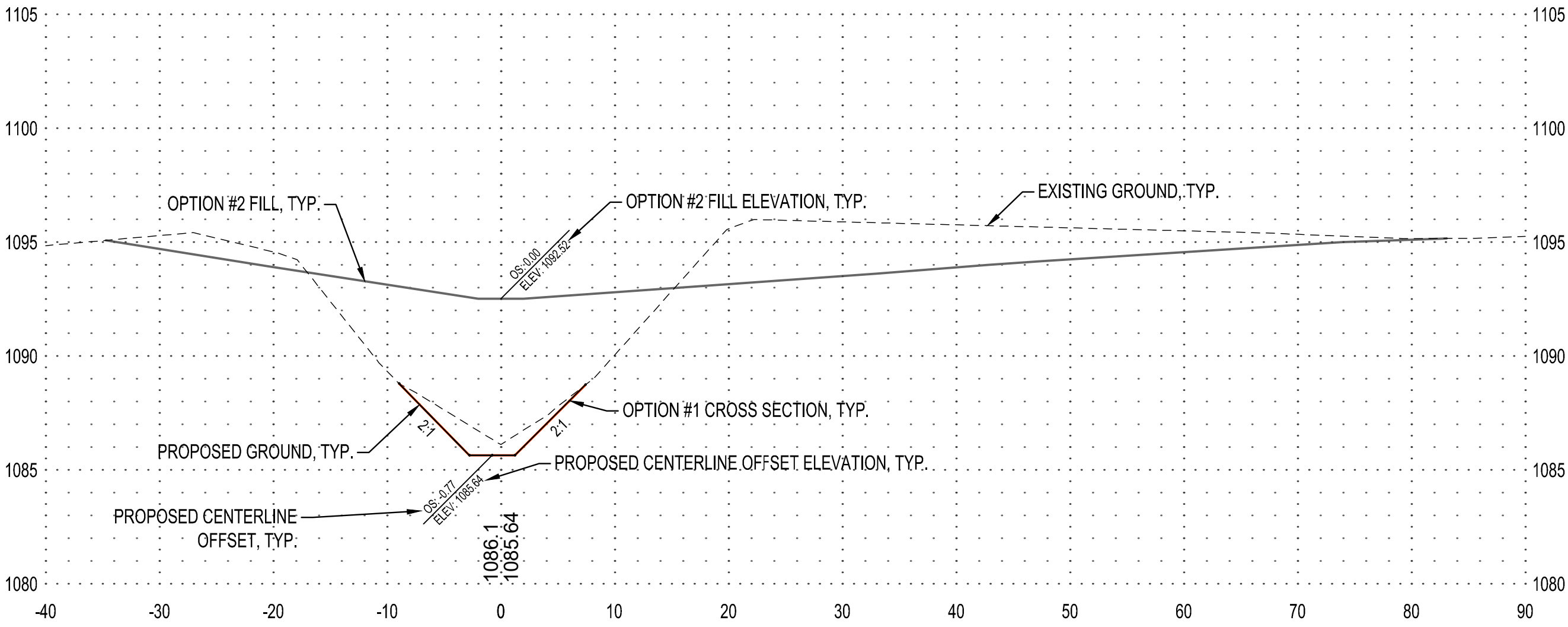
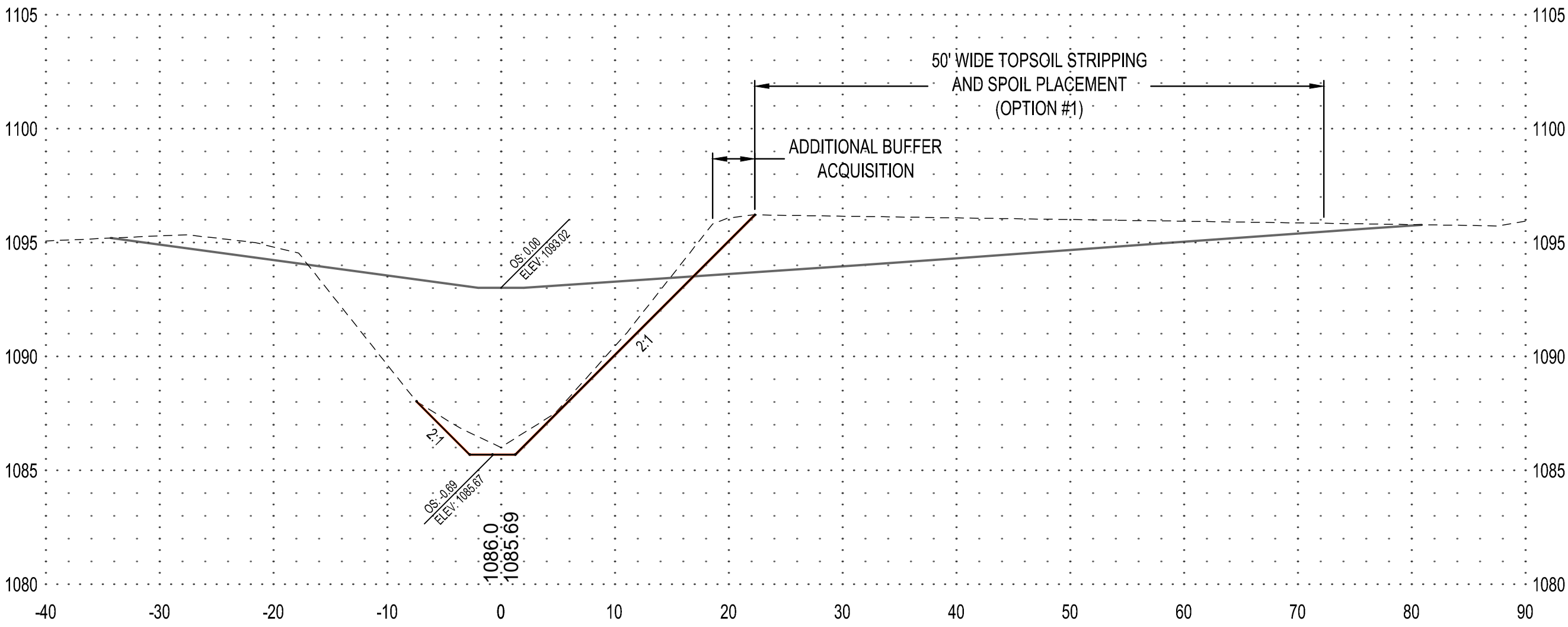
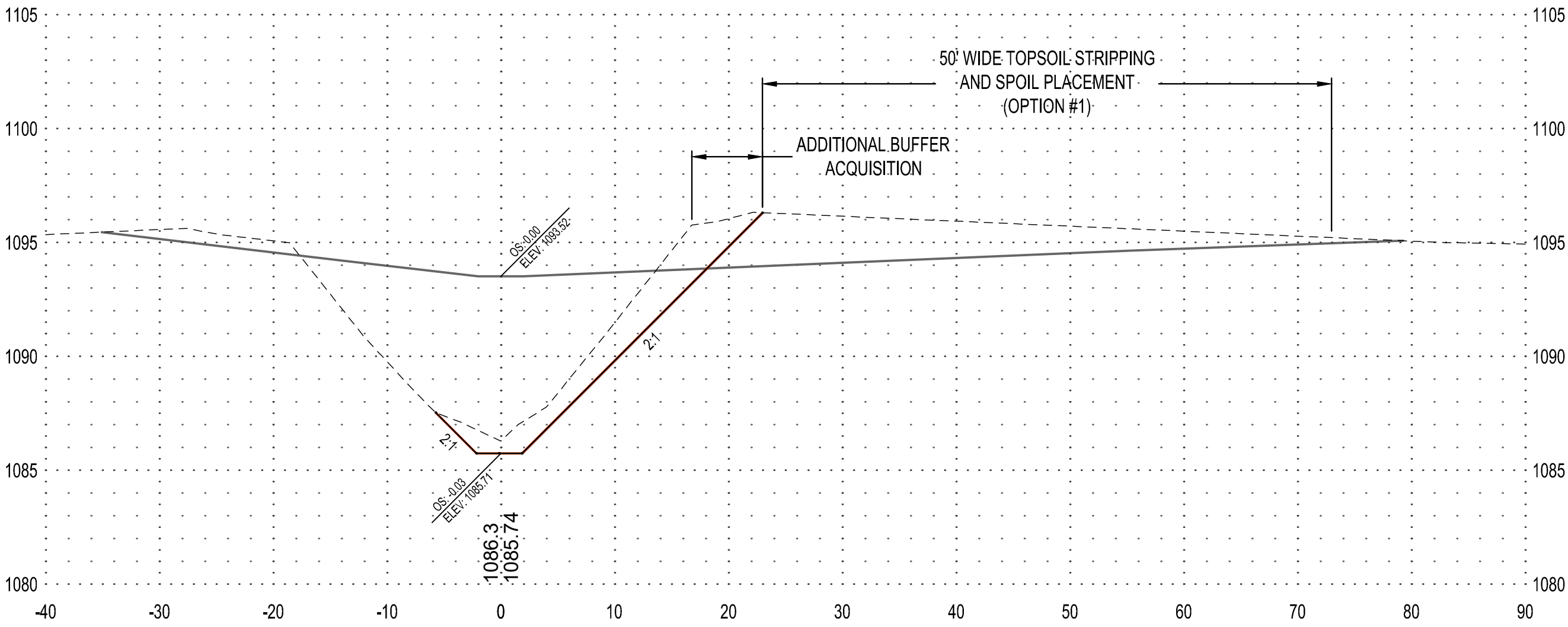
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CROSS-SECTIONS

SHEET

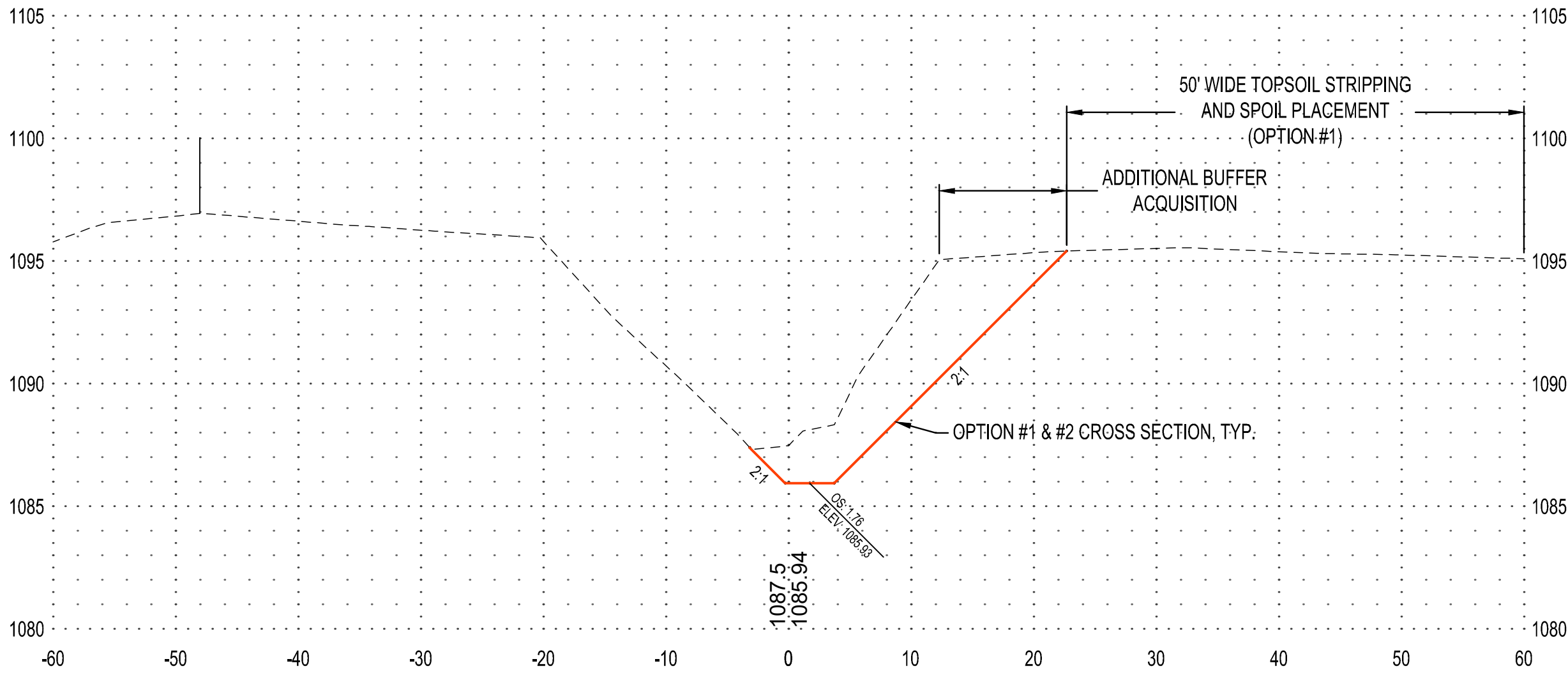
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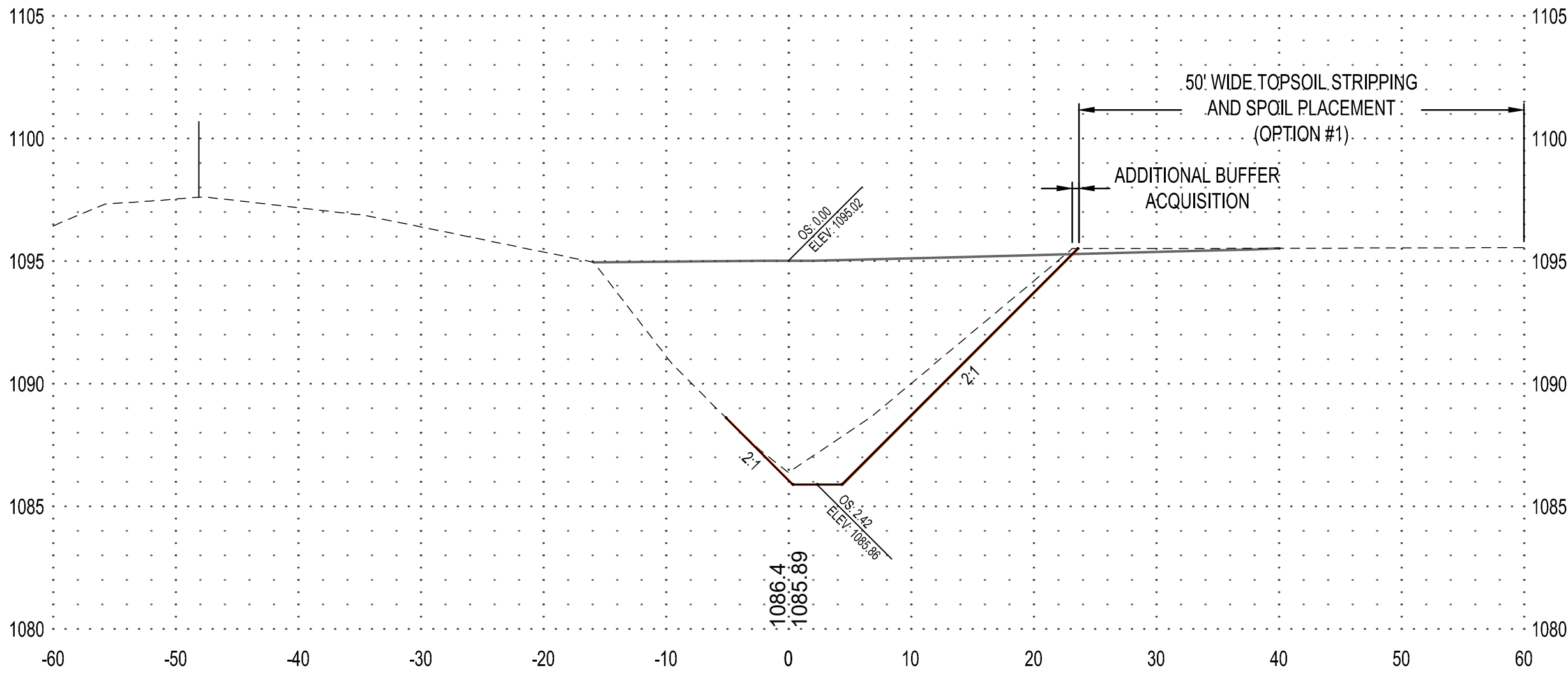


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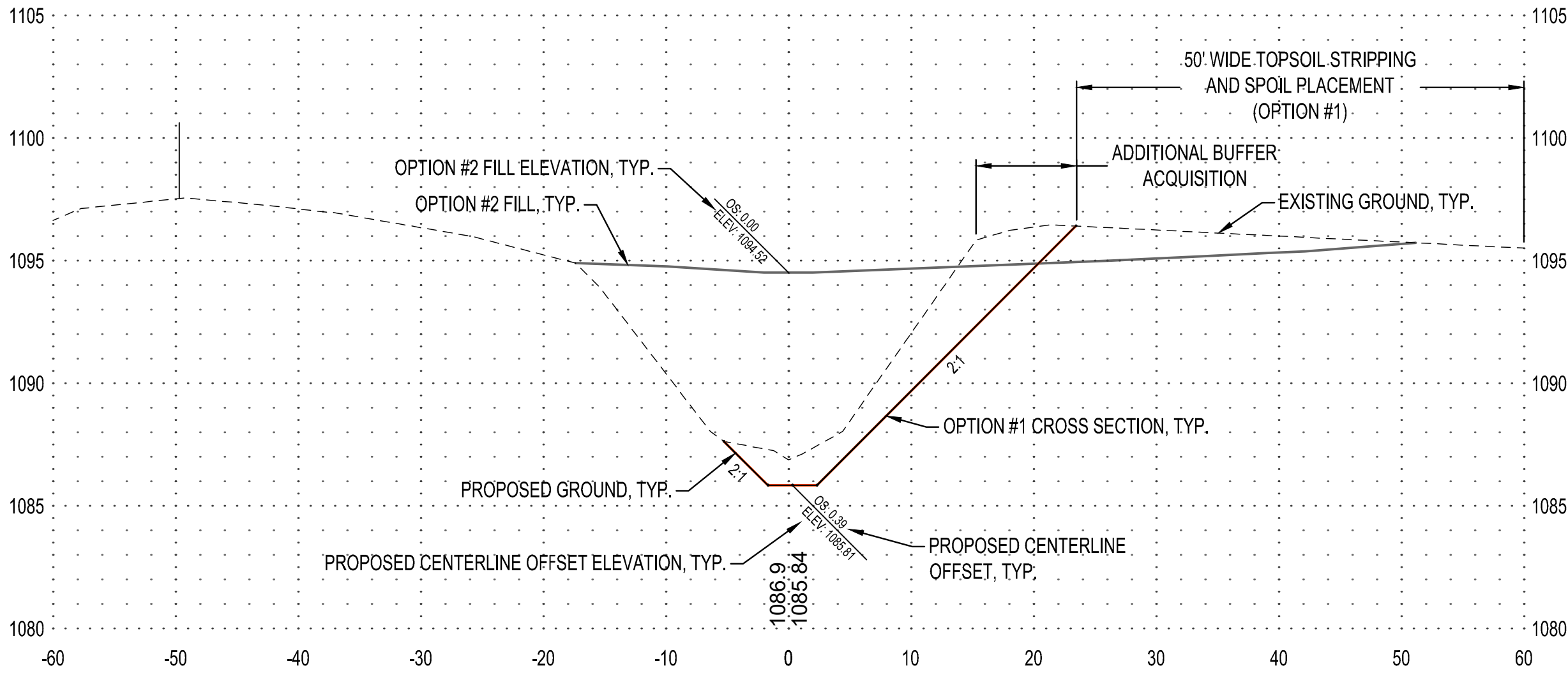
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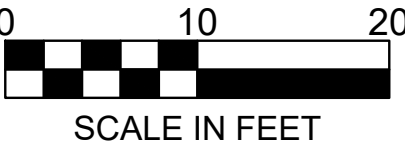
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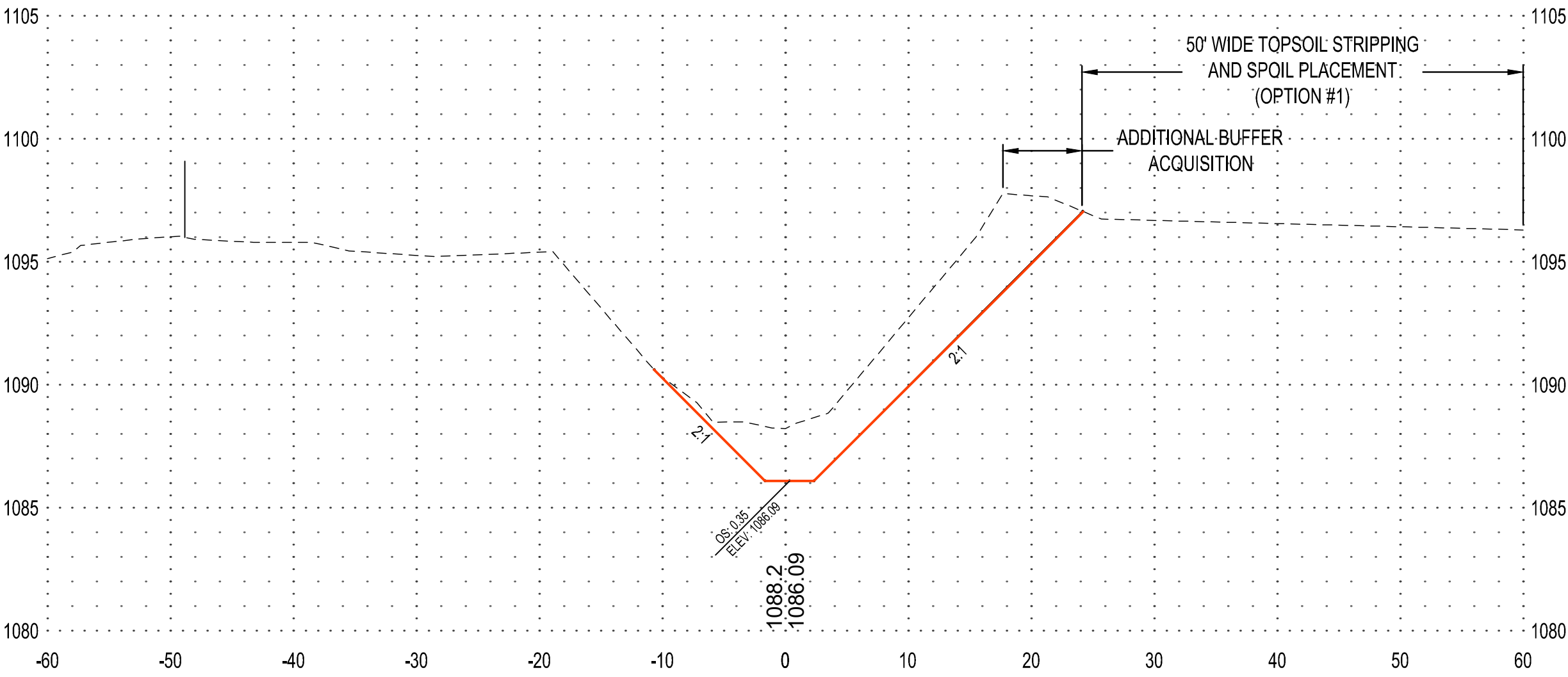
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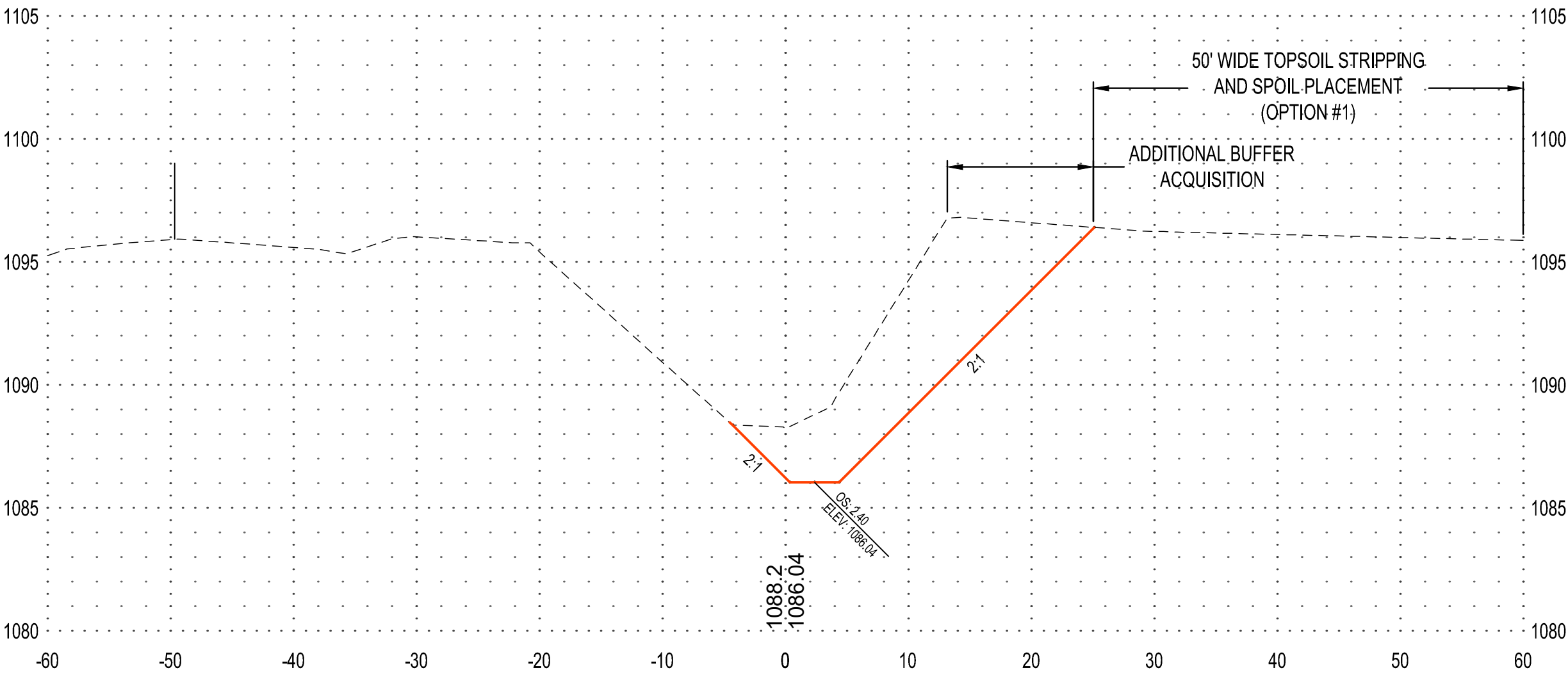
NOTE:
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XXX.XX - PROPOSED GRADE ζ



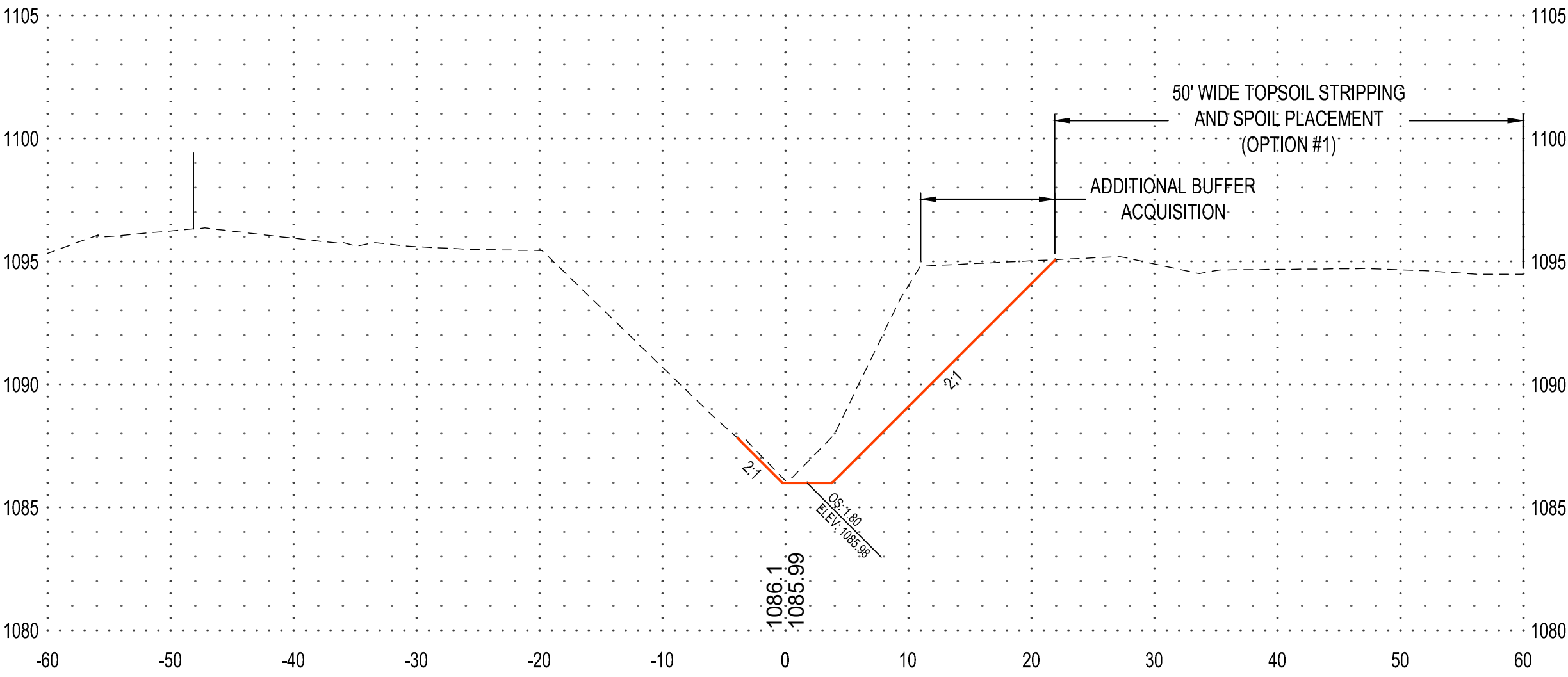
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44+00



43+00



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PROJECT

FARIBAULT COUNTY

**COUNTY DITCH
No. 10 BRANCH 1A**

BARBER TOWNSHIP MINNESOTA

REVISION SCHEDULE		
DATE	DESCRIPTION	BY

PROJECT NO.	14-16609
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CLIENT PROJECT NO.	-

TITLE

CROSS-SECTIONS

SHEET

19

OF 19

Appendix B: Petition + Order

①

**PETITION FOR A LATERAL OF
FARIBAULT COUNTY DITCH NO. 10**

TO THE FARIBAULT COUNTY BOARD OF COMMISSIONERS AS DRAINAGE
AUTHORITY IN RELATION TO FARIBAULT COUNTY DITCH NO. 10

Pursuant to the provisions of Minn. Stat. §103E.225, Petitioners herein make the following representations:

WHEREAS, this Petition relates to the existing Main Open Ditch ("Open Ditch") of the existing Faribault County Ditch No. 10 watershed district ("C.D. 10" or "the system"); and

WHEREAS, said existing Open Ditch and existing C.D. 10 system are situated in Section 26 of Barber Township; and

WHEREAS, this Petition is signed by (1) at least 26% of the owners of the property that the lateral passes over; and (2) the owners of at least 26% of the area of the property that the lateral passes over; and

WHEREAS, the lateral is an existing private open ditch that begins at the outlet of the Open Ditch in the Northeast Quarter-corner of the NE ¼ NE ¼ of Section 26 of Barber Township and runs south to the Southeast Quarter-corner of said SE ¼ of NE ¼ of Section 26 of Barber township and there terminating. The general course and terminus of the proposed lateral project is depicted on Exhibit A which is attached hereto for reference; and

WHEREAS, the lateral is necessary to connect property depicted on Exhibit A which is currently served by the system and assessed benefits in order to provide an adequate outlet to the Open Ditch;

WHEREAS, Petitioner requests that the engineer be specifically ordered to determine and offer alternative proposals for the consideration of the Drainage Authority which relate to the proposed lateral that the engineer deems feasible, if any, including re-routing or any alternative outlets, if any; and

WHEREAS, Petitioner provides herewith a corporate surety bond in the face amount of \$10,000 payable to the Faribault County Board of Commissioners acting as Drainage Authority for Faribault County Ditch No. 10, said bond conditioned to pay the costs incurred if the proceeding is dismissed or a contract is not awarded to allow the costs incurred to exceed the amount of the bond and that they will cause additional bond to be filed if it appears that the costs exceed the amount of the bond; and

WHEREAS, Petitioner has been informed and understands that it may not withdraw as a Petitioner at any time after this Petition is accepted by the Drainage Authority. Petitioner further acknowledges that if the proposed drainage project is dismissed or a contract is not awarded that it is liable to the Drainage Authority for all of the costs incurred including engineering, legal and miscellaneous fees and expenses in relation to this Petition as outlined under Minnesota Statutes 103E; and

WHEREAS, Petitioner asserts that the proposed lateral project will benefit and be useful to the public and will promote the public health; and

WHEREAS, the names and addresses of owners of the 40-acre tracts that the proposed lateral passes over as depicted on the attached Exhibit A are as follows:

PIN: 010260500

S ½ SE ¼ NE ¼

Owner/Address:

Byron & Norma Goodrich

1433 Parkside Lane

North Mankato, MN 56003

PIN: 010260100

N ½ SE ¼ NE ¼

Owner/Address:

Ronald J. Schmidt, et al.

14580 530th Ave.

Wells, MN 56097

PIN: 010260100

NE ¼ NE ¼

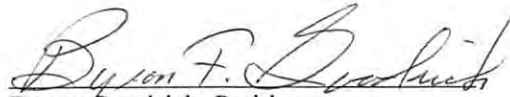
Owner/Address:

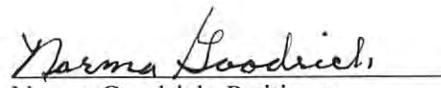
Ronald J. Schmidt, et al.

14580 530th Ave.

Wells, MN 56097

NOW THEREFORE, Petitioner asks the Faribault County Auditor to present this Petition to the Faribault County Board of Commissioners (after examination by legal counsel) for the appointment of Chuck Brandel, I+S Group, or, in the alternative, another engineer skilled in drainage matters to examine the proposed project.

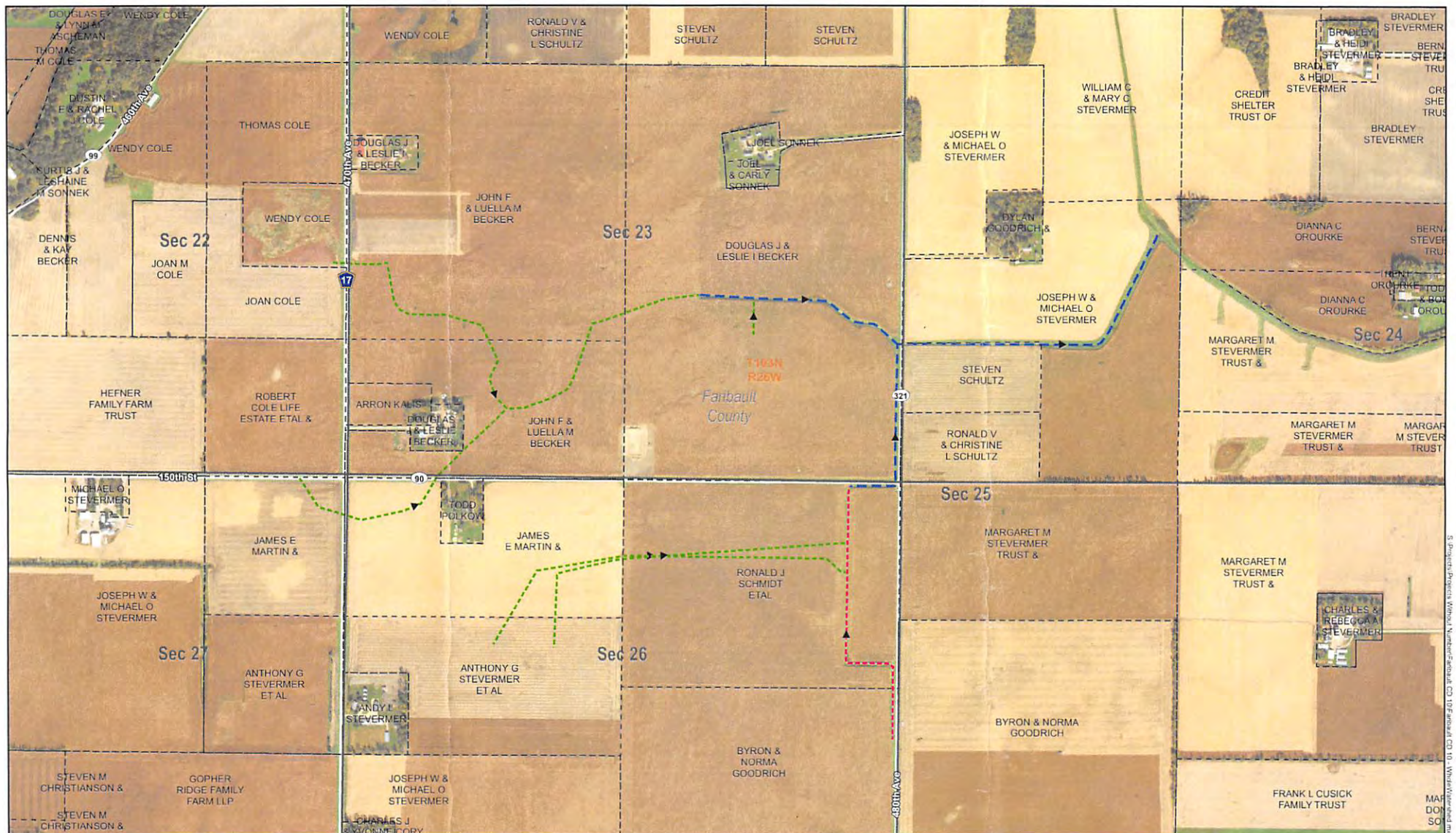

Byron Goodrich, Petitioner


Norma Goodrich, Petitioner


Bruce E. Sellers
Attorney for Petitioner
Wendland Sellers Bromeland, P.A.
825 East Second St.
P.O. Box 247
Blue Earth, MN 56013
507-526-2196

Received this 23rd
day of January 20 17
Pursuant to M.S. 272.17

Faribault County Auditor
By _____ Deputy



ISG

0 250 500 1,000 1,500 2,000
Feet



- OPEN DITCH TO BECOME PUBLIC
- FARIBAULT CD 10 OPEN DITCH
- FARIBAULT CD 10 TILE
- PARCELS

Digitized by: 10/20/2014
Municipalities: (MnGeo) MN DOT, 5/29/2014
Lakes: (MnDNR, July 2008)
Major Streams: (MnDNR, July 2008)
USGS Streams: (MnDNR, January, 2008)
Counties: (MnDNR, July 2013)
P.L.S.S. (MnGeo) USGS

EXHIBIT A
COUNTY DITCH No. 10
FARIBAULT COUNTY, MINNESOTA



Wendland Sellers Law Office

ATTORNEYS AT LAW

BRUCE E. SELLERS
SELLERS@WENDLANDLAW.COM

BLUE EARTH OFFICE:
825 EAST SECOND STREET
P.O. BOX 247
BLUE EARTH, MN 56013
TELEPHONE: (507) 526-2196
FAX: (507) 526-3065

MAPLETON OFFICE:
101 SMITH STREET NE
P.O. BOX 509
MAPLETON, MN 56065
TELEPHONE: (507) 524-4110
FAX: (507) 524-4626

REPLY TO BLUE EARTH OFFICE

January 18, 2017

Mr. John Thompson
Faribault County Treasurer
PO Box 130
Blue Earth, MN 56013

RE: Faribault County Ditch No. 10
Our File No.: 3364.01

Dear Mr. Thompson:

Enclosed herein for the above-re3ferenced matter, please find the following:

1. Petition for a lateral of Faribault County Ditch No. 10;
2. Exhibit A map; and
3. Surety Bond.

Sincerely,

Beth Cory
Legal Assistant

Enc.

* Qualified Neutral under Rule 114 of Minnesota General Rules of Practice

REAL ESTATE ▪ PROBATE ▪ ESTATE PLANNING ▪ CIVIL LITIGATION ▪ DEFENSE OF PUBLIC ENTITIES ▪ EMPLOYMENT
▪ PRIVATE/PUBLIC DRAINAGE ▪ PERSONAL INJURY ▪ CORPORATE/BUSINESS ▪ CONTRACTS ▪ FAMILY LAW



Bond No. **66237973**

SURETY BOND
Public Official, License or
Permit Bonds and Probate Bonds

SURETY BOND

KNOW ALL MEN BY THESE PRESENTS

That we, Byron Goodrich and Faribault County Ditch No. 10 landowners/petitioners, as Principal, and the Auto-Owners Insurance Company, a corporation organized under the laws of the State of Michigan, and having its principal office at Lansing, Michigan, as Surety, are held and firmly bound unto

Drainage Authority of Faribault County in the penal sum of (\$ 10,000.00)
Ten Thousand and 00/100----- Dollars,

lawful money of the United States of America, for which payment, well and truly to be made, we jointly and severally bind ourselves, our successors, administrators and assigns, firmly by these presents.

SIGNED, SEALED, and DATED this 11th day of November, 2016

WHEREAS the aforesaid Principal has petitioned to proceed in the matter of the petition for a lateral of Faribault
(If a Public Official Bond insert "been elected or appointed (name) for the terms beginning (date) and ending (date)")

County Ditch 10. Said petition is being addressed before the Board of Commissioners Drainage Authority of Faribault
(If a License or Permit Bond insert "been granted a license or permit as (name business) by the said Obligor for the period of one year from (date)")

County pursuant to Minnesota Statutes 103E.215 with respect to a petition for a lateral. This bond may be automatically
(If a Probate Bond insert "been appointed [Executor, Administrator, Guardian, Conservator] of the estate of [name of deceased, minor or incompetent]")

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the aforesaid Principal shall

pay all cost and expenses which may be incurred in case the proceedings herein are dismissed for any reason and no contract is
(If a Public Official Bond insert "faithfully perform the duties of said office")

entered into for the construction of such improvement as proposed in the petition. Petitioners covenant they will not allow the costs
(If a License or Permit Bond insert "comply with the laws of the aforesaid Obligor governing said License or Permit")

incurred to exceed the amount of the bond submitted herewith. Being part of a County Ditch the improvement will be a public utility
Principal as (Guardian, Administrator, Conservator, Executor, etc.) will faithfully discharge the duties of their trust as Fiduciary of the person and/or estate in this matter according to law

Then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED: That the liability of the Surety shall in no event exceed the penalty of this Bond.

the petitioners acknowledge that they have been informed and understand that they may not withdraw as a petitioner at any time
(If no further conditions insert "no further conditions")

once this petition is filed. The petitioners understand that if the proposed drainage proceedings are dismissed each of them is

responsible for the payment of all costs incurred. The Surety may terminate this bond at any time by giving thirty (30) days written

notice of cancellation to both the Obligor and the Principal.

Byron Goodrich and Faribault County Ditch No. 10 landowners/petitioners

Byron F. Goodrich
Principal

Auto-Owners

Surety

By

Chad W. [Signature]

Attorney-in-Fact



WHEREAS, the aforesaid Principal petitioned to proceed in the matter of the improvements part of the main of Faribault County Ditch 10. Said petition is being addressed before the Board of Commissioners Drainage Authority of Faribault County pursuant to Minnesota Statutes 103E.215 with respect to a petition for a lateral. This bond remains in effect for the term beginning November 10, 2016, and ending November 10, 2017. This bond may be automatically renewed for additional terms by Continuation Certificate issued by the Surety.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the aforesaid Principal shall pay all cost and expenses which may be incurred in case the proceedings herein are dismissed for any reason and no contract is entered into for the construction of such improvement as proposed in the petition. Petitioners covenant they will not allow the costs incurred to exceed the amount of the bond submitted herewith. Being part of a County Ditch the improvement will be a public utility. If a contract is entered into for the construction of such improvement

DATE AND ATTACH TO ORIGINAL BOND
AUTO-OWNERS INSURANCE COMPANY

LANSING, MICHIGAN
POWER OF ATTORNEY

NO. 66237973

KNOW ALL MEN BY THESE PRESENTS: That the AUTO-OWNERS INSURANCE COMPANY AT LANSING, MICHIGAN, a Michigan Corporation, having its principal office at Lansing, County of Eaton, State of Michigan, adopted the following Resolution by the directors of the Company on January 27, 1971, to wit:

"RESOLVED, That the President or any Vice President or Secretary or Assistant Secretary of the Company shall have the power and authority to appoint Attorneys-in-fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity, and other writings obligatory in the nature thereof. Signatures of officers and seal of Company imprinted on such powers of attorney by facsimile shall have same force and effect as if manually affixed. Said officers may at any time remove and revoke the authority of any such appointee."

Does hereby constitute and appoint **CHAD W OSTERMANN**

its true and lawful attorney(s)-in-fact, to execute, seal and deliver for and on its behalf as surety, any and all bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof, and the execution of such instrument(s) shall be as binding upon the AUTO-OWNERS INSURANCE COMPANY AT LANSING, MICHIGAN as fully and amply, to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal office.

IN WITNESS WHEREOF, the AUTO-OWNERS INSURANCE COMPANY AT LANSING, MICHIGAN, has caused this to be signed by its authorized officer this 1st day of August, 2016.

Denise Williams

Denise Williams

Senior Vice President

STATE OF MICHIGAN } ss.
COUNTY OF EATON }

On this 1st day of August, 2016, before me personally came Denise Williams, to me known, who being duly sworn, did depose and say that they are Denise Williams, Senior Vice President of AUTO-OWNERS INSURANCE COMPANY, the corporation described in and which executed the above instrument, that they know the seal of said corporation, that the seal affixed to said instrument is such Corporate Seal, and that they received said instrument on behalf of the corporation by authority of their office pursuant to a Resolution of the Board of Directors of said corporation.



My commission expires March 10, 2022.

Susan E. Theisen

Susan E. Theisen

Notary Public

STATE OF MICHIGAN } ss.
COUNTY OF EATON }

I, the undersigned Senior Vice President, Secretary and General Counsel of AUTO-OWNERS INSURANCE COMPANY, do hereby certify that the authority to issue a power of attorney as outlined in the above board of directors resolution remains in full force and effect as written and has not been revoked and the resolution as set forth is now in force.

Signed and sealed at Lansing, Michigan. Dated this 10th day of November, 2016.



William F. Woodbury

William F. Woodbury, Senior Vice President, Secretary and General Counsel

3

STATE OF MINNESOTA
Before the
FARIBAULT COUNTY BOARD OF COMMISSIONERS
SITTING AS THE DRAINAGE AUTHORITY FOR
COUNTY DITCH #10

In the Matter of:

the Petition for a Lateral to CD10

PRELIMINARY FINDINGS AND ORDER

The Faribault County Board of Commissioners, sitting as the drainage authority for County Ditch #10, convened on February 7, 2017, at 9:00 a.m. at the Faribault County Courthouse, 415 North Main, Blue Earth, Minnesota. Based on the record and proceedings, Commissioner Loveall moved, seconded by Commissioner Warmka to adopt the following Findings and Order:

Findings:

1. A petition dated January 18, 2017 was received by the Faribault County Auditor requesting a lateral to County Ditch #10 pursuant to Minn. Stat. §103E.225.
2. Kurt Deter, Attorney for the Drainage Authority reviewed the petition and bond filed with the county and determined that the petition and bond met the requirement of the proceedings for a lateral to County Ditch #10.
3. The drainage authority finds that it has jurisdiction over these proceedings and pursuant to Minn. Stat. § 103E.241, subd. 1 desires to appoint an engineer to make a preliminary survey.

Order:

Based on the foregoing Findings and the entire record of proceedings before the Board, the Board, acting as the drainage authority for County Ditch #10 hereby orders as follows:

- A. That Charles Brandel, I&S Group is hereby appointed as the engineer for these proceedings and shall make a preliminary survey pursuant to Minn. Stat. ch. 103E.

- B. Prior to commencing any work, the engineer must subscribe to an oath to faithfully perform the assigned duties in the best manner possible and file a bond in the amount of \$10,000 with the County Auditor within ten days after being appointed.
- C. The engineer may appoint assistant engineers and hire help necessary to complete the engineer's duties. The engineer shall be responsible for the assistant engineers and may remove them.
- D. The engineer shall make an expense report showing the costs incurred by the engineer and expenses incurred under the engineer's direction relating to the proceeding, and include the names of the engineer, engineer assistants, and employees and the time each was employed, and every item of expense incurred by the engineer. The engineer must file this report with the auditor as soon as possible and may not incur expenses for the proceeding greater than the petitioner's bond.

After discussion, the Board Chair called the question. The question was on the adoption of the foregoing findings and order, and there were 5 yeas, 0 nays, 0 absent, and abstentions as follows:

	Yea	Nay	Absent	Abstain
Loveall	☒	☐	☐	☐
Groskreutz	☒	☐	☐	☐
Roper	☒	☐	☐	☐
Young	☒	☐	☐	☐
Warmka	☒	☐	☐	☐

Upon vote, the Chair declared the motion passed and the Findings and Order adopted.


 John Roper, Chairperson

Dated: 2.7.2017

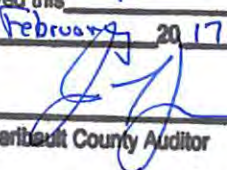
* * * * *

I, John Thompson, Faribault County Auditor do hereby certify that I have compared the above motion; findings and order with the original thereof as the same appears of record and on file with the Faribault County Auditor and find the same to be a true and correct transcript thereof. The above order was filed with me, on February 7, 2017.

IN TESTIMONY WHEREOF, I hereunto set my hand this
13th day of February, 2017.



John Thompson
Faribault County Auditor-Treasurer-Coordinator

Received this 13th
day of February, 2017


Faribault County Auditor
By _____ Deputy

**BEFORE THE FARIBAULT COUNTY BOARD OF
COMMISSIONERS, ACTING AS DRAINAGE AUTHORITY
FOR FARIBAULT COUNTY DITCH #10**

**Findings of Fact and Order Approving
Preliminary Engineer's Report, Ordering of Final
Engineer's Report and Appointment of Viewers**

At a public meeting conducted by the Faribault County Board of Commissioners, sitting as the drainage authority for County Ditch #10, on November 5, 2019, Commissioner Lovca II moved, seconded by Commissioner Warmka for adoption of the following Findings and Order:

WHEREAS, a Petition was submitted, along with a Bond, requesting the establishment of a Lateral to Faribault County Ditch #10; and

WHEREAS, Chuck Brandel of ISG was appointed the engineer to provide a Preliminary Engineer's Report; and

WHEREAS, the Preliminary Engineer's Report was filed with the Faribault County Auditor; and

WHEREAS, an initial preliminary hearing was held on April 10, 2019, and continued to October 7, 2019; and

WHEREAS, at the continued preliminary hearing on October 7, 2019, the Affidavit of Mailing, Affidavit of Posting and Affidavit of Publication was accepted into the record; and

WHEREAS, Engineer Chuck Brandel presented the Engineer's Preliminary Report, which contains several options for the Lateral, with costs ranging from \$84,339.00 to \$285,840.00; and

WHEREAS, Engineer Chuck Brandel recommended that the Lateral known as Option 1 or Option 2 be considered; and

WHEREAS, the DNR Advisory Report was read into the record; and

WHEREAS, the hearing was open for public comment and questions concerning who would benefit from the Lateral, how the Lateral would be paid for and issues on the Schmidt property were discussed. That further, there was a general discussion concerning the viewers' determination of benefits and damages, but it was indicated that the viewers make that final recommendation; and

WHEREAS, landowners representing the Goodrich property indicate their desire for the Lateral so as to receive their benefits and have adequate drainage for their tile lines on their property.

NOW, THEREFORE, based on the Preliminary Engineer's Report and all other evidence submitted and discussed at the preliminary hearing, the Faribault County Board of Commissioners, acting as Drainage Authority for Faribault County Ditch #10, makes the following Findings and Order:

FINDINGS OF FACT

1. The proposed drainage project outlined in the Petition, or modified and recommended by the engineer, is feasible.
2. There is a necessity for the proposed drainage project.
3. The proposed drainage project will be of public benefit and promote the public health after considering the environmental and land use criteria in Section 103E.015, Subd. 1.
4. The outlet is adequate.

ORDER

NOW, THEREFORE, it is hereby ordered that the Preliminary Engineer's Report is hereby approved and the engineer is ordered to complete a Final Engineer's Report. That specifically, the engineer is ordered to add Option 4 and Option 5, as discussed at the hearing and to not proceed further on Option 3. That Mark Behrends, Kendall Langseth, Robert Hanson, Dennis Distad and Bruce Ness are appointed viewers, with three of the viewers to complete a Viewers' Report, depending on availability of the viewer.

After discussion, the Board Chair called the question. The question was on the adoption of the foregoing findings and order, and there were 5 yeas, 0 nays, 0 absent, and 0 abstentions as follows:

	Yea	Nay	Absent	Abstain
Groskreutz	☒	☐	☐	☐
Loveall	☒	☐	☐	☐
Roper	☒	☐	☐	☐
Warmka	☒	☐	☐	☐
Young	☒	☐	☐	☐

Upon vote, the Chair declared the motion passed and the Findings and Order adopted.

Dated this 5th day of November, 2019.

FARIBAULT COUNTY BOARD OF
COMMISSIONERS, ACTING AS DRAINAGE
AUTHORITY FOR FARIBAULT COUNTY
DITCH #10

By 
Its Chairperson

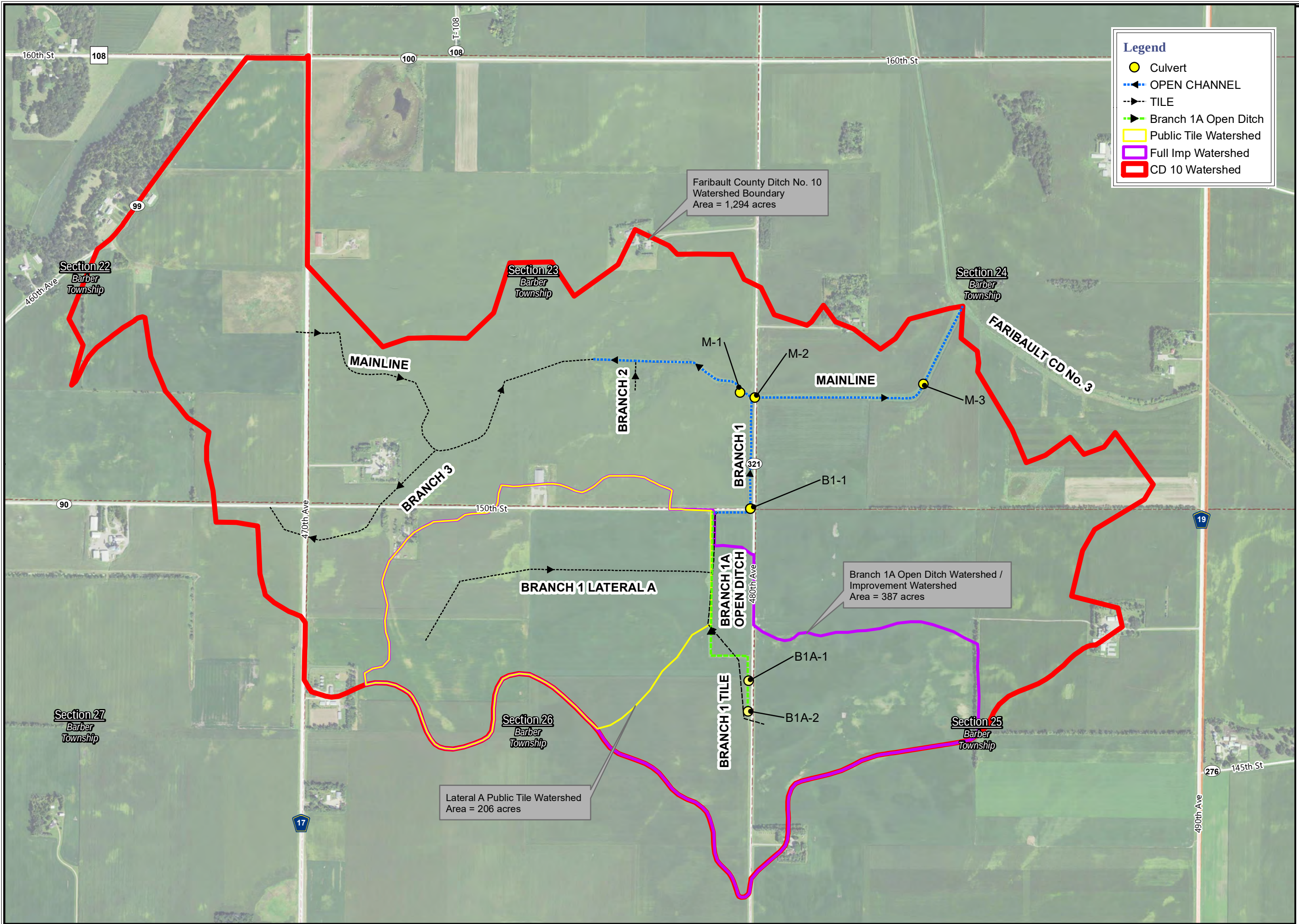
I Darren Esser, Faribault County Auditor, do hereby certify that I have compared the above motion, findings and order with the original thereof, as the same appears of record and on file with the Faribault County Drainage Authority and find the same to be a true and correct transcript thereof. The above Order was filed with the Faribault County Auditor on 11-05-2019.

IN TESTIMONY WHEREOF, I hereunto set my hand this 5th day of November, 2019.



Darren Esser, Faribault County Auditor

Appendix C: Maps



Watershed Map

County Ditch No 10

Faribault County,
Minnesota
Friday, October 16, 2020

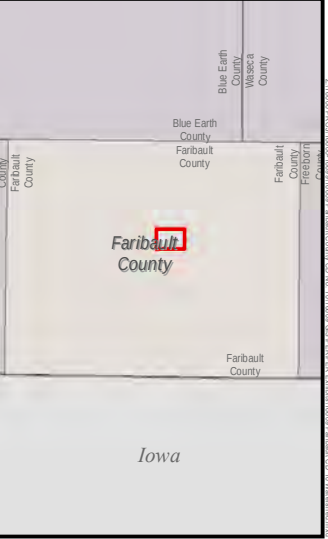
PN: 14-16609

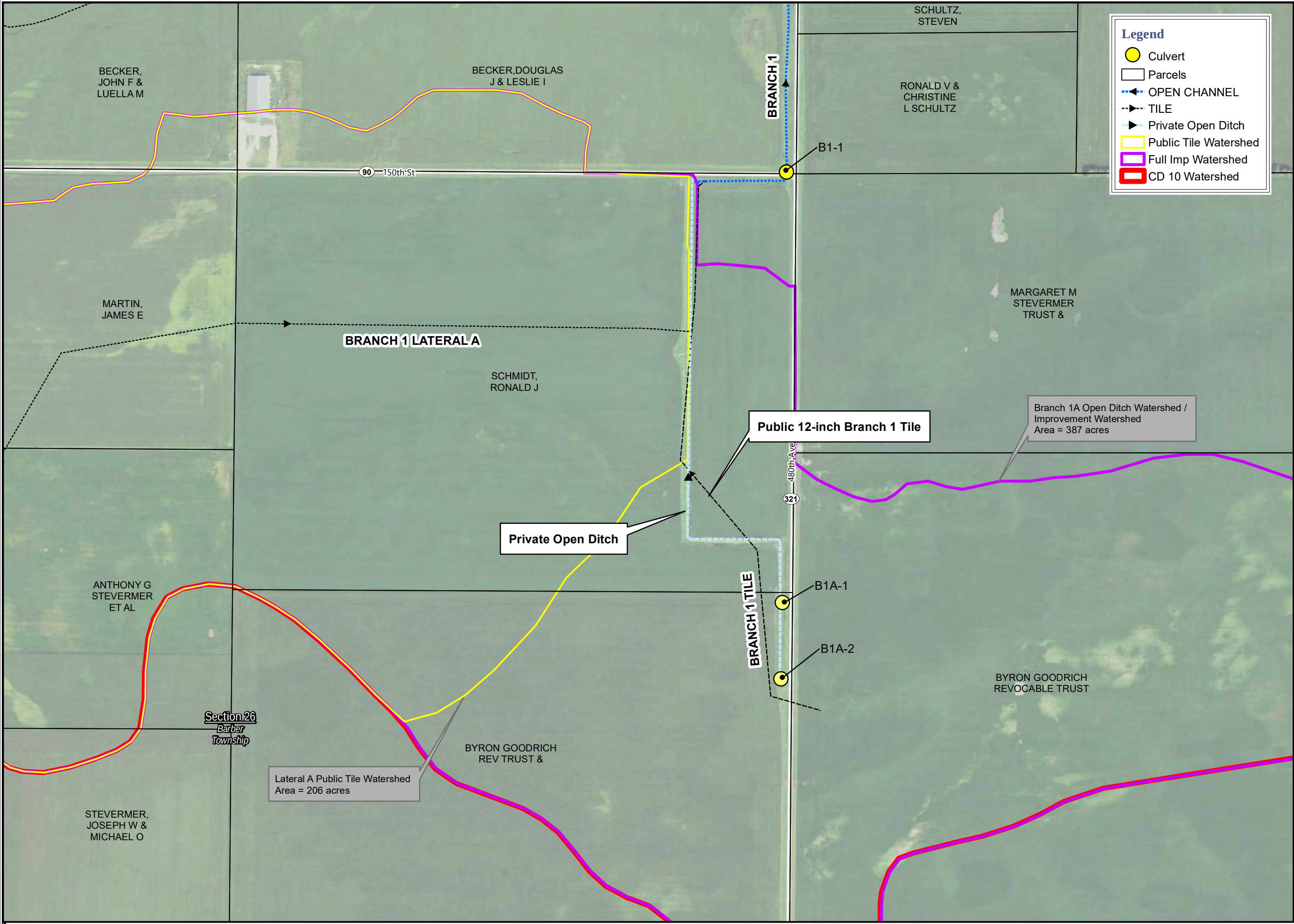
Source:

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)



0 260 520 1,040
Feet





Existing
Condition
County Ditch No 10
Faribault County,
Minnesota
Friday, October 16, 2020

PN: 14-16609

Source:

Orthophotograph (MnGeo WMS, 2015)

Tile/Ditch (XX County, 12/16/2016)

Parcels (XX County, 12/16/2016)

Lakes (MN DNR, July, 2008)

Major Stream (MN DNR, July 2008)

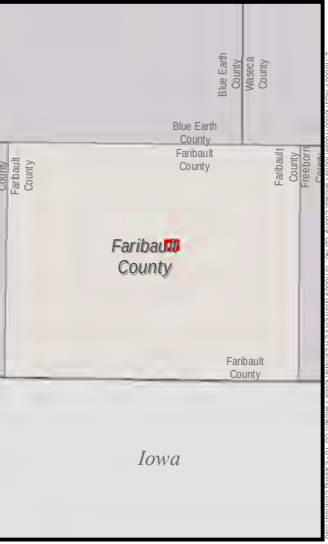
Counties (MN DNR, July 2013)

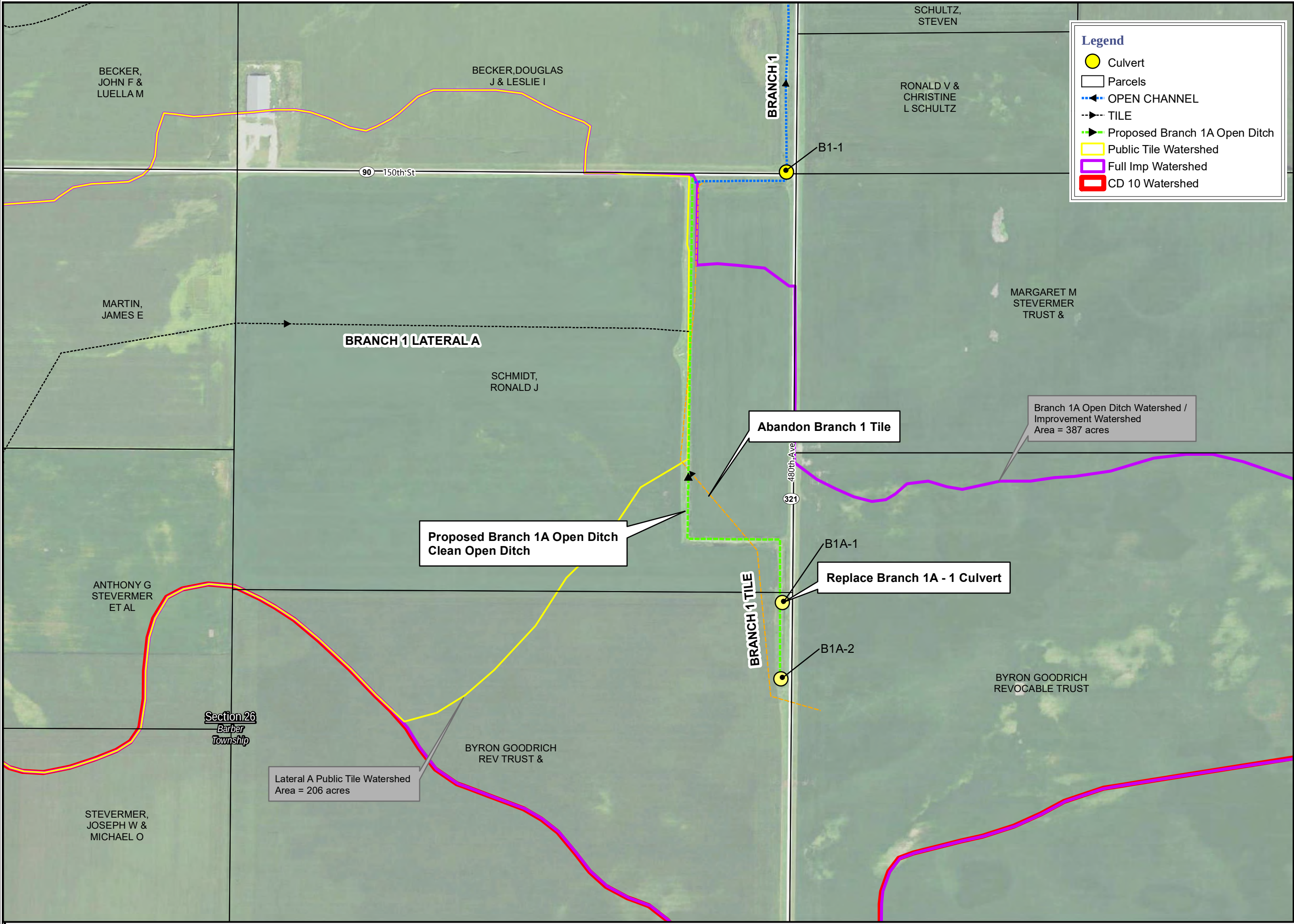
PLSS (MnGeo/USGS)

N



0 105 210 420
Feet





**Proposed
Option 1
County Ditch No 10**
Faribault County,
Minnesota
Friday, October 16, 2020

PN: 14-16609

Source:

Orthophotograph (MnGeo WMS, 2015)

Tile/Ditch (XX County, 12/16/2016)

Parcels (XX County, 12/16/2016)

Lakes (MN DNR, July, 2008)

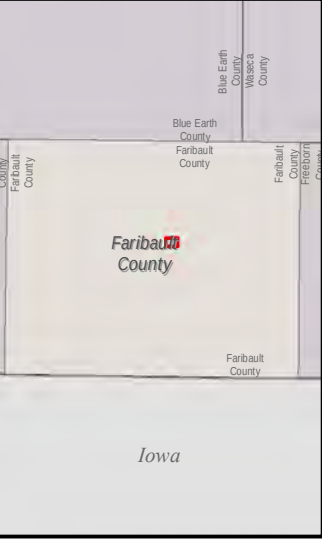
Major Stream (MN DNR, July 2008)

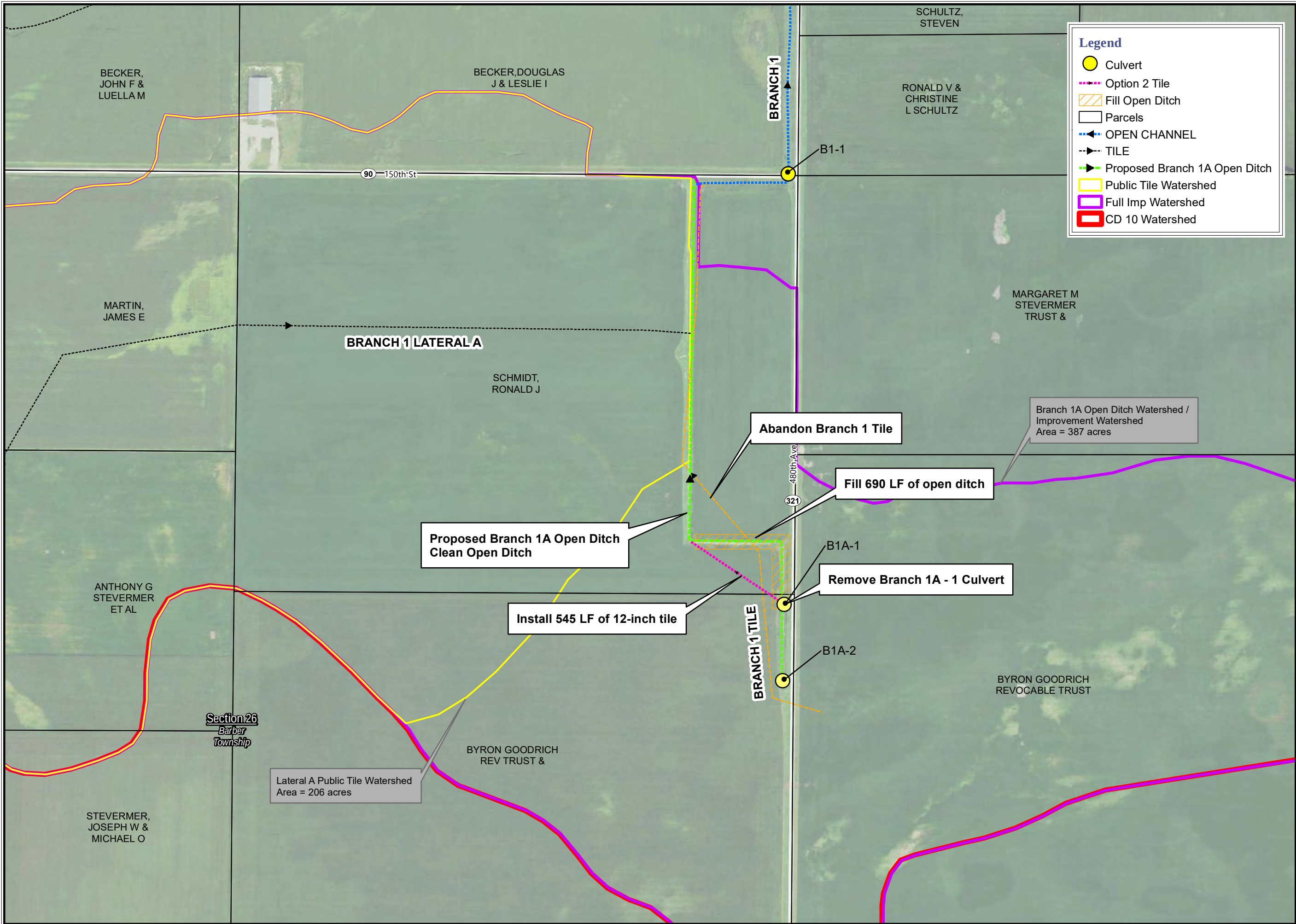
Counties (MN DNR, July 2013)

PLSS (MnGeo/USGS)



0 105 210 420
Feet





Legend

- Culvert
- Option 2 Tile
- Fill Open Ditch
- Parcels
- OPEN CHANNEL
- TILE
- Proposed Branch 1A Open Ditch
- Public Tile Watershed
- Full Imp Watershed
- CD 10 Watershed

**Proposed
Option 2
County Ditch No 10**

Faribault County,
Minnesota

Friday, October 16, 2020

PN: 14-16609

Source:

Orthophotograph (MnGeo WMS, 2015)

Tile/Ditch (XX County, 12/16/2016)

Parcels (XX County, 12/16/2016)

Lakes (MN DNR, July, 2008)

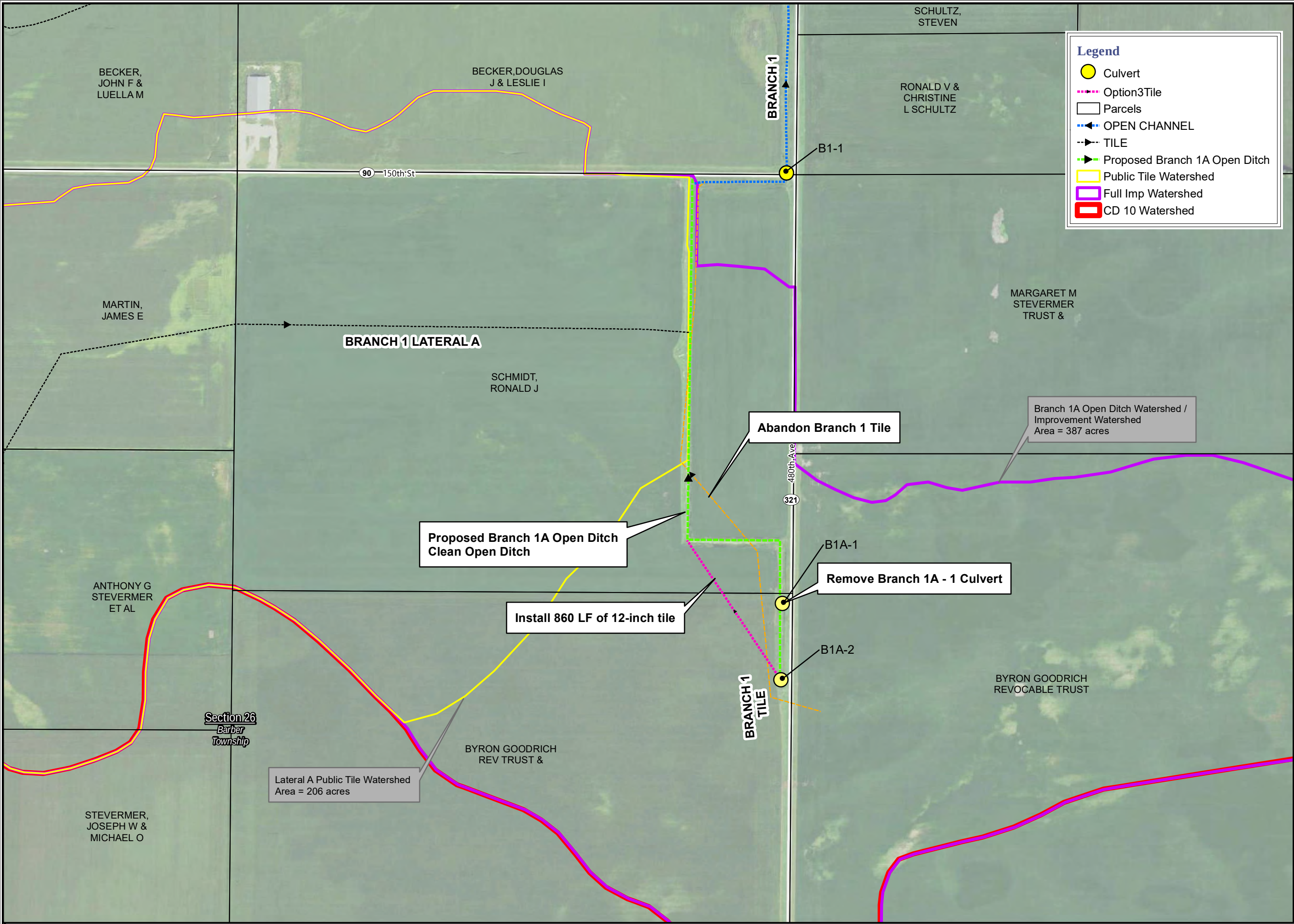
Major Stream (MN DNR, July 2008)

Counties (MN DNR, July 2013)

PLSS (MnGeo/USGS)

0 105 210 420

Feet



**Proposed
Option 3
County Ditch No 10**
Faribault County,
Minnesota
Friday, October 16, 2020

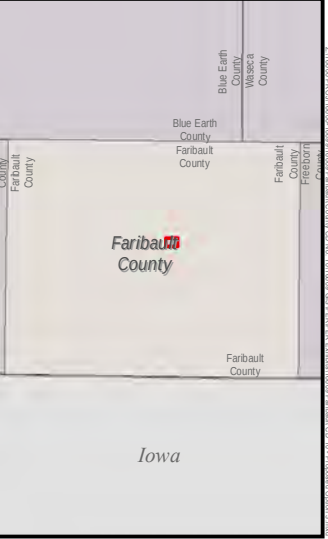
PN: 14-16609

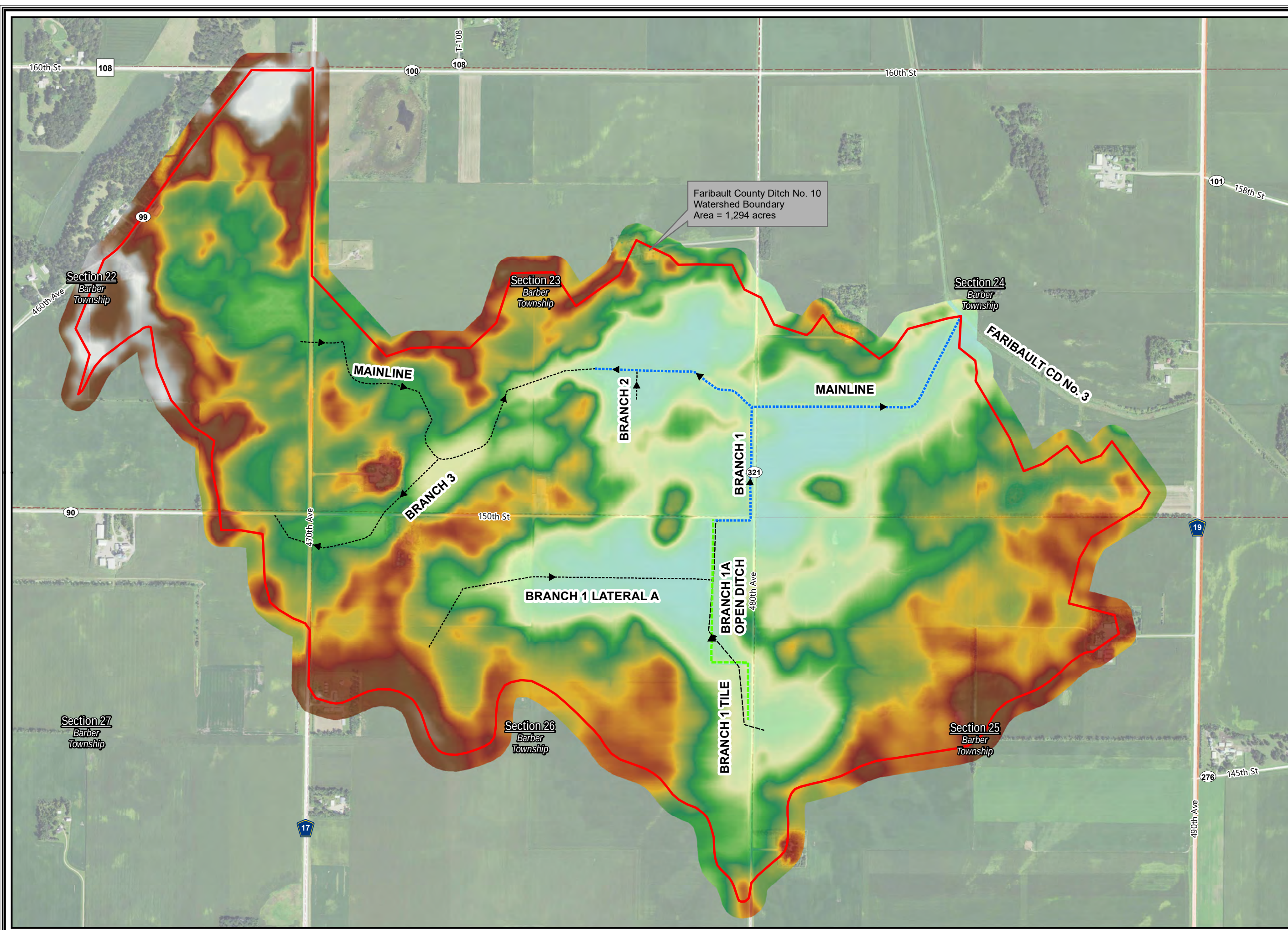
Source:

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)



0 100 200 400 Feet





Elevation Map
County Ditch No 10
Faribault County,
Minnesota
Friday, October 16, 2020

Legend

- CD 10 Watershed
 - OPEN CHANNEL
 - TILE
 - Branch 1A Open Ditch
- Elevation**
High : 1167.47
Low : 1083.42

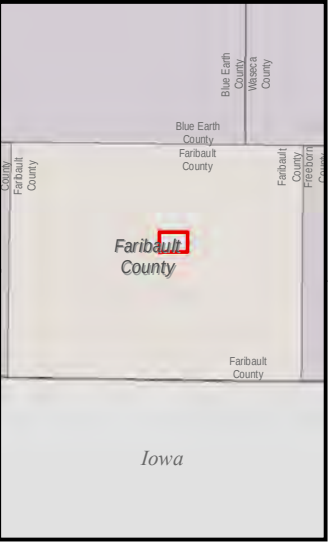
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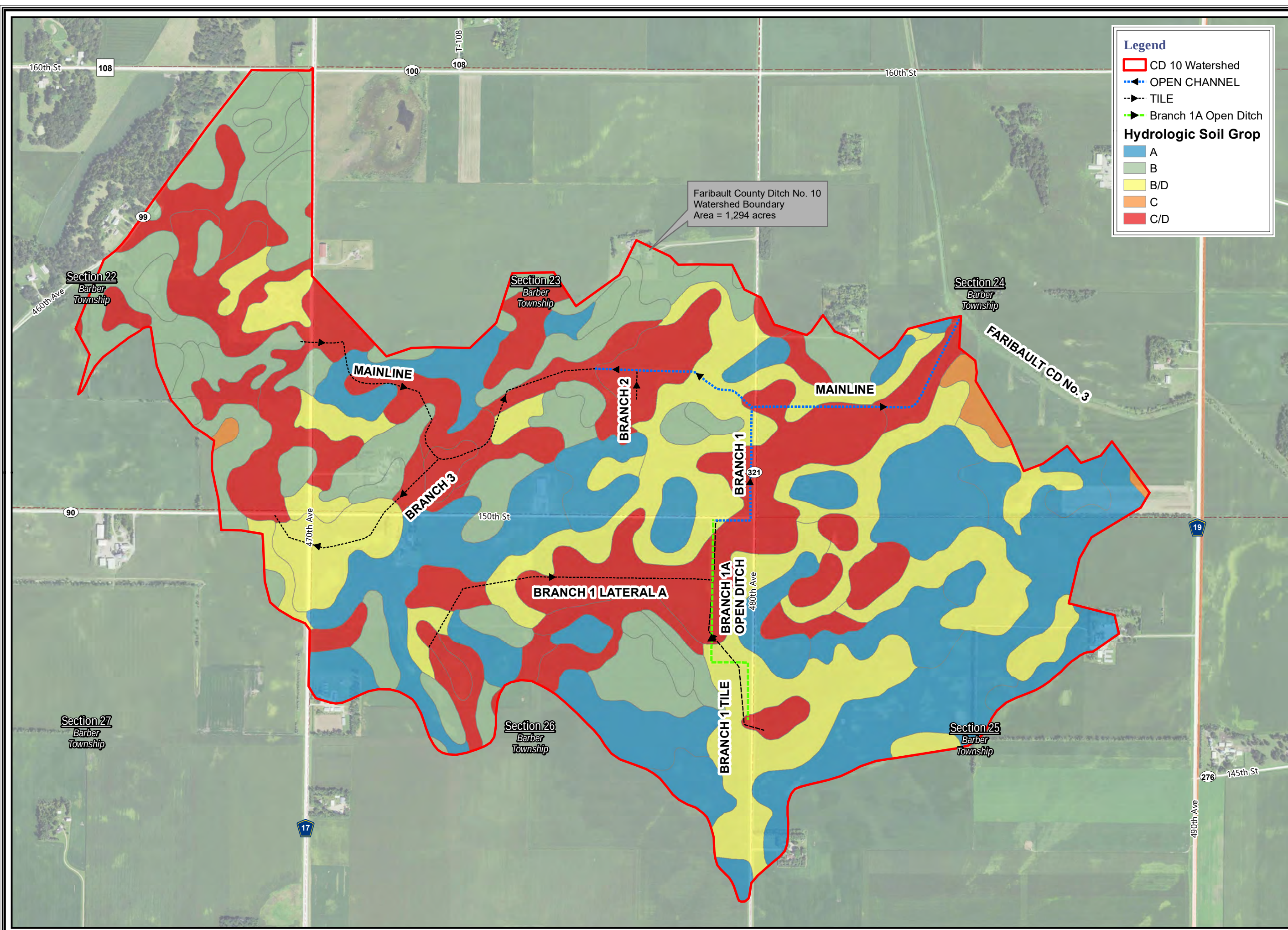
Source:

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)



0 260 520 1,040
Feet





Legend

- CD 10 Watershed
- OPEN CHANNEL
- TILE
- Branch 1A Open Ditch

Hydrologic Soil Grop

- A
- B
- B/D
- C
- C/D

Hydrologic Soil Group Map

County Ditch No 10

Faribault County, Minnesota

Friday, October 16, 2020

PN: 14-16609

Source:

Orthophotograph (MnGeo WMS, 2015)

Tile/Ditch (XX County, 12/16/2016)

Parcels (XX County, 12/16/2016)

Lakes (MN DNR, July, 2008)

Major Stream (MN DNR, July 2008)

Counties (MN DNR, July 2013)

PLSS (MnGeo/USGS)

0 255 510 1,020 Feet



**Level 1
Wetland
Delineation**
County Ditch No 10
Faribault County,
Minnesota
Wednesday, November 11, 2020

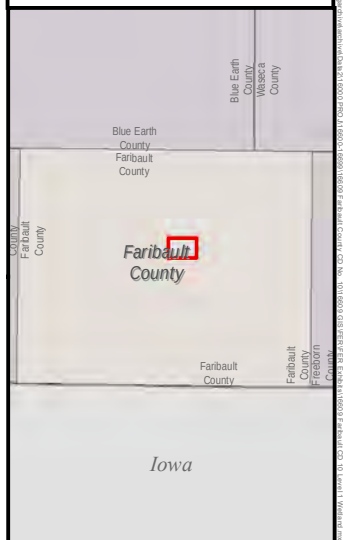
PN: 14-16609

Source:

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)



0 260 520 1,040
Feet





Soil
Classificaion
Map
County Ditch No 10
Faribault County,
Minnesota
Friday, October 16, 2020

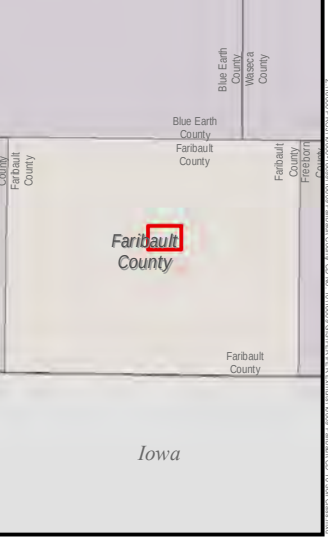
PN: 14-16609

Source:

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)



0 310 620 1,240
Feet



Section 21
Barber
Township

Section 22
Barber
Township

Section 23
Barber
Township

Section 24
Barber
Township

Section 27
Barber
Township

Section 26
Barber
Township

Section 25
Barber
Township

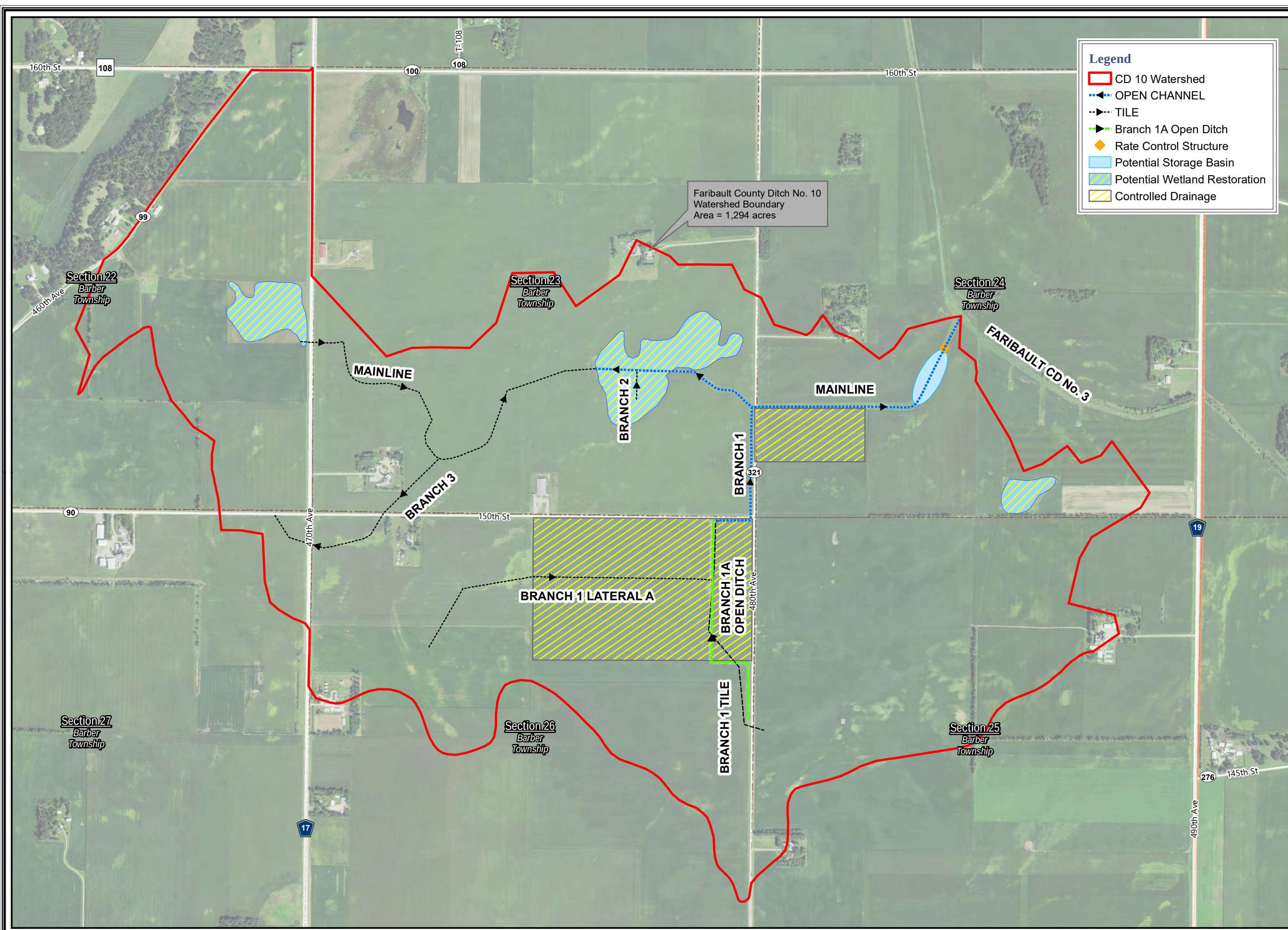
Legend

- CD 10 Watershed
- OPEN CHANNEL
- TILE
- Branch 1A Open Ditch

muaggatt_1

- Blue Earth mucky silt loam, 0 to 1 percent slopes
- Canisteo clay loam, 0 to 2 percent slopes
- Canisteo-Glencoe complex, 0 to 2 percent slopes
- Clarion-Estherville complex, 2 to 6 percent slopes
- Clarion-Storden complex, 6 to 10 percent slopes, moderately eroded
- Clarion-Storden-Estherville complex, 6 to 12 percent slopes, eroded
- Clarion-Swanlake complex, 2 to 6 percent slopes
- Crippin loam
- Darfur loam
- Delft clay loam, 0 to 2 percent slopes
- Dickinson fine sandy loam, 0 to 6 percent slopes
- Dickinson fine sandy loam, 6 to 12 percent slopes
- Estherville sandy loam, 2 to 6 percent slopes
- Fieldon loam, 0 to 2 percent slopes
- Fieldon-Canisteo complex
- Glencoe clay loam, 0 to 1 percent slopes
- Grogan silt loam, 1 to 6 percent slopes
- Kingston silty clay loam, 1 to 3 percent slopes
- Klossner muck, 0 to 1 percent slopes
- Klossner muck, lake plain, depressional, 0 to 1 percent slopes
- Lakefield silt loam
- Madelia silty clay loam, 0 to 2 percent slopes
- Muskego soils, 0 to 1 percent slopes
- Ocheyedan loam, 2 to 6 percent slopes
- Ocheyedan loam, 6 to 12 percent slopes, eroded
- Sparta loamy fine sand, 0 to 6 percent slopes
- Spicer silty clay loam, 0 to 2 percent slopes
- Storden-Clarion complex, 12 to 18 percent slopes, eroded
- Terril loam, 2 to 6 percent slopes
- Truman silt loam, 2 to 6 percent slopes
- Truman-Bold complex, 6 to 12 percent slopes, eroded

Appendix D: Multipurpose Drainage Management



Legend

- CD 10 Watershed
- OPEN CHANNEL
- TILE
- Branch 1A Open Ditch
- Rate Control Structure
- Potential Storage Basin
- Potential Wetland Restoration
- Controlled Drainage

Multipurpose Drainage Management

County Ditch No 10

Faribault County,
Minnesota

Friday, October 16, 2020

PN: 14-16609

Source:

Orthophotograph (MnGeo WMS, 2015)
Tile/Ditch (XX County, 12/16/2016)
Parcels (XX County, 12/16/2016)
Lakes (MN DNR, July, 2008)
Major Stream (MN DNR, July 2008)
Counties (MN DNR, July 2013)
PLSS (MnGeo/USGS)

0 260 520 1,040 Feet

Multi-Purpose Drainage Management Plan

Multi-purpose drainage management incorporates Best Management Practices (BMPs) which utilize effective measures aimed at reducing sediment and nutrient loading, and improving water quality. These BMPs are divided into the following three areas.

Preventative Measures

Preventative measures that can be applied throughout the watershed include crop rotation, cover crops, residue management, and nutrient management. These measures are aimed at controlling sediment, minimizing erosion and nutrient loss, and sustaining the soils health, all without dramatically changing the current land use of the landscape.

Control Measures

Control measures are practices aimed at improving water quality directly associated with the flow of water by reducing peak flow and providing in-stream storage, sedimentation, and nutrient uptake. Examples of control measures include alternative tile intakes, grassed waterways, two stage ditches, water control structures, and controlled subsurface drainage. These practices are directly linked to the conveyance of subsurface tile water or open channel ditch flow.

Treatment Measures

The function of treatment measures is to improve water quality by directly removing sediment and nutrients from the subsurface or surface water flow throughout a watershed. Examples of treatment measures include surge basins (storage ponds), filter/buffer strips, wetland restorations, woodchip bioreactors, and water and sediment control basins (WASCOBs). These practices may be incorporated to either the public or private drainage systems.

Conservative Drainage Practices

Conservative drainage practices, such as construction of controlled drainage systems, provide an option for improving the water quality within a drainage system. Through utilization of control structures, these systems are designed to allow agricultural producers to regulate water levels in their fields. The water level in the ground can be lowered during planting and harvest seasons and allowed to rise during the growing season. Water and nutrients stored in the soil during the growing season can then be used by the crops during drier periods, potentially increasing yields.

Funding

There are several outside sources of funding to potentially help pay for water quality improvements implemented in a ditch improvement project such as this. A main source of funding for this type of project is through the Minnesota Board of Water and Soil Resources (BWSR) Clean Water Fund (CWF). The primary purpose of activities funded with grants associated with the CWF is to restore, protect and enhance water quality. One CWF grant program is the Multipurpose Drainage Management Grant. This grant is geared towards implementing practices that will reduce the transport of sediment and nutrient loads. Some practices that have been funded in the past include grade stabilization, grassed waterways, water and sediment control basins, alternative side inlets, saturated buffers, storage wetlands, denitrifying bioreactors, etc.

Another potential source is the Legislative-Citizen Commission on Minnesota Resources (LCCMR) Environment and Natural Resources Trust Fund (ENRTF) which was established to provide funding for activities that protect, conserve, preserve, and enhance Minnesota's "air, water, land, fish, wildlife, and other natural resources." The LCCMR prioritizes innovative ideas that provide multiple benefits.

Potential locations for additional BMPs are shown on the Multi-Purpose Drainage Management map in this Appendix. If landowners are interested in pursuing practices that go beyond this project scope, a few programs may be a source for funding. The Agriculture Best Management Practices (BMP) Loan Program provides loans to rural landowners to encourage BMPs that help counteract pollution problems.

Another option for individual landowners that are interested in pursuing additional practices is the Environmental Quality Incentives Program (EQIP). EQIP is a voluntary program through the NRCS that provides financial assistance to individual landowners for various conservative practices as identified above.

In addition, the BWSR Community Partners Grant may be an option. This grant leverages the interest of non-governmental partners such as lake and river associations, boy/girl scout troops and other civic groups to install on-the ground projects that reduce runoff and keep water on the land. It also allows for multiple local government units to work together on a project that involves the Community Partners Grant. Projects installed with the Community Partners Grant are intended to be structural or vegetative practices designed to reduce runoff and/or keep water on the land.

All of the water quality measures proposed with this project are applicable for some source of outside funding. The sources listed above are grants that could be a good fit for this project and if the timing of the project works in conjunction with the grant schedule. These grants can be applied for, if there is support from the drainage authority and/or interest from landowners.

Currently, this project proposes to use Alternative Side Inlets (ASI) strategically installed in critical locations along the open ditch to allow for temporary storage (24-36 hours) and sedimentation. Potential locations for these and additional BMPs are shown on the *Multi-Purpose Drainage Management Map* in Appendix D and will be proposed to landowners. Furthermore; additional water quality measures can be implemented with this project if requested.

Appendix E: Modeling

ISG

XP SWMM FLOWRATE TABLE

Denotes peak flows less than or equal to existing

XP SWMM ELEVATION TABLE

[illegible]

ISG

XP SWMM FLOWRATE TABLE

Denotes peak flows less than or equal to existing

XP SWMM ELEVATION TABLE

[illegible]

ISG

XP SWMM FLOWRATE TABLE

Denotes peak flows less than or equal to existing

XP SWMM ELEVATION TABLE

Denotes peak elevation less than or equal to existing

Appendix F: Preliminary Cost Estimates

BRANCH 1 TILE REPAIR / SEPARABLE MAINTENANCE COSTS

Branch 1 Tile

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	\$ 4,510.00	\$ 4,510
102	12-INCH AGRICULTURAL TILE	LF	2800	\$ 17.10	\$ 47,880
103	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	12	\$ 500.00	\$ 6,000
104	CONNECT EXISTING 15-INCH TILE	EA	1	\$ 708.60	\$ 709
105	CONNECT EXISTING 12-INCH TILE	EA	1	\$ 573.20	\$ 573
106	SAND OR CLSM FILL PIPE UNDER ROAD (12-INCH)	LF	60	\$ 9.20	\$ 552
107	GRANULAR PIPE FOUNDATION	CY	166	\$ 21.60	\$ 3,593
108	BULKHEAD EXISTING TILE	EA	6	\$ 175.50	\$ 1,053
109	FURNISH & INSTALL WATER QUALITY INLET	EA	2	\$ 1,347.90	\$ 2,696
110	INSTALL 12-INCH PERFORATED TILE (WATER QUALITY INLET)	LF	40	\$ 17.10	\$ 684
111	INSTALL DROP INTAKE (18-INCH)	EA	3	\$ 1,075.00	\$ 3,225
112	CAP DROP INTAKE (18-INCH)	EA	1	\$ 236.10	\$ 236
113	FILL EXISTING OPEN DITCH	CY	4480	\$ 4.00	\$ 17,920
114	12-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 730.80	\$ 731
115	OPEN CUT & RESTORE GRAVEL ROAD OR DRIVEWAY	EA	1	\$ 1,698.50	\$ 1,699
116	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 3	SY	500	\$ 2.50	\$ 1,250
117	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	0.75	\$ 1,060.20	\$ 795
118	INSTALL PERIMETER CONTROL	LF	200	\$ 2.50	\$ 500
TOTAL					\$ 94,700
10% UNFORSEEN					\$ 9,470
SUBTOTAL					\$ 104,170
TEMPORARY DAMAGES		AC	6.43	\$ 650.00	\$ 4,178
COUNTY ADMINISTRATION COSTS					\$ 5,209
TOPOGRAPHIC SURVEY					\$ 4,600
REPORTS, PLANS AND SPECIFICATIONS					\$ 18,251
CONSTRUCTION STAKING & ADMINISTRATION					\$ 20,834
TOTAL BRANCH 1 TILE REPAIR COST					\$ 157,242

IMPROVEMENT OPTION 1

Branch 1A Open Ditch Opt 1

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	\$ 4,000.00	\$ 4,000
102	INSTALL 12-INCH ASI RISER ASSEMBLY W/TRASH GRATE	EA	2	\$ 1,290.50	\$ 2,581
103	INSTALL 12-INCH ASI OUTLET ASSEMBLY	EA	2	\$ 1,229.00	\$ 2,458
104	DITCH DEEPENING (4' WIDE DITCH BOTTOM)	LF	1796	\$ 4.50	\$ 8,082
105	DITCH WIDENING (4' WIDE DITCH BOTTOM)	LF	978	\$ 3.75	\$ 3,668
106	TOP SOIL STRIP & PLACE SPOILS	AC	1.6	\$ 5,250.00	\$ 8,358
107	SLOUGH REPAIR	LF	300	\$ 4.20	\$ 1,260
108	STRUCTURE REPLACEMENT SLOUGH REPAIR	LF	100	\$ 10.00	\$ 1,000
109	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2	\$ 1,150.30	\$ 2,301
110	15-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 743.90	\$ 744
111	12-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2	\$ 730.80	\$ 1,462
112	10-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 688.10	\$ 688
113	8-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 634.10	\$ 634
114	ARMOR TILE OUTLET (RIPRAP & GEOTEXTILE FABRIC)	EA	3	\$ 450.40	\$ 1,351
115	30-INCH CLASS III RCP PIPE	LF	56	\$ 175.00	\$ 9,800
116	OPEN CUT & RESTORE FIELD CROSSING	EA	1	\$ 1,277.30	\$ 1,277
117	REMOVE EXISTING SIDE INTAKE	EA	2	\$ 250.00	\$ 500
118	REMOVE CMP CULVERT	EA	1	\$ 675.10	\$ 675
119	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	2.11	\$ 1,060.20	\$ 2,237
120	STANDARD SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH)	AC	1.28	\$ 3,450.40	\$ 4,417
121	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	175	\$ 75.00	\$ 13,125
122	BUFFER STRIP MOWING	AC	4.22	\$ 80.50	\$ 340
123	WEED SPRAYING	AC	5.50	\$ 157.30	\$ 865
TOTAL					\$ 71,900
10% UNFORSEEN					\$ 7,190
SUBTOTAL					\$ 79,090
TEMPORARY DAMAGES		AC	5.26	\$ 650.00	\$ 3,419
LAND ACQUISITION/ PERMANENT DAMAGES		AC	5.69	\$ 6,500.00	\$ 36,985
COUNTY ADMINISTRATION COSTS					\$ 3,955
TOPOGRAPHIC SURVEY					\$ 7,510
REPORTS, PLANS AND SPECIFICATIONS					\$ 51,586
CONSTRUCTION STAKING & ADMINISTRATION					\$ 5,500
TOTAL BRANCH 1A OPEN DITCH OPT 1 IMPROVEMENT COST					\$ 188,045

IMPROVEMENT OPTION 2

Branch 1A Open Ditch Opt 2

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	\$ 5,000.00	\$ 5,000
102	INSTALL 12-INCH ASI RISER ASSEMBLY W/TRASH GRATE	EA	2	\$ 1,290.50	\$ 2,581
103	INSTALL 12-INCH ASI OUTLET ASSEMBLY	EA	2	\$ 1,229.00	\$ 2,458
104	DITCH DEEPENING (4' WIDE DITCH BOTTOM)	LF	1156	\$ 4.50	\$ 5,202
105	DITCH WIDENING (4' WIDE DITCH BOTTOM)	LF	978	\$ 3.75	\$ 3,668
106	TOP SOIL STRIP & PLACE SPOILS	AC	0.5	\$ 5,250.00	\$ 2,625
107	SLOUGH REPAIR	LF	300	\$ 4.20	\$ 1,260
108	STRUCTURE REPLACEMENT SLOUGH REPAIR	LF	100	\$ 10.00	\$ 1,000
109	FILL EXISTING OPEN DITCH	CY	4480	\$ 4.00	\$ 17,920
110	24-INCH AGRICULTURAL TILE	LF	525	\$ 29.90	\$ 15,698
111	INSTALL DROP INTAKE (18-INCH)	EA	1	\$ 1,075.00	\$ 1,075
112	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	3	\$ 500.00	\$ 1,500
113	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	4	\$ 1,150.30	\$ 4,601
114	15-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 743.90	\$ 744
115	12-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2	\$ 730.80	\$ 1,462
116	10-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 688.10	\$ 688
117	8-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 634.10	\$ 634
118	ARMOR TILE OUTLET (RIPRAP & GEOTEXTILE FABRIC)	EA	3	\$ 450.40	\$ 1,351
119	REMOVE CMP CULVERT	EA	1	\$ 675.10	\$ 675
120	REMOVE EXISTING SIDE INTAKE	EA	2	\$ 250.00	\$ 500
121	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	1.62	\$ 1,060.20	\$ 1,718
122	STANDARD SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH)	AC	0.98	\$ 3,450.40	\$ 3,381
123	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	145	\$ 75.00	\$ 10,875
124	BUFFER STRIP MOWING	AC	3.24	\$ 80.50	\$ 261
125	WEED SPRAYING	AC	4.22	\$ 157.30	\$ 664
TOTAL					\$ 87,600
10% UNFORSEEN					\$ 8,760
SUBTOTAL					\$ 96,360
TEMPORARY DAMAGES		AC	6.28	\$ 650.00	\$ 4,082
LAND ACQUISITION/ PERMANENT DAMAGES		AC	4.58	\$ 6,500.00	\$ 29,770
COUNTY ADMINISTRATION COSTS					\$ 4,818
TOPOGRAPHIC SURVEY					\$ 7,510
REPORTS, PLANS AND SPECIFICATIONS					\$ 51,586
CONSTRUCTION STAKING & ADMINISTRATION					\$ 5,500
TOTAL BRANCH 1A OPEN DITCH OPT 2 IMPROVEMENT COST					\$ 199,626

IMPROVEMENT OPTION 3

Branch 1A Open Ditch Opt 3

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	\$ 4,000.00	\$ 4,000
102	INSTALL 12-INCH ASI RISER ASSEMBLY W/TRASH GRATE	EA	1	\$ 1,290.50	\$ 1,291
103	INSTALL 12-INCH ASI OUTLET ASSEMBLY	EA	1	\$ 1,229.00	\$ 1,229
104	DITCH DEEPENING (4' WIDE DITCH BOTTOM)	LF	747	\$ 4.50	\$ 3,362
105	DITCH WIDENING (4' WIDE DITCH BOTTOM)	LF	978	\$ 3.75	\$ 3,668
106	TOP SOIL STRIP & PLACE SPOILS	AC	1.0	\$ 5,250.00	\$ 5,198
107	SLOUGH REPAIR	LF	300	\$ 4.20	\$ 1,260
108	STRUCTURE REPLACEMENT SLOUGH REPAIR	LF	100	\$ 10.00	\$ 1,000
109	24-INCH AGRICULTURAL TILE	LF	860	\$ 29.90	\$ 25,714
110	INSTALL DROP INTAKE (18-INCH)	EA	2	\$ 1,075.00	\$ 2,150
111	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	4	\$ 500.00	\$ 2,000
112	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	4	\$ 1,150.30	\$ 4,601
113	15-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 743.90	\$ 744
114	12-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2	\$ 730.80	\$ 1,462
115	10-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 688.10	\$ 688
116	8-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	\$ 634.10	\$ 634
117	ARMOR TILE OUTLET (RIPRAP & GEOTEXTILE FABRIC)	EA	3	\$ 450.40	\$ 1,351
118	REMOVE EXISTING SIDE INTAKE	EA	1	\$ 250.00	\$ 250
119	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	1.31	\$ 1,060.20	\$ 1,389
120	STANDARD SIDESLOPE SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 8 MULCH)	AC	0.80	\$ 3,450.40	\$ 2,760
121	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	145	\$ 75.00	\$ 10,875
122	BUFFER STRIP MOWING	AC	2.62	\$ 80.50	\$ 211
123	WEED SPRAYING	AC	3.42	\$ 157.30	\$ 538
				TOTAL	\$ 76,400
				10% UNFORSEEN	\$ 7,640
				SUBTOTAL	\$ 84,040
TEMPORARY DAMAGES		AC	5.91	\$ 650.00	\$ 3,842
LAND ACQUISITION/ PERMANENT DAMAGES		AC	3.84	\$ 6,500.00	\$ 24,960
				COUNTY ADMINISTRATION COSTS	\$ 4,202
				TOPOGRAPHIC SURVEY	\$ 7,510
				REPORTS, PLANS AND SPECIFICATIONS	\$ 51,586
				CONSTRUCTION STAKING & ADMINISTRATION	\$ 5,500
				TOTAL BRANCH 1A OPEN DITCH OPT 3 IMPROVEMENT COST	\$ 181,640

Appendix G: DNR Preliminary Advisory Report



**Division of Ecological & Water Resources
21371 Highway 15 South
New Ulm, MN 56073**

July 18, 2017

John Thompson
Faribault County Auditor
415 North Main
P.O. Box 130
Blue Earth, MN 56013

Subject: County Ditch 10 Improvements
Preliminary Engineering Report (PER)
Faribault County, MN

Dear Mr. Thompson:

On behalf of the Director of the Division of Ecological and Water Resources of the Department of Natural Resources (MNDNR), I offer the following comments on the Preliminary Engineer's Report (PER) for the project referenced above, in accordance with Minnesota Statutes Section 103E.255.

Of general concern in all proposed ditch improvement is the cumulative effect that the project may have upon downstream water resources, natural resources, and property owners in terms of quantity and quality of water that is received. Project specific and cumulative impacts from ditch projects can result in downstream flooding, erosion, and a decrease in water quality. For these reasons, we urge careful evaluation of the project to ensure it is consistent with Priority Concerns identified in the Faribault County Local Water Management Plan (Water Plan). The Water Plan includes priorities for water quality, drainage management, and erosion prevention.

The Water Plan emphasizes the use of Best Management Practices to control erosion and reduce excess nutrients from entering surface waters. During peak flow periods (i.e. spring runoff) runoff from agricultural lands can be reduced through the use of cover crops. Cover crops help retain topsoil on the land, improve soil structure, aid in the infiltration and storage of soil moisture, and improve water quality. The retention and health of topsoil is vital to long-term agricultural production. The use of cover crops in the watershed would reduce the need to expand ditch systems, stabilize ditch and stream banks, and decrease the frequency of ditch cleanouts resulting in lower landowner costs for ditch maintenance.

The Agricultural BMP Handbook for Minnesota has been developed by the Minnesota Department of Agriculture to address water quality impairments. The document provides a review of 30 conservation practices that are designed to enhance agriculture's role in addressing water quality concerns in Minnesota. Engineer Reports should include the appropriate BMP's for the project and landowners should be encouraged to implement them. The Agricultural BMP Handbook for Minnesota contains valuable information that can be viewed at the following link: <http://www.mda.state.mn.us/protecting/cleanwaterfund/research/agbmphandbook.aspx>.

Controlled drainage systems allow for the management of soil-water conditions that allows for drying out the fields in spring for planting and fall for harvest. During the summer, the drainage is restricted to allow increased water retention in the soil profile that is available to plants during the summer growing season. The DNR supports the use of controlled drainage, as it is beneficial to agricultural production by retaining moisture and nutrients in the soil while minimizing runoff and erosion. The grade in portions of the project area may be conducive to controlled drainage. If appropriate, landowners in the project area should be encouraged to consider the use of controlled drainage.

Page 5 indicates the improvements to CD 10 will result in a slight change in outlet flows based on the XP Storm software and results shown in Appendix D. However, Appendix D does not differentiate between the Repair Option or Improvement Option 1 & 2. Are the XP Storm results the same for each Option? Please clarify the XP Storm results in the Final Engineer's Report (FER).

Improvement Options 1 & 2 propose adding Branch 1A (currently private) to the public system as either an open ditch (existing) or as a new 30 inch diameter tile (3,315 feet) and lowering several existing culverts. The addition of Branch 1A to the system will have minimal impact, but lowering several culverts by a foot or more will result in increased drainage throughout the 1,308 acre watershed. Consideration should be given to not lower the culverts as much as proposed in order to retain some water during the more common storm events.

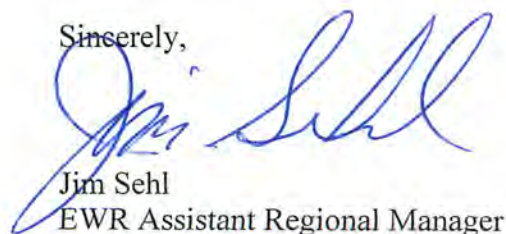
Appendix A, Figure 3 depicts the Multi-Purpose Drainage Management options for the project. Numerous wetlands have potential for restoration including a large wetland basin in the NE ¼ of section 26. A storage pond and controlled drainage are also shown on the MDM map. The drainage authority should consider requiring one or more of the practices in order to further reduce outlet flows from the system. The design plans in the FER should include the specifications for the structure type and location.

The improvement project includes 6,495 linear feet of channel cleanout and several culvert replacements that include small diameters and lowered flow inverts. For example, the construction profiles show a 72 inch culvert at station 10+00 (Joseph Stevermer – section 24) to be replaced with a 60 inch culvert with the invert lowered 1.0 foot. The project maps in the FER need to include the culvert replacement locations so they can easily be located by reviewers.

The legal grade for CD10 was determined by use of historic project profiles and the current channel bottom at the outlet into CD3. The historic profiles should be added to the FER as an attachment to support this method of establishing the "legal grade".

Please contact Kevin Mixon, Regional Environmental Assessment Ecologist, at (507-359-6073; email: kevin.mixon@state.mn.us) if you have any questions about this letter.

Sincerely,



Jim Sehl
EWR Assistant Regional Manager

John Thompson
July 18, 2017
Page 3

Ec: Chuck Brandel, I&S Group, Inc.
Kevin Mixon, EWR REAE
Dan Girolamo, Area Hydrologist
Joe Stangel, Area Wildlife Manager
Craig Soupir, Fisheries
Craig Beckman, Parks & Trails
Todd Kolander, EWR South District Manager
ERDB#20170517

Appendix H: Damages

Faribault County Ditch No. 10
Approximate Damages Summary
Per Final Engineer's Report
October 23, 2020



Approximate Damage Summary - Improvement Option 1

	40 Description	40 Owner	Approximate Station Range	Improvement Description	Buffer Strip Acquisition (Acres)	Open Ditch Acquisition Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch 1A Open Ditch	NE 1/4 NE 1/4 Section 26 BARBER Township	SCHMIDT, RONALD J ETAL	0+00 to 30+55	OPEN DITCH CLEANING	2.31	0.84	3,055	3.51
	SE 1/4 NE 1/4 Section 26 BARBER Township	SCHMIDT, RONALD J ETAL	30+55 to 41+20	OPEN DITCH CLEANING	0.81	0.96	1,065	1.22
	SE 1/4 NE 1/4 Section 26 BARBER Township	GOODRICH, BYRON & NORMA	41+20 to 45+85	OPEN DITCH CLEANING	0.35	0.41	465	0.53
Branch 1A Open Ditch Total					3.47	2.22	4585	5.26

Faribault County Ditch No. 10
Approximate Damages Summary
Per Final Engineer's Report
October 23, 2020



Approximate Damage Summary - Improvement Option 2

	40 Description	40 Owner	Approximate Station Range	Improvement Description	Buffer Strip Acquisition (Acres)	Open Ditch Acquisition Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch 1A Open Ditch	NE 1/4 NE 1/4 Section 26 BARBER Township	SCHMIDT, RONALD J ETAL	0+00 to 30+55	OPEN DITCH CLEANING	2.31	0.84	3,055	3.51
	SE 1/4 NE 1/4 Section 26 BARBER Township	SCHMIDT, RONALD J ETAL	30+55 to 34+50	OPEN DITCH CLEANING & 24-INCH TILE INSTALLATION	0.30	0.39	395	2.28
	SE 1/4 NE 1/4 Section 26 BARBER Township	GOODRICH, BYRON & NORMA	41+50 to 45+85	OPEN DITCH CLEANING	0.33	0.41	435	0.50
Branch 1A Open Ditch Total					2.94	1.64	3885	6.28

Faribault County Ditch No. 10
Approximate Damages Summary
Per Final Engineer's Report
October 23, 2020



Approximate Damage Summary - Improvement Option 3

	40 Description	40 Owner	Approximate Station Range	Improvement Description	Buffer Strip Acquisition (Acres)	Open Ditch Acquisition Permanent Damages (Acres)	Length	Temporary Damages (Acres)
Branch 1A Open Ditch	NE 1/4 NE 1/4 Section 26 BARBER Township	SCHMIDT, RONALD J ETAL	0+00 to 30+55	OPEN DITCH CLEANING	2.31	0.84	3,055	3.51
	SE 1/4 NE 1/4 Section 26 BARBER Township	SCHMIDT, RONALD J ETAL	30+55 to 34+50	OPEN DITCH CLEANING & 24-INCH TILE INSTALLATION	0.30	0.39	395	1.14
	SE 1/4 NE 1/4 Section 26 BARBER Township	GOODRICH, BYRON & NORMA	3+00 to 8+50	24-INCH TILE INSTALLATION	0.00	0.00	550	1.26
Branch 1A Open Ditch Total					2.61	1.23	4000	5.91

Appendix I: Historic Plans and Profiles

RE 1002

RE 1001

RE 1003

RE 1004

RE 1005

RE 1006

RE 1007

RE 1008

RE 1009

RE 1010

RE 1011

RE 1012

RE 1013

RE 1014

RE 1015

RE 1016

RE 1017

RE 1018

RE 1019

RE 1020

RE 1021

RE 1022

RE 1023

RE 1024

RE 1025

RE 1026

RE 1027

RE 1028

RE 1029

RE 1030

PROFILE OF

EARLEBAULT COUNTY DITCH NO 10

IMPROVEMENT PROJECT 1946-47

Station

1+00

1+10

1+20

1+30

1+40

1+50

1+60

1+70

1+80

1+90

2+00

2+10

2+20

2+30

2+40

2+50

2+60

2+70

2+80

2+90

3+00

3+10

3+20

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2000

2100

2200

2300

2400

2500

2600

2700

2800

2900

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

2800

2900

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

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2600

2700

2800

2900

100

200

300

400

500

600

700

800

900

1000

1100

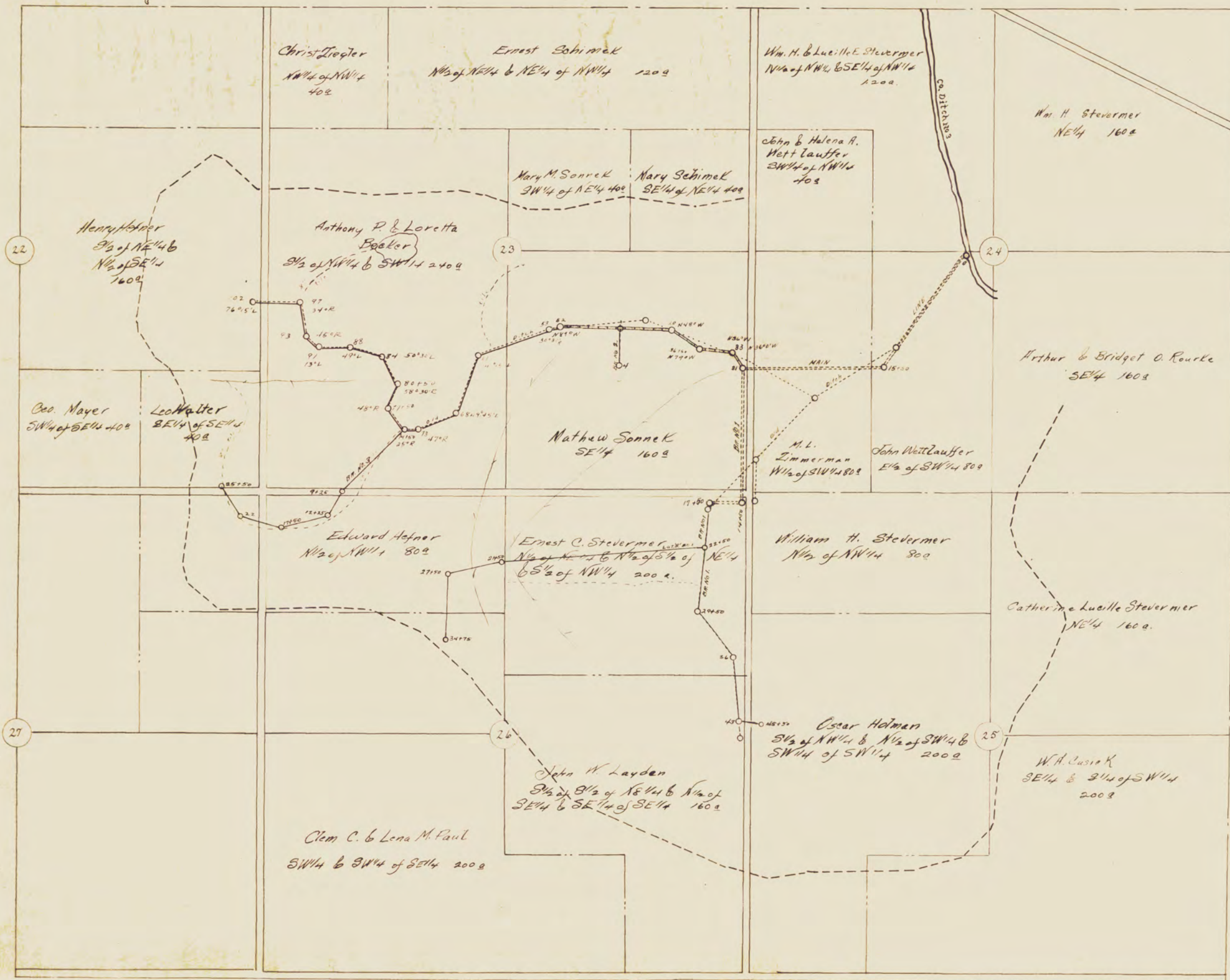
1200

1300



MAP SHOWING FARIBAULT COUNTY DITCH No. 10 IMPROVEMENT PROJECT 1945-48

SCALE 600'-1"



SCALE 600'-1"

COUNTY DITCH NO. 10. FARIBAULT COUNTY MINN.

PLAT
Exhibit No. 1

H. H. Hansen
Civil Engineer

Delavan, Minn.

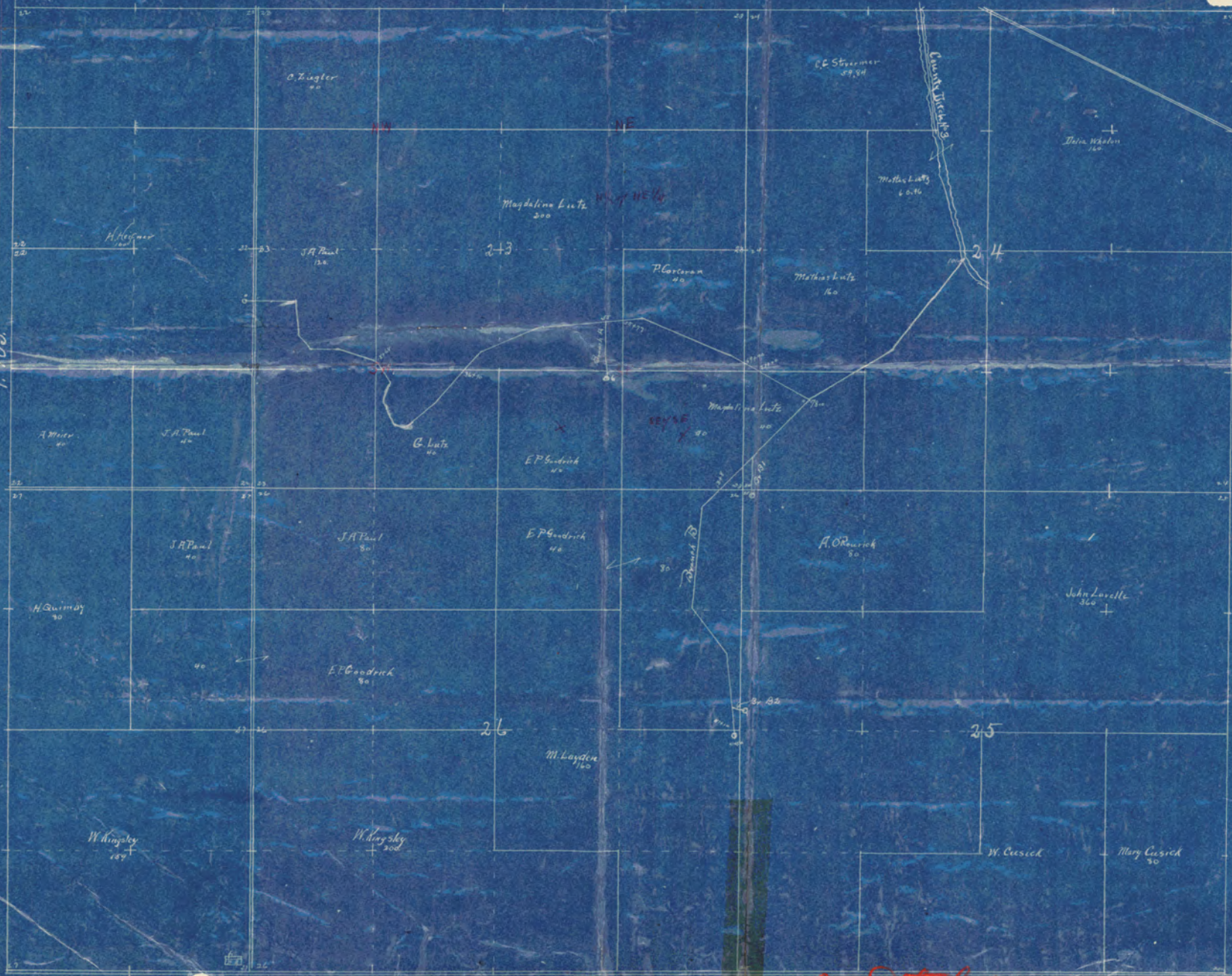
Surveyed April 1912

100 feet = 1 inch



T. 103.

T. 103



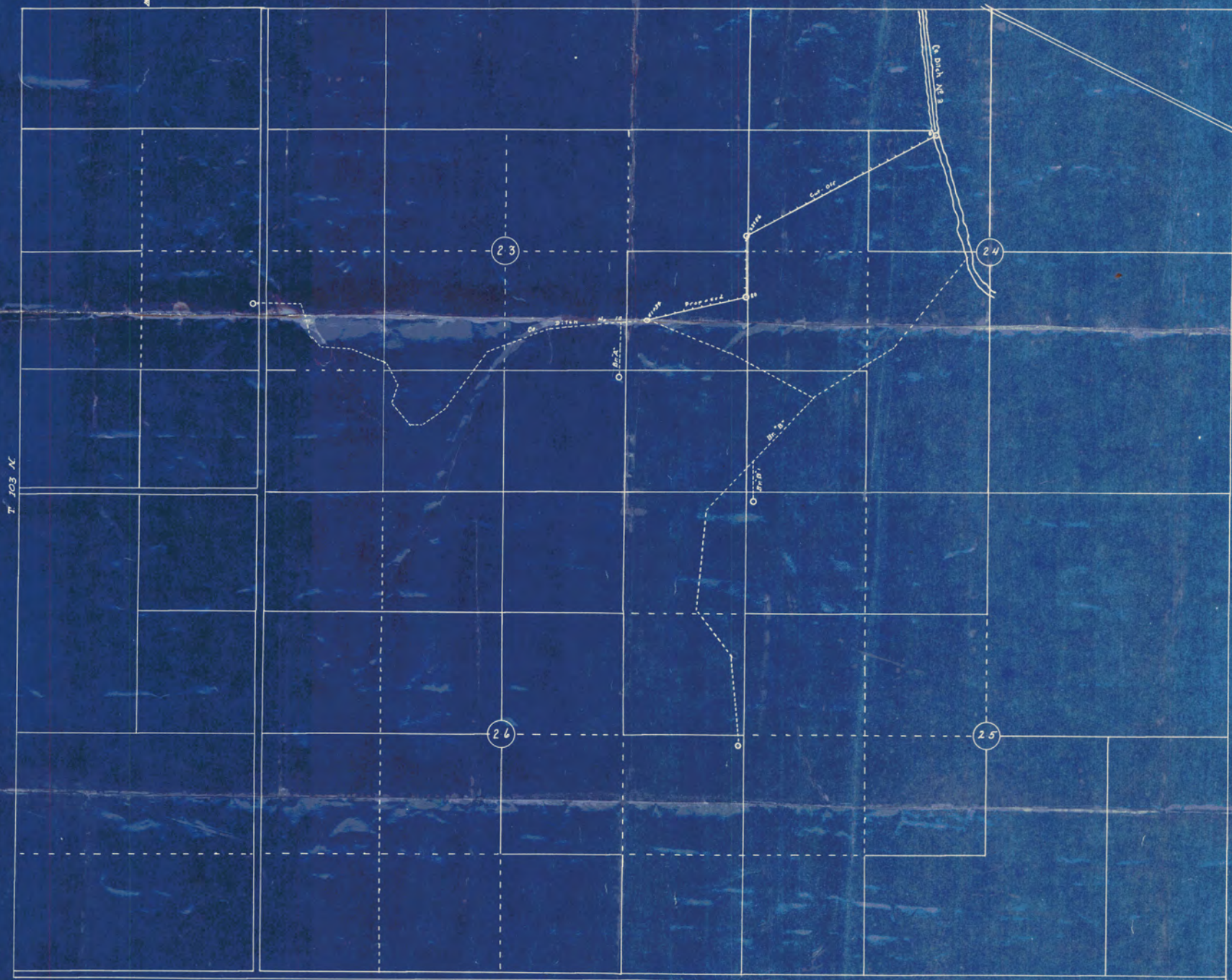
R. 36 W.

Co. 25 N. 10 E.



COUNTY DITCH NO. 10 FARIBAULT COUNTY MINN.

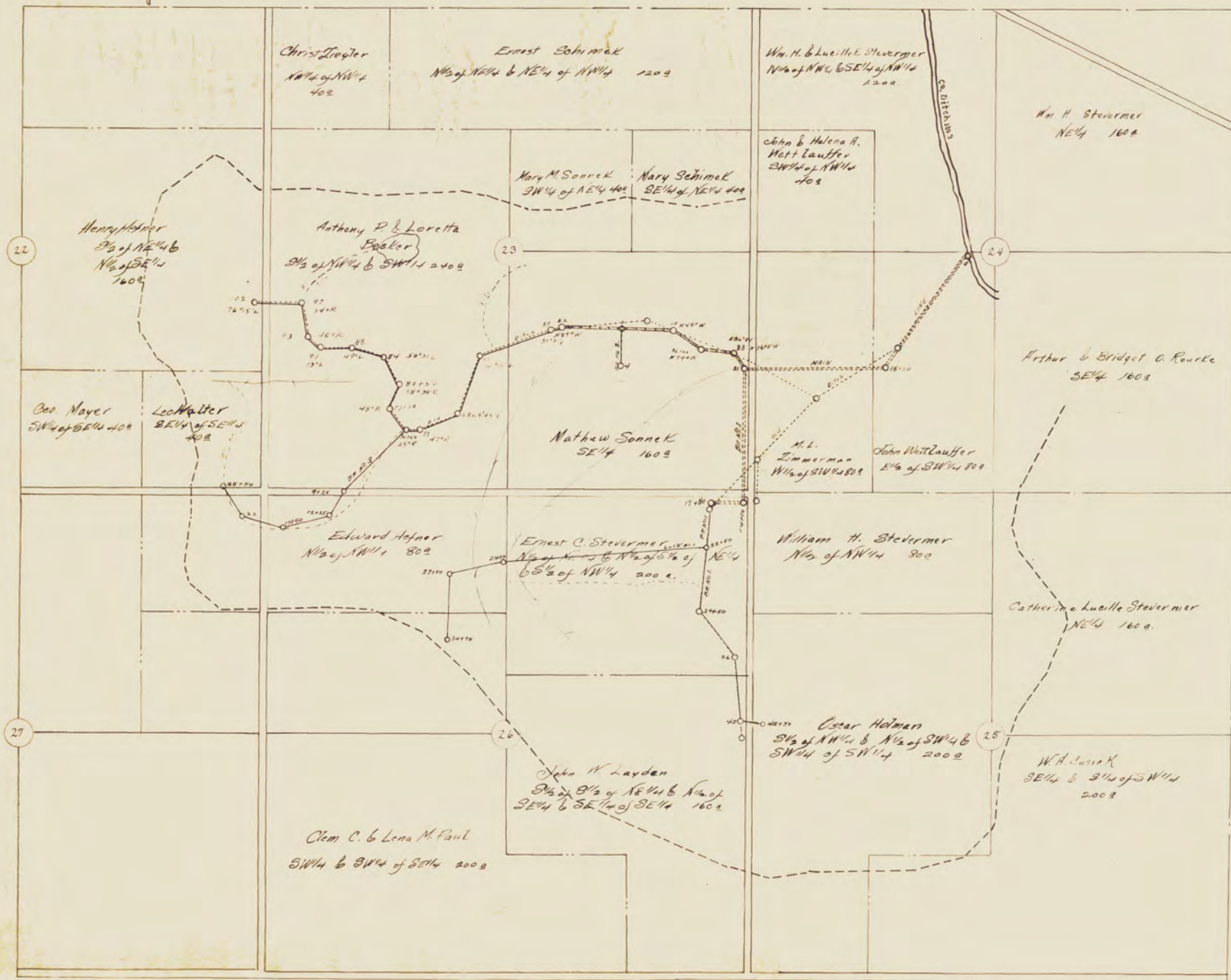
Showing Map of Proposed Cut-Off on Repair Project





MAP SHOWING FARIBAULT COUNTY DITCH No. 10 IMPROVEMENT PROJECT 1945-48

SCALE 600'-1"



MAP SHOWING FARIBAULT COUNTY DITCH No. 10 IMPROVEMENT PROJECT 1945

SCALE 600'-1"

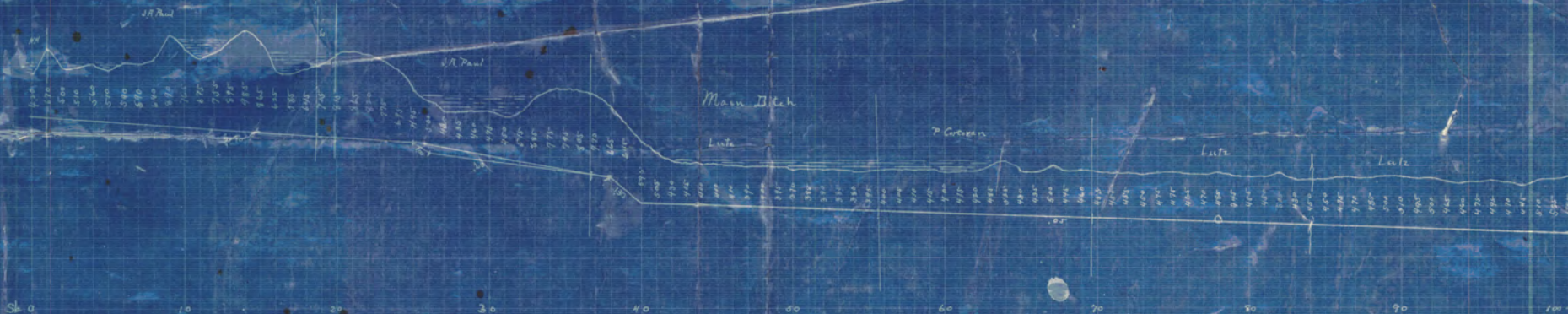


Design for Retaining Wall With Iron Pipe



Profile of County Ditch No. 10
Faribault County, Minnesota

Exhibit No. 1A



Br. B, Sep. 26.10 on B



Br. B, Sep. 26.10 on B

Branch A, Sep. 26.10 on B



Summary of Tile

1100 feet	8" tile	4.40 feet
3500 "	10" "	5.66 "
4000 "	12" "	4.56 "
4300 "	14" "	4.30 "
2310 "	16" "	4.89 "
15210		

Tile

Sh. 0	to 5	8" tile	500 feet
5	26	10"	27.40
5	26	12"	27.40
75	10110	16"	25.10
Branch A			
0	6	8"	6.00
Branch B			
0	16	10"	16.00
16	31	12"	16.00
31	91%	10"	16.00
Branch C			
0	240	10"	24.00
Branch D			
0	1	10"	1.00
15210			

PROFILE OF FARIBAUT COUNTY DITCH NO. 10 IMPROVEMENT PROJECT 1945

2nd Edition

MAIN LINE NO. 1

MAIN LINE 2

MAIN LINE NO. 1

MAIN LINE NO. 2

BR. NO. 1

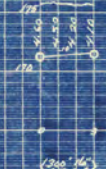
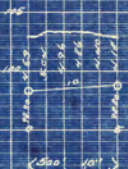
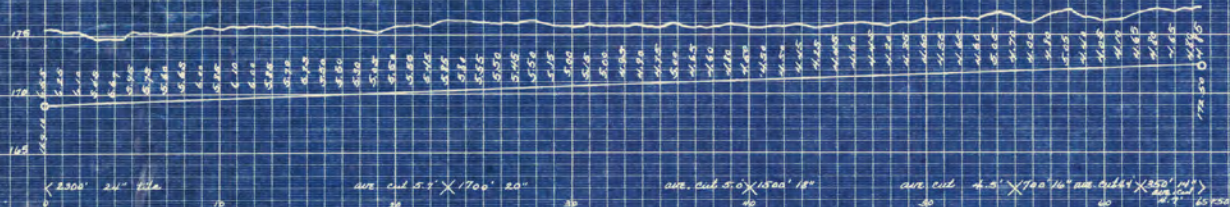
BR. NO. 1

BR. NO. 2

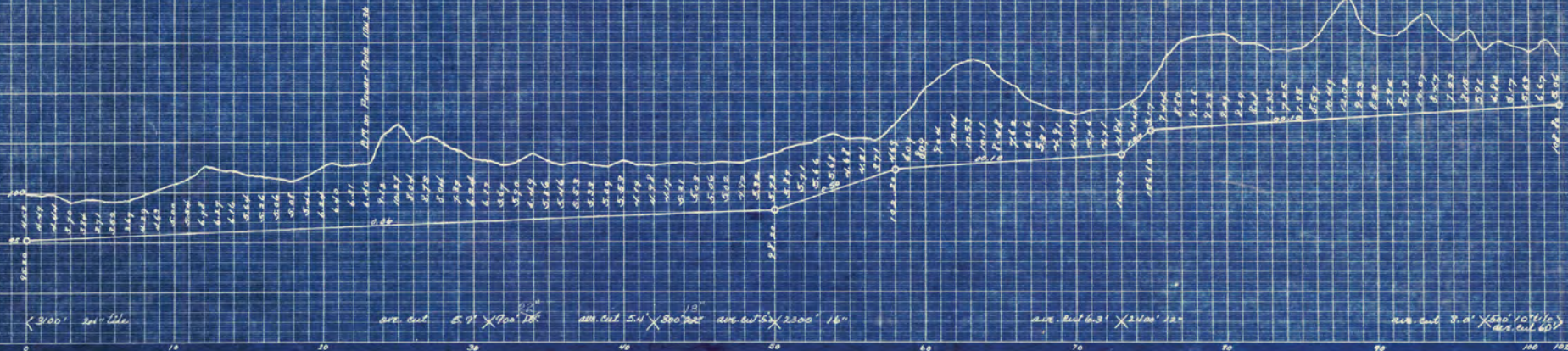
D+45

D+52

D+64



MAIN LINE NO. 2



PROFILE OF FARIBAULT COUNTY DITCH NO. 10 IMPROVEMENT PROJECT 1945

2.000' Station

MAIN LINE NO. 1

MAIN LINE 2

BR. NO. A

01.46

MAIN LINE NO. 1

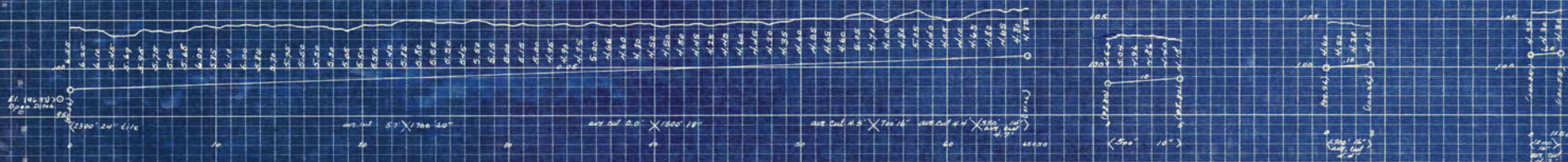
BR. NO. 1

01.32

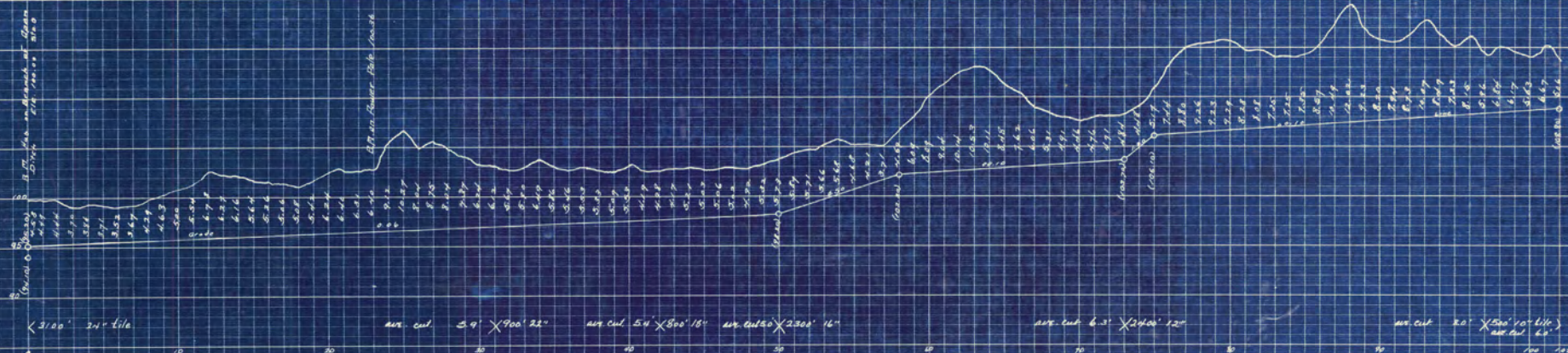
MAIN LINE NO. 1

BR. NO. 2

01.61



MAIN LINE NO. 2



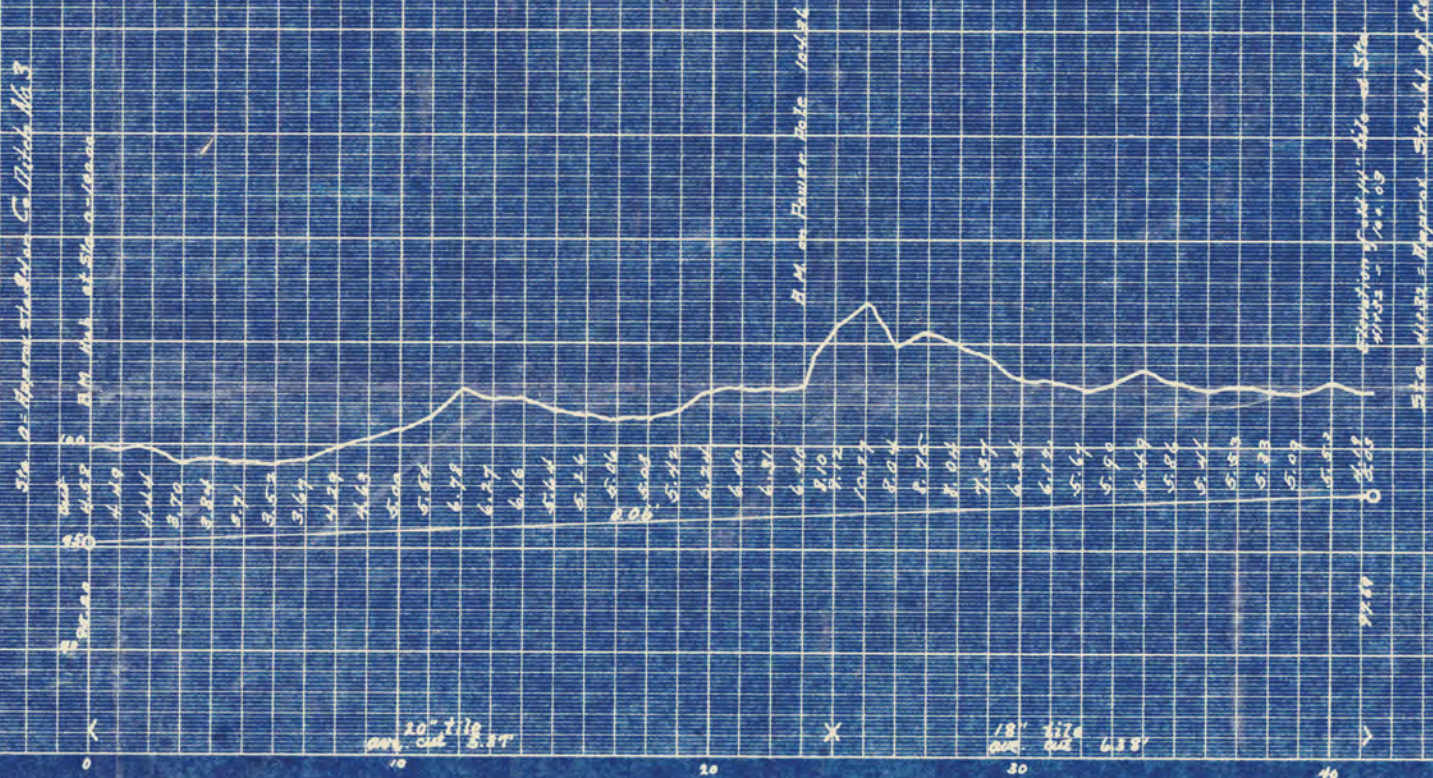
COUNTY DITCH - No 10

FARIBAULT CO

Showing Profile of Proposed
Cut-Off on Repair Project

Sta 0 + 94 + 80 of County Ditch No 3

X Dec. Hazden '14'

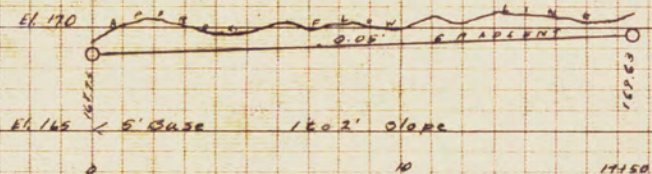


FARIBAUT COUNTY DITCH NO. 10

CLEANOUT LEVELS

N. DEK. HALLAM, S.D. 50

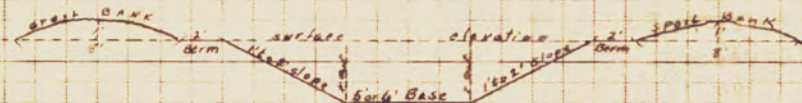
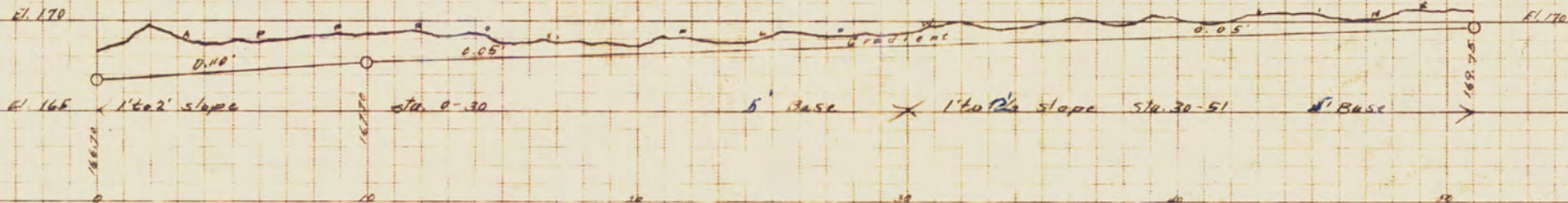
BR. NO. 1
D=Sta. 31



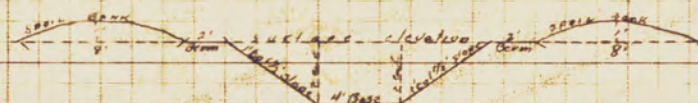
El. 180

El. 176

Sta. 0-51 of MAIN LINE D=Sta. 80 of Co. Ditch No. 3



Cross Section of Open Ditch
1 to 2' slope (scale 1/4")



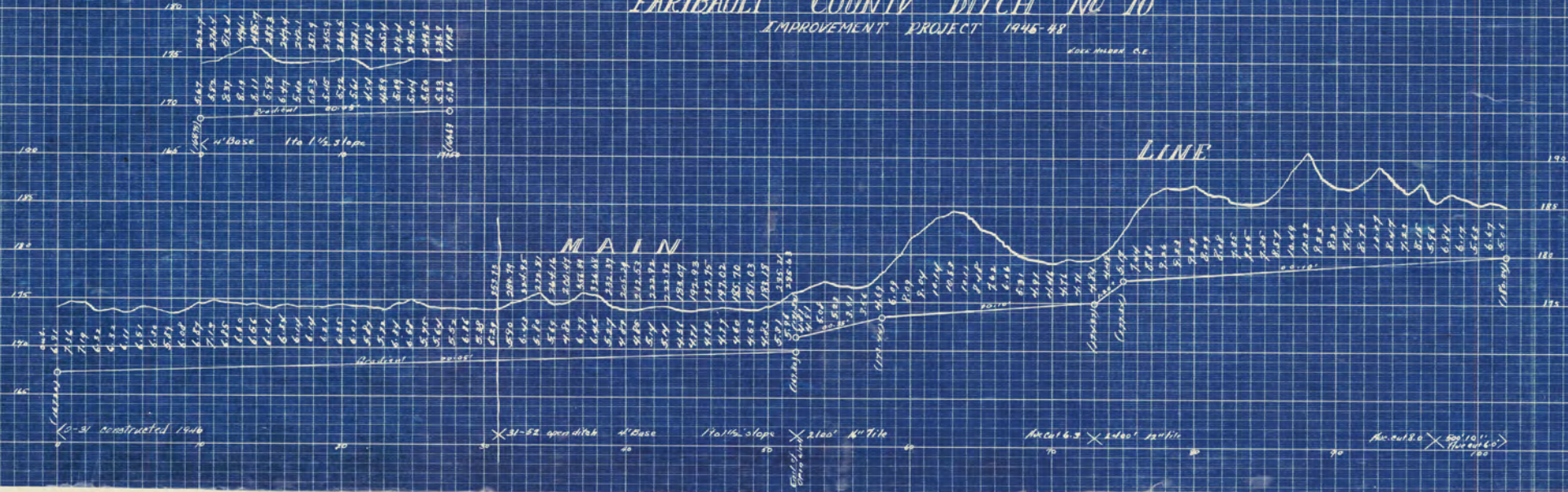
Cross Section of Open Ditch
1 to 1 1/2' slope (scale 1/4")

PROFILE OF FARIBAUT COUNTY DITCH NO 10 IMPROVEMENT PROJECT 1946-48

ROCK HADEN, C.E.

BR. NO. 1

Sta. 0 = Main 31 constructed 1946



FARIBAULT COUNTY DITCH NO 10



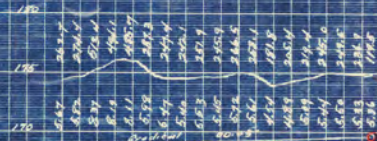
BR. NO. 1
Sta. 0 - Main St. constructed 1946

PROFILE OF FARIBAULT COUNTY DITCH NO. 10

Lat. 'A' E.H. Branch No. 3
1925 8"
Aug. 4-5

IMPROVEMENT PROJECT 1946-48

Lat. 'A' 100' HORIZ. C.C.



4" Base 1 to 1 1/2 slope

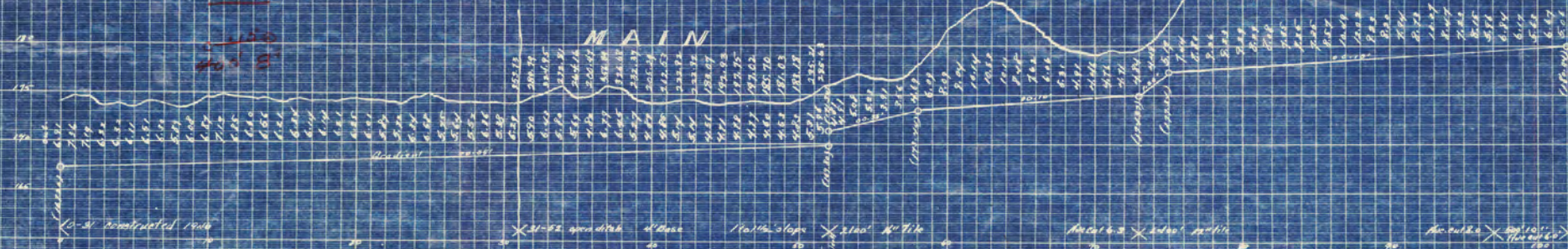
Branch No. 2

4" Base 1 to 1 1/2 slope

2800 12" AVE. 4-5

LINE

MAIN



31-32 open ditch

4" Base

1 to 1 1/2 slope

2100 12" tile

6" cut 6" 2400 12" tile

6" cut 6" 2400 12" tile

BR. NO 2

REMARKS

BR. NO 1

Sta. 0 - Main 3 constructed 1944

PROFILE OF FARIBAUT COUNTY DITCH NO 10 IMPROVEMENT PROJECT 1945-48

LONG BRIDGE S.E.

Lat. N. Br. 1 at 22100

LINE

MAIN

BR. NO 3

6-21-50

10-31 constructed 1946

31-52 apr. ditch

d'Base

10 1/2% slope

2100' N" tile

Ac. cut 6.7 X 2400' 12" tile

12200 Lin. Ft. 10" tile

Ac. cut 18.0 X 2400' 12" tile

Ac. cut 10.1 X 2400' 12" tile

