

# Bois de Sioux Watershed District

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## Grant County Ditch No. 21 Improvement

### Detailed Survey and Engineer's Report

I hereby certify that this 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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Date: 05/07/2024



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Includes Updates from Hearing  
Date: 05/07/2024  
Project No. 22549

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## 1. INTRODUCTION

The proposed project consists of improvements to Tile Branches No. 1, 2, and 4 and a clean out of the existing open channel portion of Grant County Ditch No.21 (GCD 21) system. The improvement will also include replacement of the existing (3) inline crossings, additional side inlet culverts and riprap protection in certain areas, these improvements will reduce seasonal flood impacts to adjacent structures and lands, reduce sediment transport via erosion, as well as meet the current 10-year/ 24-hour storm event design standards. The proposed project and its drainage area are shown in Appendix A – Overall Ditch Alignment and Watershed.

The proposed project is a result of a petition received by the Bois de Sioux Watershed District (BdSWD). A copy of the petition for improvement is included in Appendix B of this report.

## 2. LEGAL DESCRIPTIONS AND SCOPE OF IMPROVEMENT

The petition for the improvement to GCD 21 states: “CD 21 is inadequate to support beneficial drainage for current farming and drainage practices. CD 21 has insufficient capacity and needs enlarging to furnish sufficient capacity. CD 21 does not meet current design criteria: the original construction of CD 21 was not deep enough to accommodate adequate drainage to much of the watershed it was intended to serve; new drainage and farming practices in the watershed of the ditch create further need for increased tile capacity; and shallow installation depth must be corrected to reduce frequency of repair to accommodate current farming implements” (collectively, the “Improvement Project”).

Per the Petition the proposed improvement of GCD 21 is as follows:

Lowering the depth of the improved portions of the drainage system to accommodate current farming practices, tile outlets and improve drainage efficiency; increasing the size of existing tile segments to accommodate improved flow; construction of new surface intakes where necessary to provide improved, buffered, and stabilized inlets and to prevent erosion of soil into the system; and improve crossings.

- a. Branch 1: from its junction with the Main on the east line of SW  $\frac{1}{4}$  of §18, T128N, R43W to its terminus along the east line of the SE  $\frac{1}{4}$  of the NW  $\frac{1}{4}$  and the west line of the SW  $\frac{1}{4}$  of the NE  $\frac{1}{4}$  of §7, T128N, R43W.
- b. Branch 1 Fork: from its junction with Branch 1 along the north line of the SW  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  and the south line of the NW  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  of §7, T128N, R43W to its terminus on the east line of the SW  $\frac{1}{4}$  of the SW  $\frac{1}{4}$  and the west line of the SE  $\frac{1}{4}$  of the SW  $\frac{1}{4}$  of §7, T128N, R43W.
- c. Branch 2: from its junction with the Main on the north line the NW  $\frac{1}{4}$  of the SW  $\frac{1}{4}$  of §17, T128N, R43W through portions of the NW  $\frac{1}{4}$  and NE  $\frac{1}{4}$  of §20 to its terminus in the SE  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  of §17, T128N, R43W.
- d. Branch 2 Fork: from its junction with Branch 2 in the NE  $\frac{1}{4}$  of §20, T128N, R43W south through the NE  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  of §20 to its terminus in the NW  $\frac{1}{4}$  of §21, T128N, R43W.

- e. Branch 3: from its junction with Branch 4 in the SE ¼ of the NW ¼ of §17, T128N, R43W to its terminus in the south half of the NW ¼ of §16, T128N, R43W.
- f. Branch 4: from its junction with the main line in the SE ¼ of the NW ¼ of §17, T128N, R43W to its terminus in the SE ¼ of the NE ¼ of §8, T128N, R43W.
- g. Main: from the outlet in the SW ¼ of §19, T128N, R43W to its terminus in the middle of section §17, T109N, R41W.

### 3. EXISTING TILE SYSTEM

#### *3.1. History*

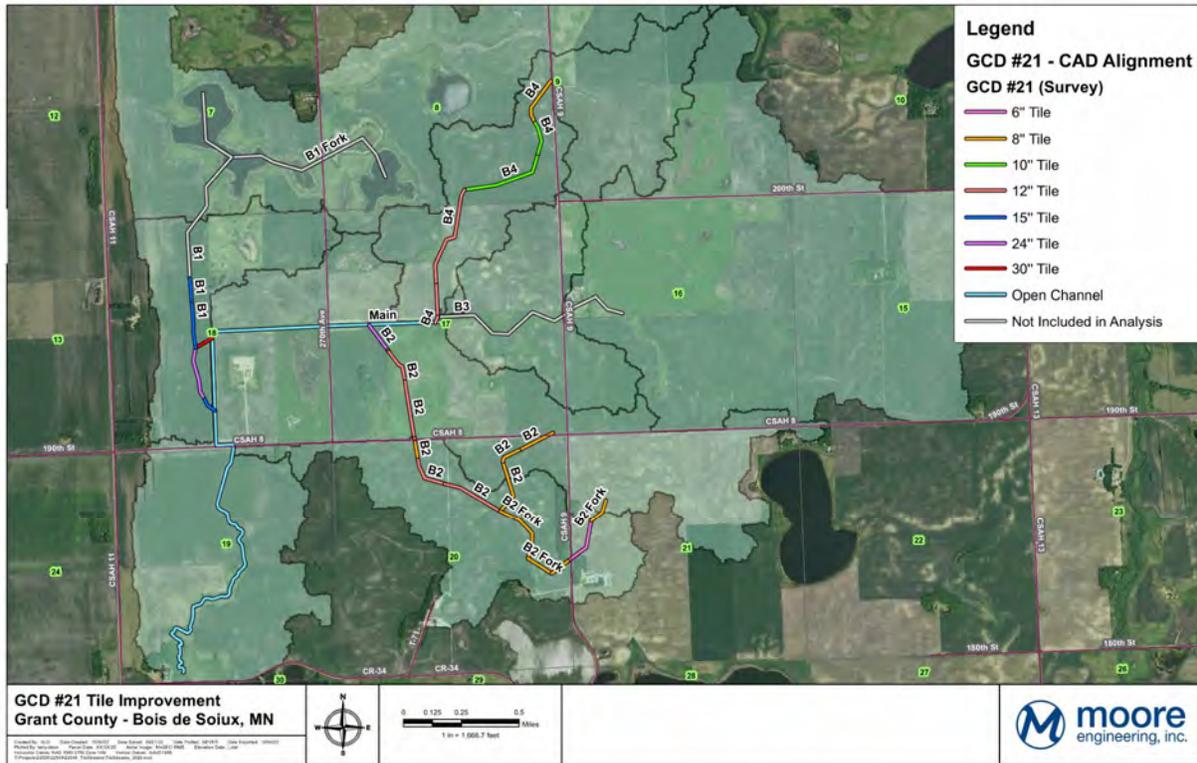
The following is a summary of the documents on record pertaining to the ditch and drain tile system. The intent of this summary is to provide the known historical timeline regarding the drainage system's construction, improvements, and maintenance. This information may be carried forward, and updated as necessary, from previous reports.

- a. GCD 21 has remained in service since its original establishment in 1914. The original drainage system consisted of the Main and four tile branches. There is a 5<sup>th</sup> branch that is known as "Original Tile Main" which is mostly part of Branch 1.
- b. Being over 100 years old, the tile is experiencing more frequent failure and is at the end of its useful life.

There are no records to show maintenance was performed.

#### *3.2. Current Condition / Inadequacy / Improvement Discussion*

A survey was completed by Moore Engineering, Inc. in 2020. This survey found that the GCD 21 open channel continues to be effective at conveying flows but some of the culvert crossings appear to be undersized and the original tile network was found to be inadequate. The report indicated that tile inlet structures and grade of the existing tile system cannot convey water to the open channel ditch system. Frequent and prolonged flooding of agricultural lands are the landowner's main concern. Through meetings with the landowners, it was determined that improving the open channel of the main ditch would not provide significant benefit as observations of the open ditch indicate that it is functioning adequately. The primary failures are due to the age and condition of the existing tile lines. The preferred path forward would be to replace the existing tile system with new, appropriately sized tile, to effectively convey water and better handle the current flows and capacities of the contributing watershed from modern farming and tile practices. In order for the GCD #21 to work as a system, it would also require the inline culvert crossings along the open channel portion to be replaced to meet the current 10-year/ 24-hour rainfall event design standard, this will allow the ditch system to function as desired.



### 3.3. Input from Preliminary Hearing

A public hearing was held on the Preliminary Engineer's Report on March 16, 2023. At this hearing the MN DNR Advisory Letter was read (Appendix D). The requests of this letter include; 1) provide a map illustrating the locations of all public waters in this area, 2) consider water storage and multipurpose drainage management to minimize or mitigate for modeled changes in hydrology downstream, 3) Utilize non-perforated tile through wetlands and perforated tile should be beyond the lateral drainage limits of wetlands. In response to these requests; 1) a map illustrating the public waters is included in Appendix A, 2) while no storage is proposed the adequacy outlet section of this report has been modified to explain more clearly the anticipated change in hydrology, and 3) non perforated pipe is proposed for the entirety of this project.

In addition to the MN DNR comments, several landowner comments were received. Many comments and questions required clarification during the hearing, however, several comments received required corresponding response or action. They are as follows;

Comment 1: A landowner expressed concerns with Lateral 1 not extending into the Fish and Wildlife easement, stating maintenance will be an issue and the water will bounce higher than the inlet elevation.

Response 1: After the hearing communication with U.S. Fish and Wildlife began on extending lateral 1 into the water as it historically was. An agreement was met on a preferred route,

inlet structure, and inlet elevation, all of which are called out on the preliminary plans included with this report.

Comment 2: Lateral 4 should not be split, the tile for lateral 4 should pass through the last property without an inlet, otherwise, it will overflow above ground. Additionally, it should be located farther east near the property line.

Response 2: The downstream 1,700 feet of Lateral 4 will have no inlets and only will allow water to pass through the NE ¼ of Section 17 property. It will be located near the property edge and in lieu of the inlets a swale ditch will be constructed to provide drainage for the NE ¼ of Section 17 and inlet into the main channel through a side inlet culvert. This swale ditch will not be part of the public system but will be a private ditch maintained by the landowner.

Discussion 3: At the hearing concern was brought up on the cost and we discussed options for reducing the cost including; 1) smaller tile on lateral 1, 2) stopping lateral 2 at the section line, 3) creating swale ditch instead of tile on Lateral 4. Of these items discussed to reduce cost it was determined the only alteration to be made was the swale ditch on Lateral 4.

### 3.4. Hydrology and Hydraulics

As described in the petition “to accommodate current farming practices, improve drainage efficiency, and improved, buffered and stabilized intakes to prevent erosion of soils into the system”. The design goal for this improvement is to provide the capacity needed for frequent summer rainfall events. When evaluating the existing culvert capacity, the Bois de Sioux Watershed district utilized the 10-year design standard according to the BTSAC BP 3 Water Management Options for Surface Drainage published September 15, 2014.” Meaning that with this improvement the culverts will be sized to a 10-year 24-hour rain event. With this project no change to the open channel is proposed. All new culverts and tile will be placed so the invert of the pipes matches the channel grade line.

<b>GCD #21 - In-Line Culvert Summary of Findings</b>						
<b>Road</b>	<b>Station</b>	<b>Drainage Area (sq-mi)</b>	<b>Existing</b>		<b>Proposed</b>	
			<b>Size &amp; Type</b>	<b>X-Sec Area (ft<sup>2</sup>)</b>	<b>Size &amp; Type</b>	<b>X-Sec Area (ft<sup>2</sup>)</b>
CSAH 8	71+50	8.0	60" CSP	19.6	115" X 72" RCPA	44.1
Field Approach	111+00	5.5	71" X 47" CSPA	18.1	95" X 67" CSPA	33.1
270th Ave	128+50	5.2	73" X 55" CSPA	23.2	95" X 67" CSPA	33.1

The Bois de Sioux Watershed District restricts drain tile with gravity outlets to the ¼” drainage coefficient. The table below shows the diameter of existing tile lines in comparison to the proposed tile sizes at the outlet of each branch for this improvement project. The proposed tile size correlates to the ¼” drainage coefficient. These sizes are reduced as appropriate for upstream reaches to account for changes to the watershed area and slope. Sizing for the entire system can be seen in Appendix A. The inlets for this project are proposed to match the existing inlet locations, rim elevation, and sizes. Additional inlets have been added where necessary to ensure the ability to televise the entire length of the branch.

<b>GCD #21 - Drain Tile Outlet Summary</b>					
<b>Branch Outlet</b>	<b>Existing Drainage Area (ac)  (Proposed if Different)</b>	<b>Existing</b>		<b>Proposed</b>	
		<b>Diameter (in)</b>	<b>Slope</b>	<b>Diameter (in)</b>	<b>Slope</b>
Original Tile Main  (Branch 1 Watershed Removed)	1,418  (160)	15	0.13%	15	0.10%
Branch 1	1,345	15	0.03%	30	0.05%
Branch 2 (Outlet relocated)	1,143  (1,200)	24	0.08%	24	0.13%
Branch 2 Fork	698	8	0.19%	12	0.13%
Branch 3	1,200	Unknown		Open Channel	
Branch 4	567	12	0.02%	24	0.04%

#### 4. ADEQUACY OF THE OUTLET

The water surface elevations shown below represent output from a steady state HEC-RAS model of the open channel portion of the drainage system. A steady state model generally results in higher than actual water surface elevations as it does not account for upstream storage and attenuation. Actual water surface elevations may be lower. This is especially true for the larger events that exceed the channel capacity and breakout into floodplain storage.

The tile branches will not flow while the water in the channel is high until the water surface is low enough to result in a positive hydraulic grade. During a normal flow event the surface flow will rise and fall and only then will the tile flow continue. Tile in the system, in general, increases the duration of flow but does not necessarily increase the peak flow.

However, for reporting purposes, a very conservative “worst case” modeling scenario was utilized which assumes peak flow from surface water times with the peak flow from the tile branches. With this effort we evaluated the existing conditions and the improved tile laterals with proposed culverts. This evaluation was carried downstream past CSAH 11, at this point there was no measurable difference. Meaning that even with this conservative evaluation the flow and water surface on the Mustinka River downstream of CSAH 11 are not measurably altered. Upstream of CSAH 11 the 25-year event resulted in the largest increase from existing to proposed, however this did not change any road overtopping results. All other events saw minimal change from the proposed improvements.

Location	Event	Existing		Branch Tile Improvements and Culvert Improvements	
		Flow	Water Surface Elevation	Flow	Water Surface Elevation
Outlet of GCD 21	2	76	1048.2	90	1048.2
	5	169	1050.1	183	1050.2
	10	249	1051.6	263	1051.7
	25	388	1053.2	402	1053.5
	50	516	1055.6	530	1055.6
	100	666	1055.8	679	1055.8

Upstream of CR 34 (Addition of Mustinka River Flow)	2	393	1048.2	407	1048.2
	5	670	1050.1	684	1050.2
	10	876	1051.6	890	1051.7
	25	1058	1053.2	1072	1053.5
	50	1218	1055.6	1232	1055.6
	100	1346	1055.8	1360	1055.8
Upstream of CSAH 11	2	393	1047.6	407	1047.7
	5	670	1049.8	684	1050.0
	10	876	1051.5	890	1051.6
	25	1058	1053.2	1072	1053.5
	50	1218	1055.6	1232	1055.6
	100	1346	1055.8	1360	1055.8

## 5. LEGAL PROCESS

The Bois de Sioux Watershed District acting as the drainage authority, having been petitioned by resident landowners in the district for an improvement of GCD 21, are given the authority to order a Preliminary Survey Report by Minnesota Statutes 103E.241 and 103E.245.

Following the filing of the Preliminary Survey Report, the District will hold a preliminary hearing in accordance with MS 103E.261. At the close of this hearing the District must either:

- 1) adjourn the hearing to a later date.
- 2) dismiss the improvement proceedings; or
- 3) state by order its findings and changes, if any.

If the proceedings are not dismissed and after the preliminary hearing order is filed, the District, following MS 103E.265, shall order the Engineer to make a detailed survey with plans and specifications.

When this order is made, the District shall, by order, appoint viewers to assess benefits and damages in accordance with MS 103E.321. The District shall hold a hearing in accordance with MS 103E.325. At this hearing, the District has the authority under MS 103E.335 to:

- 1) adjourn and reconvene the hearing, as necessary.
- 2) may amend the Engineer's Detailed Survey Report or the Viewers' Report or resubmit matters to the Engineer or to the Viewers for immediate consideration; or
- 3) resubmit the reports to the Engineer and Viewers for reexamination.

Following these proceedings, MS 103E.341 gives the District the authority to either dismiss the proceedings or order the improvement project.

### ***5.1. Content of the Survey Reports***

Minnesota Statutes 103E.245 requires the designated Engineer, if finding the improvement feasible, and compliant with the environmental and land use criteria in MS 103E.015 to include in the preliminary Survey Report a preliminary plan of the drainage project showing the proposed ditches, tile, laterals, and other improvements, the outlet of the project, the watershed of the drainage project or system, and the property likely to be affected and its known users.

The plan must show:

1. The elevation of the outlet and the controlling elevations of the property likely to be affected referenced to standard sea level datum, if practical;
2. The probable size and character of the ditch necessary to make the plan practicable and feasible;
3. The character of the outlet and whether it is sufficient;
4. The probable cost of the drains and improvements shown on the plan;
5. All other information and data necessary to disclose the practicability, necessity, and feasibility of the proposed drainage project;
6. Consideration of the drainage project under the environmental and land use, and multipurpose water management criteria in Section 103E.015; and
7. Other information as ordered by the drainage authority.

Minnesota Statute 103.265 requires the Engineer, if ordered by the drainage authority and following the filing of the preliminary hearing order, to make a detailed survey and submit a Detailed Survey Report. Minnesota Statute 103E.285 requires that the Detailed Survey Report include the following data and information:

1. Map. A complete map of the proposed drainage project and drainage system must be drawn to scale, showing:
  - a. The terminus and course of each drain and whether it is ditch or tile, and the location of other proposed drainage works;
  - b. The location and situation of the outlet;
  - c. The watershed of the proposed drainage project and the sub watershed of main branches, if any, with the location of existing highway bridges and culverts;
  - d. All property affected, with the names of the known owners;

- e. Public roads and railways affected;
  - f. The outline of any lake basin, wetland, or public water body affected;
  - g. Other physical characteristics of the watershed necessary to understand the proposed drainage project and the affected drainage system; and
  - h. The area to be acquired to maintain a grass strip under Section 103E.021.
2. Profile of drainage lines.
  3. Bridge and culvert plans.
  4. Tabular statement of excavation, construction, and cost. A tabular statement must be prepared showing:
    - a. The number of cubic yards of excavation, linear feet of tile, and average depth of each tile line;
    - b. The bridges, culverts, and works to be constructed under the plans for the drainage project; and
    - c. The estimated unit cost of each item, a summary of the total cost, and an estimate of the total cost of completing the proposed drainage project that includes engineering and other costs.
  5. Right-of-way acreage. The acreage must be shown that will be taken for ditch right-of-way on each government lot, 40-acre tract, or fraction of a lot or tract under separate ownership. The ditch right-of-way must include the area to be taken to maintain a grass strip under Section 103E.021.
  6. Drain tile specifications (if applicable).
  7. Soil survey report (if required).
  8. Recommendation for division of work.
  9. Other information on practicability and necessity of drainage project. Other data and information to inform the drainage authority of the practicability and necessity of the proposed drainage project must be made available including a comprehensive examination and the recommendation by the Engineer regarding the environmental and land use criteria in Section 103E.015.

## 6. PERMITS REQUIRED

### *6.1. Local*

1. A permit will be obtained from the Grant County Highway Dept. for working within their right of way.

### *6.2. State*

1. This project is proceeding as a 103E ditch improvement and requires that the MnDNR and Minnesota Board of Water and Soil Resources have the responsibility to review the Engineer's Report and provide an Advisory Report to the Watershed District.
2. This project does affect public water but is exempt from a public works permit as the work is in a 103E legal ditch.

3. A Stormwater Pollution Prevention Plan (SWPPP) will be developed, and a permit will be required from the Minnesota Pollution Control Agency, since construction activities will disturb more than one acre of land. Additionally, as this project is a phase of the larger Redpath Impoundment project, a mandatory review of the SWPPP will be required.
4. Work in or near wetlands may trigger a need for A Minnesota Wetland Conservation Act (WCA) approval. Based on preliminary wetland investigation that indicates that many of the wetlands within the proposed project area are within cropland or previously impacted by drainage, the proposed activities would likely meet the criteria for a WCA No Loss or Exemption approval. Additional investigation would be required to document wetlands and obtain WCA approval prior to implementation of the project.

### ***6.3.Federal***

1. For the GCD 21 improvement; a permit may be required under Section 404 of the Clean Water act if discharge of dredged or fill material will be placed within waters of the United States.
2. The Swampbuster provision of the 1985 Farm Bill was aimed at reducing the conversion of wetlands for agricultural purposes. Farmers who drain, fill, level, clear stumps or otherwise alter a wetland may lose eligibility for U.S. Department of Agriculture (USDA) program benefits. If any landowner has concerns about compliance with the 1985 farm bill, they should contact their local FSA office and complete Form AD-1026.
3. A special use permit will be required from U.S. Fish and Wildlife services for work within their property on Lateral 1.

## **7. PROJECT BENEFIT**

### ***7.1.Private Benefits***

The private benefits to be expected from the project accrue mainly to agricultural lands. Private benefits would be experienced through a reduction in the frequency of flooding within the watershed, an outlet for field drainage within the watershed, reduced sediment transport, reduced erosion. A secondary benefit is reduced maintenance cost, as the project will incorporate best management practices to reduce sediment transport from the field to the ditch.

## *7.2. Public Benefits*

Public transportation systems that will benefit from the proposed project would include; County Hwy 8 and 270<sup>th</sup> Ave, these culvert crossing would be improved to meet current design standards to reduce the likelihood of water overtopping during season flooding.

## **8. PROJECT COST**

The Engineer's Opinion of Probable Cost for the improvement of GCD 21 as currently proposed is \$4,065,000. This opinion of cost includes expected construction costs, design, and construction administration fees. The opinion of cost also includes an estimated right-of-way cost necessary for the project and 103E grass buffers. However, the final right-of-way cost, which includes "damages," will be determined by the viewers. A detailed opinion of cost can be seen in Appendix C. Of the total project cost, \$3,070,000 would be necessary to repair GCD 21 to the current capacity. The additional \$995,000 is the proportion cost to improve Branch 1, 2, and 4.

## **9. ALTERNATIVES TO PROJECT**

MN Statutes 103E.015 requires the consideration of alternative measures for the problem being addressed by the project. Alternative measures identified in state and locally adopted water management plans would include changing land use by restoring wetlands, enrolling the effected land in a permanent easement program through the state of MN (Reinvest in Minnesota) or the federal government (i.e., Conservation Reserve Program, Wetland Reserve Easement, etc.), or flood storage easements throughout the watershed. All these alternative measures involve landowner participation on a voluntary basis. Lands within the project area are utilized almost exclusively for agricultural production and, from conversations with local landowners, it would be unlikely that they would participate in these programs voluntarily.

Additional consideration for the cost to repair the existing as-built tile system would result in negligible benefits and would not address the concerns of the landowners via the petition.

## **10. ENVIRONMENTAL IMPACT**

### *10.1. Water Quality*

Due to the installation of grass buffers, riprap at culverts, and replacing the existing failing tile an improvement in water quality is anticipated as a result of this project. A MPCA construction erosion control permit is required for this project. This permit requires the establishment of an erosion control plan. This plan will incorporate temporary rock checks, straw waddles, and establishment of permanent grass as soon as possible once construction is complete. These features help to reduce erosion that may occur during construction.

## **10.2. *Fish, Wildlife, and Wetlands***

The watershed of GCD 21 contains pockets of wildlife habitat areas. What area that is available for wildlife use consists of some wetlands, farmstead tree groves, fence lines, and road ditches. These areas, outside of the construction limits, are not proposed to be impacted. From this improvement project negligible impact on fish and wildlife is expected. The land use within the watershed is well defined and extensively agricultural.

An off-site investigation consisting of review of the National Wetland Inventory (NWI) and aerial photographs indicates that wetlands are present in the proximity of the proposed project impact areas. As shown in Figure A, review of aerial photographs demonstrates that many of the wetlands are within cropland and are partially drained, while others are not within cropland and contain natural vegetation. A field investigation was conducted in November 2022 to identify the presence and approximate extent of wetlands in selected areas where uncropped wetlands are located directly adjacent to proposed project impact areas. During this investigation, the locations and elevations of selected approximate wetland boundaries were surveyed to provide information to guide the design to avoid impacts to wetlands in these areas. The information collected in the field as well as the off-site wetland determination will be used during design to avoid and minimize wetland impacts from the proposed project.

Little to no land use change is expected to occur from this improvement. Therefore, this improvement project will have little adverse effect on the wildlife in the watershed. Alternatively, widening the ditch system and installing the 103E grass buffer will add additional acres of grassed habitat to the watershed.

## **10.3. *Ground Water***

This project is proposing a minor change to the tile depth with non-perforated pipe. Therefore, the change in lateral affect is anticipated to be minimal. In addition, most existing adjacent private tile lines have been constructed at about 4 feet below the ground surface and utilize gravity systems to carry the water into the current ditch. Therefore, no change in the availability, distribution, or use of the ground water beyond that necessary to provide for the efficient production of crops within the watershed is anticipated by this improvement.

## **10.4. *Other Environmental Effects***

The adverse effects of the proposed improvement are of a temporary nature and are listed as follows:

Temporary noise and dust generation can be expected from the construction operations. These impacts are not viewed as significant since there are very few residences near the proposed construction route.

Temporary erosion of soil is likely to occur in the construction area until permanent ground cover is established along the top and banks of the ditch. Although these effects need to be considered, they are probably not significantly different than the current topsoil loss that occurs annually from

the erosion of topsoil due to overland flow in the watershed. This construction erosion will be minimized through the use of temporary ditch blocks, inlet protection, and rapid establishment of permanent grass cover.

## **11. INVESTIGATING POTENTIAL EXTERNAL SOURCES OF FUNDING AND TECHNICAL ASSISTANCE**

In accordance with MN Statutes 103E.015, the Engineer on behalf of the Bois de Sioux Watershed District investigated the potential use of external sources of funding to facilitate the purposes of MN Statutes 103E.011, subd. 5. Options for external funding for producers is available through Environmental Quality Incentives Program (EQIP) through NRCS. Additionally, there is a potential to apply for a Clean Water Fund grant program administered by the MN Board of Water and Soil Resources. The types of practices that are eligible for these funds include those to install grass waterways, water and sediment control basins, alternative tile intakes, etc. Constructing these BMPs requires voluntary landowner participation and is subject to the timing and availability of the funds. The Bois de Sioux Watershed District does have an internal cost share program for clean water elements which this project has eligibility for.

## **12. RECOMMENDATION**

The proposed improvement to Grant County Ditch #21 as described is practical and feasible. The project includes improvements to the tile branches and the culverts on the main. The existing tile system currently functions at an extremely limited capacity, overall having adverse effects on adjacent landowners. It is the recommendation of Moore Engineering to improve the three culvert crossings within the open channel section of GCD 21 and to improve the drain tile alignment, size, and grade as proposed in this report. This recommended improvement would have the capacity to convey flows more effectively through the watershed basin, benefitting landowners, minimizing soil erosion while meeting current design standards.

## 13.APPENDIX A – OVERALL DITCH ALIGNMENT AND WATERSHED

Includes Effected Landowners

**Legend**

- Culvert Sites
- GCD 21 Watershed
- MN Public Waters
- Affected Landowners
- Desktop Review Wetland Area

**GCD #21**

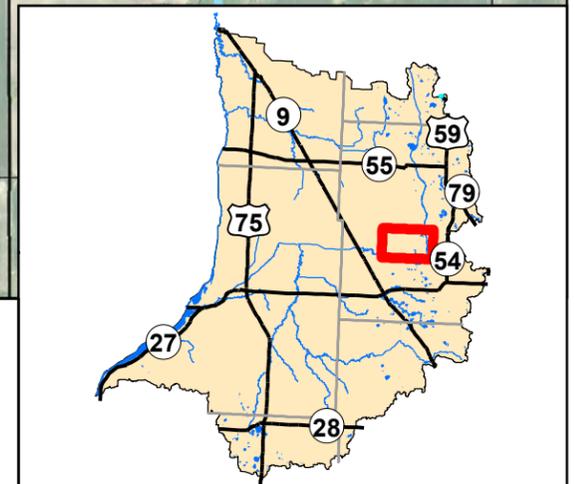
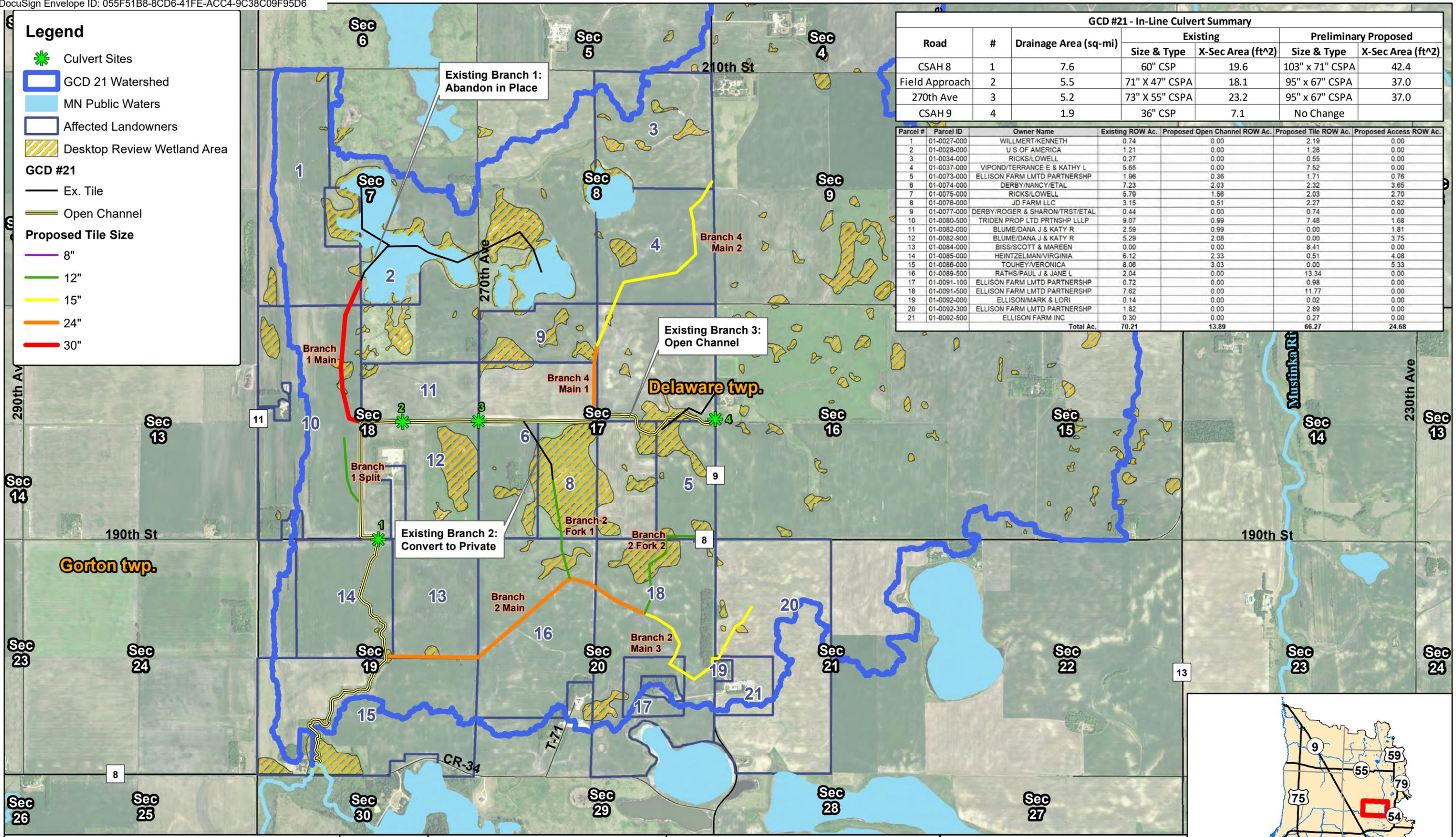
- Ex. Tile
- Open Channel

**Proposed Tile Size**

- 8"
- 12"
- 15"
- 24"
- 30"

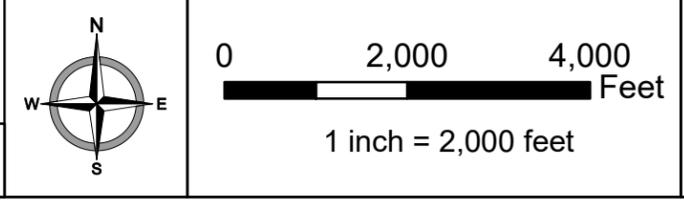
GCD #21 - In-Line Culvert Summary						
Road	#	Drainage Area (sq-mi)	Existing		Preliminary Proposed	
			Size & Type	X-Sec Area (ft^2)	Size & Type	X-Sec Area (ft^2)
CSAH 8	1	7.6	60" CSP	19.6	103" x 71" CSPA	42.4
Field Approach	2	5.5	71" X 47" CSPA	18.1	95" x 67" CSPA	37.0
270th Ave	3	5.2	73" X 55" CSPA	23.2	95" x 67" CSPA	37.0
CSAH 9	4	1.9	36" CSP	7.1	No Change	

Parcel #	Parcel ID	Owner Name	Existing ROW Ac.	Proposed Open Channel ROW Ac.	Proposed Tile ROW Ac.	Proposed Access ROW Ac.
1	01-0027-000	WILLMERT/KENNETH	0.74	0.00	2.19	0.00
2	01-0028-000	U S OF AMERICA	1.21	0.00	1.28	0.00
3	01-0034-000	RICKS/LOWELL	0.27	0.00	0.55	0.00
4	01-0037-000	VIPOND/TERRANCE E & KATHY L	5.65	0.00	7.52	0.00
5	01-0073-000	ELLISON FARM LMTD PARTNERSHP	1.96	0.36	1.71	0.76
6	01-0074-000	DERBY/NANCY/ETAL	7.23	2.03	2.32	3.65
7	01-0075-000	RICKS/LOWELL	5.79	1.56	2.03	2.70
8	01-0076-000	JD FARM LLC	3.15	0.51	2.27	0.92
9	01-0077-000	DERBY/ROGER & SHARON/TRST/ETAL	0.44	0.00	0.74	0.00
10	01-0080-500	TRIDEN PROP LTD PRTNShP LLLP	9.07	0.99	7.48	1.68
11	01-0082-000	BLUME/DANA J & KATY R	2.59	0.99	0.00	1.81
12	01-0082-900	BLUME/DANA J & KATY R	5.29	2.08	0.00	3.75
13	01-0084-000	BISS/SCOTT & MAREEN	0.00	0.00	8.41	0.00
14	01-0085-000	HEINTZELMAN/VIRGINIA	6.12	2.33	0.51	4.08
15	01-0086-000	TOUHEY/VERONICA	8.06	3.03	0.00	5.33
16	01-0089-500	RATHS/PAUL J & JANE L	2.04	0.00	13.34	0.00
17	01-0091-100	ELLISON FARM LMTD PARTNERSHP	0.72	0.00	0.98	0.00
18	01-0091-500	ELLISON FARM LMTD PARTNERSHP	7.62	0.00	11.77	0.00
19	01-0092-000	ELLISON/MARK & LORI	0.14	0.00	0.02	0.00
20	01-0092-300	ELLISON FARM LMTD PARTNERSHP	1.82	0.00	2.89	0.00
21	01-0092-500	ELLISON FARM INC	0.30	0.00	0.27	0.00
<b>Total Ac.</b>			<b>70.21</b>	<b>13.89</b>	<b>66.27</b>	<b>24.68</b>



**Grant County Ditch #21  
Watershed & Landowner Map  
Bois de Sioux Watershed District**

Created By: TJS Date Created: 08/28/23 Date Saved: 08/30/23 Date Plotted: 12/21/22 Date Exported: 08/30/23  
 Plotted By: Tanner.Schmidt Parcel Date: 2021 Aerial Image: 2021 SIDA Elevation Data: IWI Lidar  
 Horizontal Datum: NAD 1983 HARN Adj MN Grant Feet Vertical Datum: NAVD 1988  
 T:\Projects\22500\22549\22549\_GCD21\_ProposedMap.mxd



## 14.APPENDIX B - PETITION FROM LANDOWNERS

**STATE OF MINNESOTA  
GRANT COUNTY BOARD OF COMMISSIONERS  
DRAINAGE AUTHORITY FOR GRANT COUNTY DITCH 21**

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In the matter of the Improvement of  
Grant County Ditch 21

**Petition for Improvement and Separable  
Maintenance Request**

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For their petition for the improvement of Grant County Ditch 21 (hereinafter "CD 21"), the undersigned Petitioners state and allege the following:

1. Petitioners file this petition for improvement of CD 21 pursuant to statutes section 103E.215.
2. CD 21 provides beneficial drainage to agricultural properties and Township and County roads in Sections 4, 5, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, and 21 of Delaware Township (Township 128 N, Range 43 W), Grant County, Minnesota.
3. CD 21 is in need of repair. CD 21 has remained in service since its original establishment in 1914. The original ditch consisted of the Main and four branches. There's a 5<sup>th</sup> branch that is known as "Original Tile Main" which is mostly part of Branch 1.
4. Being over 100 years old, the tile is experiencing more frequent failure and is at the end of its useful life.
5. Even in a repaired state, CD 21 is inadequate to support beneficial drainage for current farming and drainage practices. CD 21 has insufficient capacity and needs enlarging to furnish sufficient capacity. CD 21 does not meet current design criteria: the original construction of CD 21 was not deep enough to accommodate adequate drainage to much of the watershed it was intended to serve; new drainage and farming practices in

the watershed of the ditch create further need for increased tile capacity; and shallow installation depth must be corrected to reduce frequency of repair to accommodate current farming implements.

6. The proposed improvements include: lowering the depth of the improved portions of the drainage system to accommodate current farming practices, tile outlets and improve drainage efficiency; increasing the size of existing tile segments to accommodate improved flow; construction of new surface intakes where necessary to provide improved, buffered and stabilized inlets and to prevent erosion of soil into the system; and improve crossings.
7. The course of the proposed improvement is described as follows:
  - a. **Branch 1:** from its junction with the Main on the east line of SW  $\frac{1}{4}$  of  $\S$ 18, T128N, R43W to its terminus along the east line of the SE  $\frac{1}{4}$  of the NW  $\frac{1}{4}$  and the west line of the SW  $\frac{1}{4}$  of the NE  $\frac{1}{4}$  of  $\S$ 7, T128N, R43W.
  - b. **Branch 1 Fork:** from its junction with Branch 1 along the north line of the SW  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  and the south line of the NW  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  of  $\S$ 7, T128N, R43W to its terminus on the east line of the SW  $\frac{1}{4}$  of the SW  $\frac{1}{4}$  and the west line of the SE  $\frac{1}{4}$  of the SW  $\frac{1}{4}$  of  $\S$ 7, T128N, R43W.
  - c. **Branch 2:** from its junction with the Main on the north line the NW  $\frac{1}{4}$  of the SW  $\frac{1}{4}$  of  $\S$ 17, T128N, R43W through portions of the NW  $\frac{1}{4}$  and NE  $\frac{1}{4}$  of  $\S$ 20 to its terminus in the SE  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  of  $\S$ 17, T128N, R43W.

- d. **Branch 2 Fork:** from its junction with Branch 2 in the NE ¼ of §20, T128N, R43W south through the NE ¼ of the SE ¼ of §20 to its terminus in the NW ¼ of §21, T128N, R43W.
- e. **Branch 3:** from its junction with Branch 4 in the SE ¼ of the NW ¼ of §17, T128N, R43W to its terminus in the south half of the NW ¼ of §16, T128N, R43W.
- f. **Branch 4:** from its junction with the main line in the SE ¼ of the NW ¼ of §17, T128N, R43W to its terminus in the SE ¼ of the NE ¼ of §8, T128N, R43W.
- g. **Main:** from the outlet in the SW ¼ of §19, T128N, R43W to its terminus in the middle of section §17, T109N, R41W.

8. The improvement passes over 54 40-acre or smaller parcels under the following ownership:

	Owner	Address	Description	Sec	Twp	Rg
1	U.S. of America		Part of the SENW PID 01-0029-000	7	128	43
2	U.S. of America		Part of the SWNE PID 01-0032-000	7	128	43
3	U.S. of America		Part of the NESW PID 01-0028-000	7	128	43
4	U.S. of America		Part of the NWSE PID 01-0032-000	7	128	43
5	Kenneth Willmert	16 Gilmore St. Potsdam, NY 13676	SESW PID 01-0027-000	7	128	43
6	U.S. of America		SWSE PID 01-0028-000	7	128	43
7	U.S. of America		Part of the SESE PID 01-0032-000	7	128	43
8	U.S. of America		Part of the NWSW PID 01-0036-000	8	128	43
9	U.S. of America		SWSW PID 01-0036-000	8	128	43
10	U.S. of America		Part of the SESW PID 01-0036-000	8	128	43

	Owner	Address	Description	Sec	Twp	Rg
11 ✓	Triden Properties Limited Partnership, L.L.P.	20550 Co. Rd. 30 Rogers, MN 55374	NENW PID 01-0080-500	18	128	43
12 ✓	Triden Properties Limited Partnership, L.L.P.	20550 Co. Rd. 30 Rogers, MN 55374	SESW PID 01-0080-500	18	128	43
13 ✓	Triden Properties Limited Partnership, L.L.P.	20550 Co. Rd. 30 Rogers, MN 55374	NESW PID 01-0080-500	18	128	43
14 ✓	Triden Properties Limited Partnership, L.L.P.	20550 Co. Rd. 30 Rogers, MN 55374	SESW PID 01-0080-500	18	128	43
15 ✓	Virginia Heintzelman	P.O. Box 85 Chokio, MN 56221	NENW PID 01-0085-000	19	128	43
16 ✓	Virginia Heintzelman	P.O. Box 85 Chokio, MN 56221	Part of the NWNE PID 01-0085-000	19	128	43
17 ✓	Virginia Heintzelman	P.O. Box 85 Chokio, MN 56221	SESW PID 01-0085-000	19	128	43
18 ✓	Virginia Heintzelman	P.O. Box 85 Chokio, MN 56221	Part of the SWNE PID 01-0085-000	19	128	43
19 no	Veronica Touhey	27820 180 <sup>th</sup> St. Norcross, MN 56274	NESW PID 01-0086-000	19	128	43
20 no	Veronica Touhey	27820 180th St. Norcross, MN 56274	NWSE PID 01-0086-000	19	128	43
21 no	Veronica Touhey	27820 180th St. Norcross, MN 56274	SESW PID 01-0086-000	19	128	43
22 ✓	Dana J. & Katy R. Blume	27384 Co. Rd. 8 Elbow Lake, MN 56531	SWNE PID 01-0082-000	18	128	43
23 ✓	Dana J. & Katy R. Blume	27384 Co. Rd. 8 Elbow Lake, MN 56531	Part of the NWSE PID 01-0082-900	18	128	43
24 ✓	Dana J. & Katy R. Blume	27384 Co. Rd. 8 Elbow Lake, MN 56531	SENE PID 01-0082-000	18	128	43
25 ✓	Dana J. & Katy R. Blume	27384 Co. Rd. 8 Elbow Lake, MN 56531	NESE PID 01-0082-900	18	128	43
26 no	Nancy Derby, et al	1001 Lyndon Ave. S Unit 101 Glyndon, MN 56547	SWNW PID 01-0074-000	17	128	43
27 no	Nancy Derby, et al	1001 Lyndon Ave. S Unit 101 Glyndon, MN 56547	NWSW PID 01-0074-000	17	128	43
28 no	Nancy Derby, et al	1001 Lyndon Ave. S Unit 101 Glyndon, MN 56547	SESW PID 01-0074-000	17	128	43
29 ✓	JD Farm LLC	10820 Sanctuary Dr. NE Blaine, MN 55449	NESW PID 01-0076-000	17	128	43

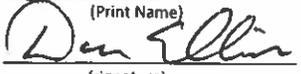
	Owner	Address	Description	Sec	Twp	Rg
30	no Lowell Ricks	26684 210 <sup>th</sup> St. Elbow Lake, MN 56531	SWNE PID 01-0075-000	17	128	43
31	Nancy Derby, et al	1001 Lyndon Ave. S Unit 101 Glyndon, MN 56547	NWSE PID 01-0074-000	17	128	43
32	no Lowell Ricks	26684 210 <sup>th</sup> St. Elbow Lake, MN 56531	SENE PID 01-0075-000	17	128	43
33	✓ Ellison Farm Limited Partnership	18414 260 <sup>th</sup> Ave. Elbow Lake, MN 56531	NESE PID 01-0073-000	17	128	43
34	no Nicholas A. & Megan J. Olson	19568 260 <sup>th</sup> Ave. Elbow Lake, MN 56531	Part of the SWNW PID 01-0070-000	16	128	43
35	no Olson Revocable Living Trust Loren H. & Sheryl A. Olson, Trustees	26873 Grand View Road Unit #2 Elbow Lake, MN 56531	Part of the SWNW PID 01-0070-500	16	128	43
36	no Olson Revocable Living Trust Loren H. & Sheryl A. Olson, Trustees	26873 Grand View Road Unit #2 Elbow Lake, MN 56531	SENE PID 01-0070-500	16	128	43
37	Roger & Sharon Derby Trust, et al	18121 300 <sup>th</sup> Ave. Norcross, MN 56274	NENW PID 01-0077-000	17	128	43
38	no Lowell Ricks	26684 210 <sup>th</sup> St. Elbow Lake, MN 56531	NWNE PID 01-0075-000	17	128	43
39	✓ Terrance E. & Kathy L. Vipond	30318 200 <sup>th</sup> St. Norcross, MN 56274	SWSE PID 01-0037-000	8	128	43
40	✓ Terrance E. & Kathy L. Vipond	30318 200 <sup>th</sup> St. Norcross, MN 56274	SESE PID 01-0037-000	8	128	43
41	✓ Terrance E. & Kathy L. Vipond	30318 200 <sup>th</sup> St. Norcross, MN 56274	NESE PID 01-0037-000	8	128	43
42	no Lowell Ricks	26684 210 <sup>th</sup> St. Elbow Lake, MN 56531	SENE PID 01-0034-000	8	128	43
43	✓ JD Farm LLC	10820 Sanctuary Dr. NE Blaine, MN 55449	SESW PID 01-0076-000	17	128	43
44	✓ Paul J. & Jane L. Rath	26865 180 <sup>th</sup> St. Norcross, MN 56274	NENW PID 01-0089-500	20	128	43
45	✓ Ellison Farm Limited Partnership	18414 260 <sup>th</sup> Ave. Elbow Lake, MN 56531	NWNE PID 01-0091-500	20	128	43
46	✓ Ellison Farm Limited Partnership	18414 260 <sup>th</sup> Ave. Elbow Lake, MN 56531	NENE PID 01-0091-500	20	128	43
47	✓ Ellison Farm Limited Partnership	18414 260 <sup>th</sup> Ave. Elbow Lake, MN 56531	SESE PID 01-0073-000	17	128	43
48	✓ Ellison Farm Limited Partnership	18414 260 <sup>th</sup> Ave. Elbow Lake, MN 56531	SWNE PID 01-0091-500	20	128	43
49	✓ Ellison Farm Limited Partnership	18414 260 <sup>th</sup> Ave. Elbow Lake, MN 56531	SENE PID 01-0091-500	20	128	43

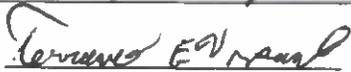
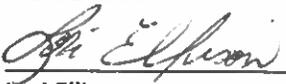
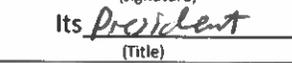
	Owner	Address	Description	Sec	Twp	Rg
50	✓ Ellison Farm Limited Partnership	18414 260th Ave. Elbow Lake, MN 56531	SWNW PID 01-0092-300	21	128	43
51	✓ Ellison Farm Limited Partnership	18414 260 <sup>th</sup> Ave. Elbow Lake, MN 56531	Part of the NESE PID 01-0091-100	20	128	43
52	✓ Ellison Farm Limited Partnership	18414 260th Ave. Elbow Lake, MN 56531	Part of the NESE PID 01-0091-500	20	128	43
53	✓ Mark & Lori Ellison	18414 260th Ave. Elbow Lake, MN 56531	Part of the NWSW PID 01-0092-000	21	128	43
54	✓ Ellison Farm Inc.	18414 260th Ave. Elbow Lake, MN 56531	Part of the NWSW PID 01-0092-500	21	128	43

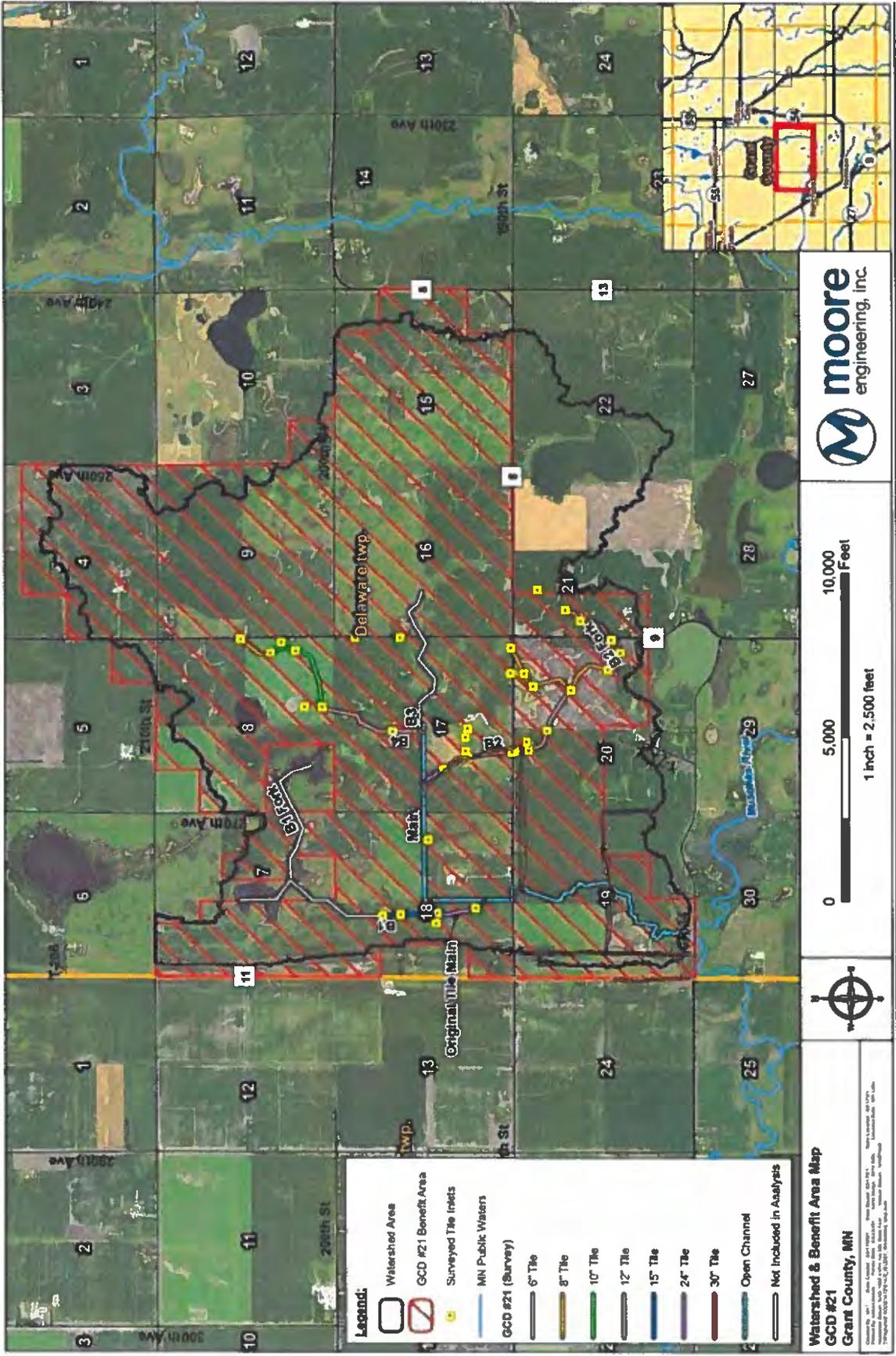
9. A diagram of the proposed improvement, showing the general location of the proposed improvement and the owners of properties crossed by the improvement, is attached as **Exhibit A**. Parcels numbered in the exhibit correspond to the parcels listed in the table above.
10. Petitioners are the owners of 9 of the <sup>17</sup>~~54~~ 40-acre or smaller parcels that the proposed improvement passes over and, as such, represent more than 26 percent of the owners of property that the proposed improvement passes over as required by statutes section 103E.215.
11. Because CD 21 is in need of repair, Petitioners request, to the extent practicable, that the Drainage Authority consider, under statutes section 103E.215, subd. 6, the separable maintenance portion of the work when determining benefits and assessing costs of the improvement.
12. The improvement of CD 21 will be of public utility and promote public health.
13. Accompanying this Petition is the Petitioners' initial bond in the amount of \$ 60,000. Petitioners acknowledge and agree that additional bonds may be required as additional costs are incurred in the improvement proceedings. Petitioners agree to pay all costs and expenses that may be incurred if the improvement proceedings are dismissed.
14. Petitioners have hired Rinke Noonan to represent them in the improvement proceedings and request the legal costs of Petitioners' attorney be paid from the bond and/or the project as provided in statutes section 103E.645.



Owner Signature	Property Owned	Sec	Twp	Rg	Mailing Address	Dated
<u>Virginia Heintzelman</u> Virginia Heintzelman	NENW PID 01-0085-000 NWNE PID 01-0085-000 SEnw PID 01-0085-000 SWNE PID 01-0085-000	19 19 19 19	128 128 128 128	43 43 43 43	P.O. Box 85 Chokio, MN 56221	_____
<u>Veronica Touhey</u> no	NESW PID 01-0086-000 NWSE PID 01-0086-000 SESW PID 01-0086-000	19 19 19	128 128 128	43 43 43	27820 180th St. Norcross, MN 56274	_____
<u>Dana J. Blume</u> Dana J. Blume <u>Katy R. Blume</u> Katy R. Blume	SWNE PID 01-0082-000 NWSE PID 01-0082-900 SENE PID 01-0082-000 NESE PID 01-0082-900	18 18 18 18	128 128 128 128	43 43 43 43	27384 Co. Rd. 8 Elbow Lake, MN 56531	_____ _____
<u>Nancy Derby, et al</u> no	SWNW PID 01-0074-000 NWSW PID 01-0074-000 SEnw PID 01-0074-000 NWSE PID 01-0074-000	17 17 17 17	128 128 128 128	43 43 43 43	1001 Lyndon Ave. S Unit 101 Glyndon, MN 56547	_____
JD Farm LLC By <u>Julie Larson</u> (Print Name) <u>Julie Larson</u> (signature) Its _____ (Title)	NESW PID 01-0076-000 SESW PID 01-0076-000	17 17	128 128	43 43	10820 Sanctuary Dr. NE Blaine, MN 55449	_____
<del><u>Lowell Ricks</u></del> Lowell Ricks Remove	SWNE PID 01-0075-000 SENE PID 01-0075-000 NWNE PID 01-0075-000 SENE PID 01-0034-000	17 17 17 8	128 128 128 128	43 43 43 43	26684 210th St. Elbow Lake, MN 56531	_____

Owner Signature	Property Owned	Sec	Twp	Rg	Mailing Address	Dated
Ellison Farm Limited Partnership By <u>Dan Ellison</u> (Print Name)  (signature) Its <u>General Partner</u> (Title)	NESE PID 01-0073-000 NWNE PID 01-0091-500 NENE PID 01-0091-500 SESE PID 01-0073-000 SWNE PID 01-0091-500 SENE PID 01-0091-500 SWNW PID 01-0092-300 Part of the NESE PID 01-0091-100 Part of the NESE PID 01-0091-500	17 20 20 17 20 20 21 20 20	128 128 128 128 128 128 128 128 128	43 43 43 43 43 43 43 43 43	18414 260th Ave. Elbow Lake, MN 56531	_____ _____ _____ _____ _____ _____ _____ _____ _____
_____ Nicholas A. Olson <span style="color: blue;">no</span> _____ Megan J. Olson	Part of the SWNW PID 01-0070-000	16	128	43	19568 260th Ave. Elbow Lake, MN 56531	_____ _____ _____
Olson Revocable Living Trust By _____ <span style="color: blue;">no</span> Loren H. Olson, Trustee By _____ <span style="color: blue;">no</span> Sheryl A. Olson, Trustee	Part of the SWNW PID 01-0070-500 SENW PID 01-0070-500	16 16	128 128	43 43	26873 Grand View Road Unit #2 Elbow Lake, MN 56531	_____ _____ _____
Roger & Sharon Derby Trust, et al By _____ <span style="color: blue;">no</span> Roger Derby, Trustee By _____ <span style="color: blue;">no</span> Sharon Derby, Trustee	NENW PID 01-0077-000	17	128	43	18121 300th Ave. Norcross, MN 5624	_____ _____ _____

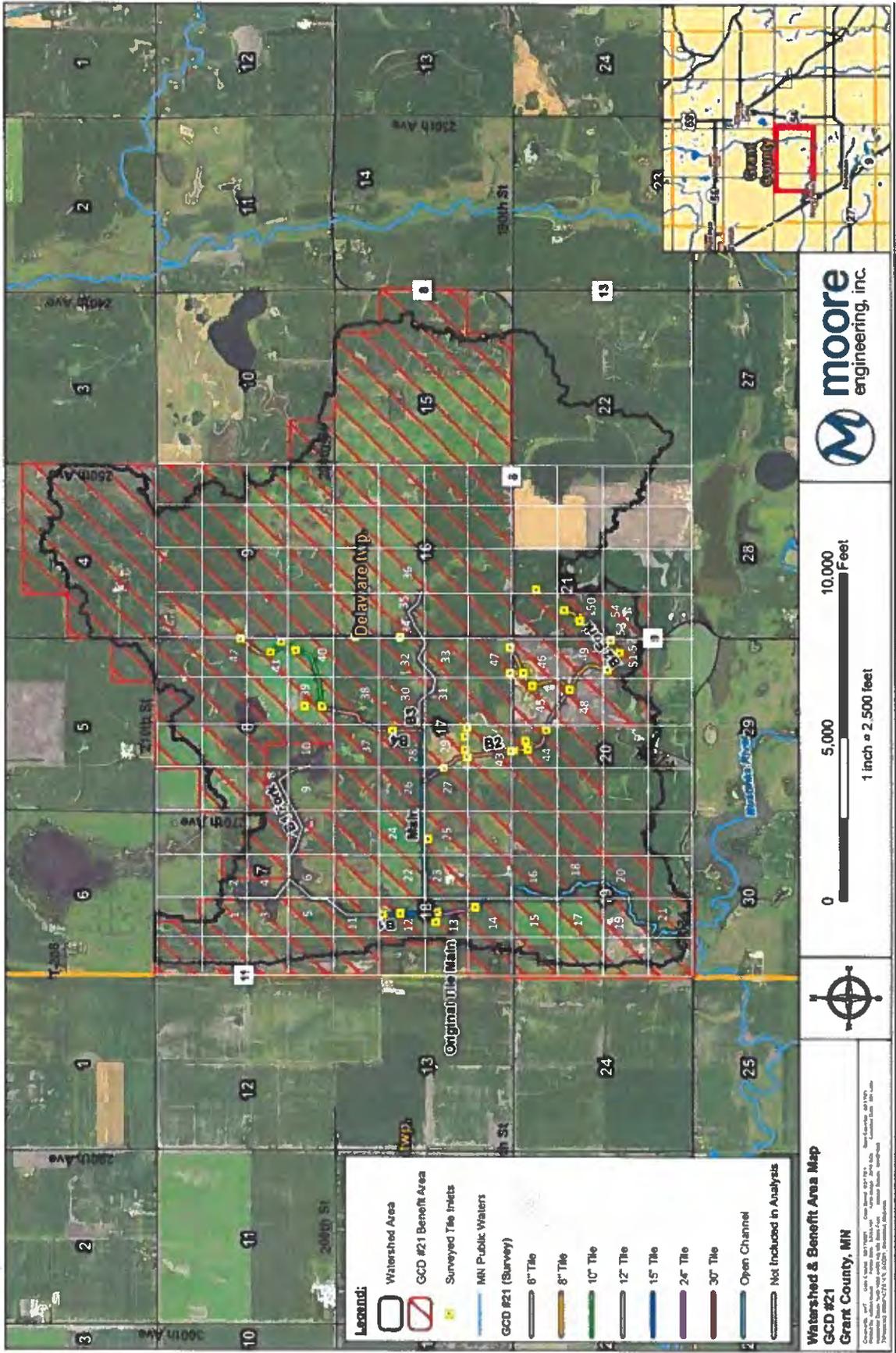
Owner Signature	Property Owned	Sec	Twp	Rg	Mailing Address	Dated
 Terrence E. Vipond  Kathy L. Vipond	SWSE PID 01-0037-000 SESE PID 01-0037-000 NESE PID 01-0037-000	8	128	43	30318 200th St. Norcross, MN 56274	4-26-2022
 Paul J. Rath  Jane L. Rath	NENW PID 01-0089-500	20	128	43	26865 180th St. Norcross, MN 56274	
 Mark Ellison  Lori Ellison	Part of the NWSW PID 01-0092-000	21	128	43	18414 260th Ave. Elbow Lake, MN 56531	
Ellison Farm Inc. By  (Print Name)  (signature) Its  (Title)	Part of the NWSW PID 01-0092-500	21	128	43	18414 260th Ave. Elbow Lake, MN 56531	



Watershed & Benefit Area Map  
 GCD #21  
 Grant County, MN

200 Acres

Exhibit A



- Legend:**
- Watershed Area
  - GCD #21 Benefit Area
  - Surveyed Tile Inlets
  - MN Public Waters
  - GCD #21 (Survey)
  - 6" Tile
  - 8" Tile
  - 10" Tile
  - 12" Tile
  - 15" Tile
  - 24" Tile
  - 30" Tile
  - Open Channel
  - Not Included in Analysis

**Watershed & Benefit Area Map**  
**GCD #21**  
**Grant County, MN**

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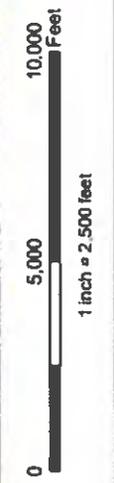


Exhibit A

## 15.APPENDIX C – ENGINEER’S OPINION OF COST



Project # 22549  
Date: May 7, 2024

**Grant County Ditch #21 Improvement**  
**Bois de Sioux Watershed District**  
**Grant County, MN**

Engineer's Opinion of Probable Cost - With Updates from Final Hearing

ITEM	UNIT	QUANTITY	Repair Project			Improvement Changes		
			UNIT PRICE	TOTAL	QUANTITY	UNIT PRICE	TOTAL	
<b>Culvert Crossings</b>								
1. Culvert - Remove (All Types & Sizes)	LF	252.0	\$20.00	\$ 5,040.00				
2. RCP - 36" Class III	LF	18.0	\$370.00	\$ 6,660.00				
3. RCP - 36" End Sections	EA	2.0	\$3,500.00	\$ 7,000.00				
4. CSPA - 95"x67"	LF	166.0	\$375.00	\$ 62,250.00				
5. RCPA - 115"x72" Class III	LF	90.0	\$2,000.00	\$ 180,000.00				
6. RCPA - 115"x72" End Sections	EA	2.0	\$6,500.00	\$ 13,000.00				
7. Select Backfill	CY	550.0	\$30.00	\$ 16,500.00				
8. Riprap - Class IV	CY	400.0	\$90.00	\$ 36,000.00				
9. Riprap Filter Blanket	SY	600.0	\$5.00	\$ 3,000.00				
10. Road Surface Aggregate	CY	320.0	\$30.00	\$ 9,600.00				
11. Asphalt Road Surface - Removal	SY	45.0	\$50.00	\$ 2,250.00				
12. Class 5 Subbase	SY	400.0	\$3.00	\$ 1,200.00				
13. Commercial Grade Hot Mix Asphalt	TON	100.0	\$400.00	\$ 40,000.00				
14. Pavement Park Painted 4 in Line	LF	200.0	\$6.00	\$ 1,200.00				
15. Traffic Control	LS	1.0	\$2,000.00	\$ 2,000.00				
16. Material Testing	Invoice	ALLOWANCE	\$5,000.00	\$ 5,000.00				
<b>Open Channel - Main</b>								
1. Mobilization	LS	1.0	\$40,000.00	\$ 40,000.00				
2. Excavation - Channel Cleaning	MIle	3.0	\$15,000.00	\$ 45,000.00				
3. Riprap - Class III	CY	0.0	\$75.00	\$ -				
4. Riprap Filter Blanket	SY	0.0	\$3.00	\$ -				
5. Silt Fence	LF	500.0	\$5.00	\$ 2,500.00				
6. Temporary Stabilized Construction Entrance	LS	1.0	\$1,500.00	\$ 1,500.00				
7. Site Clearing and Grubbing	LS	1.0	\$5,000.00	\$ 5,000.00				
8. Control of Water / Storm Water Management	LS	1.0	\$20,000.00	\$ 20,000.00				
9. Seeding	Ac	5.0	\$1,000.00	\$ 5,000.00				
<b>Original Tile #1</b>								
1. Tile - Remove(All Types and Sizes)	LF	1,550.0	\$3.00	\$ 4,650.00				
2. HP Dual-Wall - 8"	LF	0.0	\$30.00	\$ -				
3. HP Dual-Wall - 12"	LF	0.0	\$30.00	\$ -				
4. HP Dual-Wall - 15"	LF	1,550.0	\$40.00	\$ 62,000.00				
5. HP Dual-Wall - 24"	LF	0.0	\$57.50	\$ -				
6. HP Dual-Wall - 30"	LF	0.0	\$90.00	\$ -				
7. 15" Steel Casing Pipe - Jacked	LF	0.0	\$700.00	\$ -				
8. Telesiving Structure - 8" Surface Inlet	EA	0.0	\$1,000.00	\$ -				
9. Telesiving Structure - 12" Surface Inlet	EA	0.0	\$1,300.00	\$ -				
10. Telesiving Structure - 15" Surface Inlet	EA	2.0	\$1,800.00	\$ 3,600.00				
11. Telesiving Structure - 18" Surface Inlet	EA	0.0	\$2,200.00	\$ -				
12. Telesiving - Tile Inspection	LF	1,550.0	\$2.00	\$ 3,100.00				
13. Private Tile Connections	EA	6.0	\$1,200.00	\$ 7,200.00				
14. Riprap - Class III	CY	20.0	\$75.00	\$ 1,500.00				
15. Riprap Filter Blanket	SY	40.0	\$3.00	\$ 120.00				
<b>Original Tile #2</b>								
1. Tile - Remove(All Types and Sizes)	LF	942.0	\$3.00	\$ 2,826.00				
2. HP Dual-Wall - 8"	LF	0.0	\$30.00	\$ -				
3. HP Dual-Wall - 12"	LF	942.0	\$30.00	\$ 28,260.00				
4. HP Dual-Wall - 15"	LF	0.0	\$40.00	\$ -				
5. HP Dual-Wall - 24"	LF	0.0	\$57.50	\$ -				
6. HP Dual-Wall - 30"	LF	0.0	\$90.00	\$ -				
7. 15" Steel Casing Pipe - Jacked	LF	0.0	\$700.00	\$ -				
8. Telesiving Structure - 8" Surface Inlet	EA	0.0	\$1,000.00	\$ -				
9. Telesiving Structure - 12" Surface Inlet	EA	2.0	\$1,300.00	\$ 2,600.00				
10. Telesiving Structure - 15" Surface Inlet	EA	0.0	\$1,800.00	\$ -				
11. Telesiving Structure - 18" Surface Inlet	EA	0.0	\$2,200.00	\$ -				
12. Telesiving - Tile Inspection	LF	942.0	\$2.00	\$ 1,884.00				
13. Private Tile Connections	EA	3.0	\$1,200.00	\$ 3,600.00				
14. Riprap - Class III	CY	20.0	\$75.00	\$ 1,500.00				
15. Riprap Filter Blanket	SY	40.0	\$3.00	\$ 120.00				
<b>Branch 1</b>								
1. Tile - Remove(All Types and Sizes)	LF	3,900.0	\$3.00	\$ 11,700.00				
2. Tile - Crush and Abandon in Place	LF	500.0	\$20.00	\$ 10,000.00				
3. HP Dual-Wall - 8"	LF	0.0	\$30.00	\$ -				
4. HP Dual-Wall - 12"	LF	0.0	\$30.00	\$ -				
5. HP Dual-Wall - 15"	LF	0.0	\$40.00	\$ -				
6. HP Dual-Wall - 24"	LF	4,410.0	\$57.50	\$ 253,575.00	-4,410.0	\$57.50	\$ (253,575.00)	
7. HP Dual-Wall - 30"	LF	0.0	\$90.00	\$ -	4,410.0	\$80.00	\$ 352,800.00	
8. CSP - 24"	LF	0.0	\$75.00	\$ -				
9. Flared End Section CSP - 24"	EA	0.0	\$600.00	\$ -				
10. Adjustable Flap Gate - 24" Steel	EA	0.0	\$1,200.00	\$ -				
11. RCP - 30" Class II	LF	150.0	\$300.00	\$ 45,000.00				
12. RCP - 30" End Sections	EA	1.0	\$3,500.00	\$ 3,500.00				
13. Concrete Water Control Structure	EA	1.0	\$15,000.00	\$ 15,000.00				
14. 15" Steel Casing Pipe - Jacked	LF	0.0	\$700.00	\$ -				
15. Telesiving Structure - 8" Surface Inlet	EA	0.0	\$1,000.00	\$ -				
16. Telesiving Structure - 12" Surface Inlet	EA	0.0	\$1,300.00	\$ -				
17. Telesiving Structure - 15" Surface Inlet	EA	2.0	\$1,800.00	\$ 3,600.00	0.0	\$1,800.00	\$ -	
18. Telesiving Structure - 18" Surface Inlet	EA	0.0	\$2,200.00	\$ -	2.0	\$2,200.00	\$ 4,400.00	
19. Telesiving - Tile Inspection	LF	4,410.0	\$2.00	\$ 8,820.00				
20. Private Tile Connections	EA	15.0	\$1,200.00	\$ 18,000.00				
21. Riprap - Class III	CY	20.0	\$75.00	\$ 1,500.00				
22. Riprap Filter Blanket	SY	40.0	\$3.00	\$ 120.00				
23. Silt Fence	LF	0.0	\$5.00	\$ -				
<b>Branch 2</b>								
1. Tile - Remove(All Types and Sizes)	LF	10,953.0	\$3.00	\$ 32,859.00				
2. Tile - Crush and Abandon in Place	LF	0.0	\$5.00	\$ -				
3. HP Dual-Wall - 8"	LF	6,245.0	\$30.00	\$ 187,350.00	-5,509.0	\$30.00	\$ (165,270.00)	
4. HP Dual-Wall - 12"	LF	4,208.0	\$30.00	\$ 126,240.00		\$30.00	\$ (98,130.00)	
5. HP Dual-Wall - 15"	LF	0.0	\$40.00	\$ -		6,785.0	\$ 271,400.00	
6. HP Dual-Wall - 24"	LF	1,000.0	\$57.50	\$ 57,500.00	5,718.0	\$57.50	\$ 328,785.00	
7. HP Dual-Wall - 30"	LF	0.0	\$90.00	\$ -				
8. CSP - 24"	LF	0.0	\$75.00	\$ -				
9. Flared End Section CSP - 24"	EA	0.0	\$600.00	\$ -				
10. Adjustable Flap Gate - 24" Steel	EA	0.0	\$1,200.00	\$ -				
11. RCP - 36" Class II	LF	0.0	\$300.00	\$ -				
12. RCP - 36" End Sections	EA	0.0	\$3,500.00	\$ -				
13. Concrete Water Control Structure	EA	0.0	\$15,000.00	\$ -				
14. 15" Steel Casing Pipe - Jacked	LF	160.0	\$700.00	\$ 112,000.00				
15. Telesiving Structure - 8" Surface Inlet	EA	8.0	\$1,000.00	\$ 8,000.00	1.0	\$1,000.00	\$ 1,000.00	
16. Telesiving Structure - 12" Surface Inlet	EA	6.0	\$1,300.00	\$ 7,800.00	0.0	\$1,300.00	\$ -	
17. Telesiving Structure - 15" Surface Inlet	EA	0.0	\$1,800.00	\$ -				
18. Telesiving Structure - 18" Surface Inlet	EA	2.0	\$2,200.00	\$ 4,400.00	-2.0	\$2,200.00	\$ (4,400.00)	
19. Telesiving - Tile Inspection	LF	11,453.0	\$2.00	\$ 22,906.00	5,723.0	\$2.00	\$ 11,446.00	
20. Private Tile Connections	EA	15.0	\$1,200.00	\$ 18,000.00	10.0	\$1,200.00	\$ 12,000.00	
21. Riprap - Class III	CY	30.0	\$75.00	\$ 2,250.00				
22. Riprap Filter Blanket	SY	60.0	\$3.00	\$ 180.00				
23. Silt Fence	LF	0.0	\$5.00	\$ -				
<b>Branch 3</b>								
1. Tile - Remove(All Types and Sizes)	LF	2,800.0	\$3.00	\$ 8,400.00				
2. HP Dual-Wall - 8"	LF	2,800.0	\$30.00	\$ 84,000.00				

3.	HP Dual-Wall - 12"	LF	0.0	\$30.00	\$ -				
4.	HP Dual-Wall - 15"	LF	0.0	\$40.00	\$ -				
5.	HP Dual-Wall - 24"	LF	0.0	\$57.50	\$ -				
6.	HP Dual-Wall - 30"	LF	0.0	\$80.00	\$ -				
7.	15" Steel Casing Pipe - Jacked	LF	0.0	\$700.00	\$ -				
8.	Televising Structure - 8" Surface Inlet	EA	2.0	\$1,000.00	\$ 2,000.00				
9.	Televising Structure - 12" Surface Inlet	EA	0.0	\$1,300.00	\$ -				
10.	Televising Structure - 15" Surface Inlet	EA	0.0	\$1,800.00	\$ -				
11.	Televising Structure - 18" Surface Inlet	EA	0.0	\$2,200.00	\$ -				
12.	Televising - Tile Inspection	LF	2,800.0	\$2.00	\$ 5,600.00				
13.	Private Tile Connections	EA	2.0	\$1,200.00	\$ 2,400.00				
14.	Excavation - Channel Cleaning	Mile	0.7	\$15,000.00	\$ 10,500.00				
15.	Riprap - Class III	CY	20.0	\$75.00	\$ 1,500.00				
16.	Riprap Filter Blanket	SY	40.0	\$3.00	\$ 120.00				
<b>Branch 4</b>									
1.	Tile - Remove(All Types and Sizes)	LF	7,145.0	\$3.00	\$ 21,435.00				
2.	Tile - Crush and Abandon in Place	LF	0.0	\$5.00	\$ -				
3.	HP Dual-Wall - 8"	LF	0.0	\$30.00	\$ -				\$ -
4.	HP Dual-Wall - 12"	LF	7,145.0	\$30.00	\$ 214,350.00	-7,145.0	\$30.00	\$ (214,350.00)	
5.	HP Dual-Wall - 15"	LF	0.0	\$40.00	\$ -	7,045.0	\$40.00	\$ 281,800.00	
6.	HP Dual-Wall - 24"	LF	0.0	\$57.50	\$ -	1,500.0	\$57.50	\$ 86,250.00	
7.	HP Dual-Wall - 30"	LF	0.0	\$80.00	\$ -				
8.	CSP - 24"	LF	0.0	\$75.00	\$ -				
9.	Flared End Section CSP - 24"	EA	0.0	\$600.00	\$ -				
10.	Adjustable Flap Gate - 24" Steel	EA	0.0	\$1,200.00	\$ -				
11.	RCP - 36" Class II	LF	0.0	\$300.00	\$ -				
12.	RCP - 36" End Sections	LF	0.0	\$3,500.00	\$ -				
13.	Concrete Water Control Structure	EA	0.0	\$15,000.00	\$ -				
14.	15" Steel Casing Pipe - Jacked	LF	0.0	\$700.00	\$ -				
15.	Televising Structure - 8" Surface Inlet	EA	1.0	\$1,000.00	\$ 1,000.00	-1.0	\$1,000.00	\$ (1,000.00)	
16.	Televising Structure - 12" Surface Inlet	EA	4.0	\$1,300.00	\$ 5,200.00	1.0	\$1,300.00	\$ 1,300.00	
17.	Televising Structure - 15" Surface Inlet	EA	0.0	\$1,800.00	\$ -				
18.	Televising Structure - 18" Surface Inlet	EA	1.0	\$2,200.00	\$ 2,200.00				
19.	Televising - Tile Inspection	LF	7,145.0	\$2.00	\$ 14,290.00	1,400.0	\$2.00	\$ 2,800.00	
20.	Private Tile Connections	EA	8.0	\$1,200.00	\$ 9,600.00				
21.	Riprap - Class III	CY	20.0	\$75.00	\$ 1,500.00				
22.	Riprap Filter Blanket	SY	40.0	\$3.00	\$ 120.00				
					<b>Total Construction</b>	<b>\$ 1,966,435.00</b>		<b>\$ 677,256.00</b>	
					<b>Contingencies (+/- 15%)</b>	<b>\$ 299,960.00</b>		<b>\$ 103,874.50</b>	
					<b>Engineering (Redetermination of Benefits/Project Development, 200 &amp; 201)</b>	<b>\$ 68,000.00</b>		<b>\$ 20,000.00</b>	
					<b>Project Permitting</b>	<b>\$ 20,000.00</b>			
					<b>Viewers (Redetermination of Benefits)</b>	<b>\$ 11,000.00</b>		<b>\$ 5,000.00</b>	
					<b>R/W Monumentation / Legal Descriptions</b>	<b>\$ 15,000.00</b>			
					<b>Engineering (Final Design, 300)</b>	<b>\$ 138,000.00</b>		<b>\$ 48,000.00</b>	
					<b>Engineering (Construction Staking, Construction Administration, 400)</b>	<b>\$ 177,000.00</b>		<b>\$ 61,000.00</b>	
					<b>Legal Fees</b>	<b>\$ 25,000.00</b>		<b>\$ 5,000.00</b>	
					<b>Right of way and Utilities - Construction and Coordination</b>	<b>\$ 15,000.00</b>		<b>\$ 5,000.00</b>	
					<b>BdSWD Staff Construction and Administration Services</b>	<b>\$ 10,000.00</b>			
					<b>Grant Application and Administration Assistance</b>	<b>\$ 5,000.00</b>			
					<b>Project Bonding / Fiscal</b>	<b>\$ 177,000.00</b>		<b>\$ 61,000.00</b>	
					<b>Right of Way - Permanent Easement for Channel</b>	<b>\$ 111,200.00</b>		<b>\$ -</b>	
					<b>Right of Way - Permanent Easement for Future Maintenance Access along Channel</b>	<b>\$ 8,750.00</b>		<b>\$ -</b>	
					<b>Right of Way - Permanent Easement for Tile</b>	<b>\$ 22,635.00</b>		<b>\$ 8,869.50</b>	
					<b>BASE PROJECT COST</b>	<b>\$ 3,070,000.00</b>		<b>TOTAL IMPROVEMENT ADDITIONS</b>	<b>\$ 995,000.00</b>

**TOTAL PROJECT COST \$ 4,065,000.00**

Repair Costs		Summary of Project Costs		Summary of Funding Source	
<b>Entire GCD 21 Watershed</b>	Construction	\$ 1,966,435.00	BdSWD Clean Water Cost Share	\$ 363,993.75	
	Soft Costs Lines 2 - 15	\$ 1,103,565.00	BdSWD Inline Culvert Cost Share	\$ 389,960.00	
	<b>Total</b>	<b>\$ 3,070,000.00</b>	<b>GCD 21 Benefit Area</b>	<b>\$ 2,316,046.25</b>	
Additional Improvement Costs		Summary of Project Costs		Summary of Funding Source	
<b>Branch 1 Sub Watershed</b>	Construction	\$ 103,625.00	BdSWD Clean Water Cost Share	\$ 25,906.25	
	15.3% of Soft Costs (Lines 2 - 15)	\$ 48,617.10			
	<b>Total</b>	<b>\$ 152,242.10</b>	<b>Branch 1 Benefit Area</b>	<b>\$ 126,335.85</b>	
<b>Branch 2 Sub Watershed</b>	Construction	\$ 416,831.00	BdSWD Clean Water Cost Share	\$ 104,207.75	
	61.55% of Soft Costs (Lines 2 - 15)	\$ 195,562.02			
	<b>Total</b>	<b>\$ 612,393.02</b>	<b>Branch 2 Benefit Area</b>	<b>\$ 508,185.27</b>	
<b>Branch 4 Sub Watershed</b>	Construction	\$ 156,800.00	BdSWD Clean Water Cost Share	\$ 39,200.00	
	23.15% of Soft Costs (Lines 2 - 15)	\$ 73,564.88			
	<b>Total</b>	<b>\$ 230,364.88</b>	<b>Branch 4 Benefit Area</b>	<b>\$ 191,164.88</b>	

## 16. APPENDIX D – MN DNR PRELIMINARY ADVISORY LETTER



**Ecological and Water Resources  
2115 Birchmont Beach Rd NE  
Bemidji, MN 56601**

February 17, 2023

Jamie Beyer, Administrator  
Bois de Sioux Watershed District  
704 Hwy 75 South  
Wheaton, MN 56296

## **Re: Preliminary Survey and Engineer's Report for Grant County Ditch No. 21 Improvement**

Dear Jamie Beyer,

On behalf of the Director of Ecological and Water Resources of the Minnesota Department of Natural Resources (MN DNR), I offer the following review of the Preliminary Survey and Engineer's Report for the Grant County Ditch No. 21 Improvement project in accordance with Minnesota Statutes section 103E.255.

- The Preliminary Survey Report appears to be adequate as it contains all the required information; however, we have recommendations for the final engineering report below.
- Our review finds the project will not require Public Water Work Permitting or Permissions from the DNR.
- A soil survey is not needed.

MN DNR supports the abandonment of the upper portions of Branch 1 in Sections 7 and 8 and Branch 3 in Section 17.

### **Recommendations to improve completeness**

- Please update project maps to show locations of all public waters (basins, public waters wetlands, and watercourses) in relation to drainage improvements.

### **Water quality and altered hydrology**

- The project appears to result in small increases to peak flows from the drainage system into the Mustinka River. The Bois de Sioux – Mustinka Comprehensive Watershed Management Plan states that altered hydraulic conditions, sediment loading to surface waters, and unstable river

and stream channels are high priority issues in the Lower Mustinka/Twelve Mile Creek Planning area (page 25 of 140 of the watershed management plan). Specifically, the Mustinka River downstream of Pine Ridge Park is a priority river or stream (page 83 of 140). Grant County Ditch 21 outlets downstream of the Park. Practices such as water storage and multipurpose drainage management within the watershed of County Ditch 21 should be considered as ways to minimize or mitigate for modeled changes in hydrology at the system outlet and downstream in the Mustinka River (Page 107 of 140).

### Effects of proposed drainage on wetlands

- Tile improvements are proposed through several wetland areas of the project. MN DNR recommends avoiding use of perforated tile through wetlands. To prevent lateral drainage effects, we further recommend that all perforated tile be placed beyond the lateral drainage effect of the tile from wetland boundaries. We also encourage close coordination with the Wetland Conservation Act (WCA) Local Government Unit, WCA Technical Evaluation Panel, and the United States Army Corps of Engineers to ensure compliance with state and federal wetland regulations.

Please also consider the following recommendations:

- DNR recommends incorporating a native seed mix to benefit pollinators. The Board of Soil and Water Resources seed mix for Native Construction (32-241) or the Mid Diversity Moist Buffer South & West (NRCS 342) may be good choices.
- Due to entanglement issues with small animals, use of erosion control blanket should be limited to 'bio-netting' or 'natural netting' types (i.e., no products containing plastic mesh netting or other plastic components). These are Category 3N or 4N in the 2016 & 2018 MNDOT Standards Specifications for Construction.

Thank you for the consideration of these comments. Please contact Environmental Assessment Ecologist Owen Baird ([owen.baird@state.mn.us](mailto:owen.baird@state.mn.us)) with any concerns or questions.

Sincerely,



Nathan Kestner  
Regional Manager, Ecological and Water Resources

CC: Emily Siira, Area Hydrologist  
Owen Baird, NW Region Environmental Assessment Ecologist  
Randall Doneen, DNR Conservation Assistance and Regulation Section Manager  
Erik Anthonisen, DNR NW Region Southern District Manager

## 17. APPENDIX E - PLAN AND PROFILE

# GRANT CO. DITCH 21 IMPROVEMENT

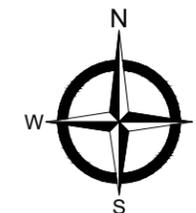
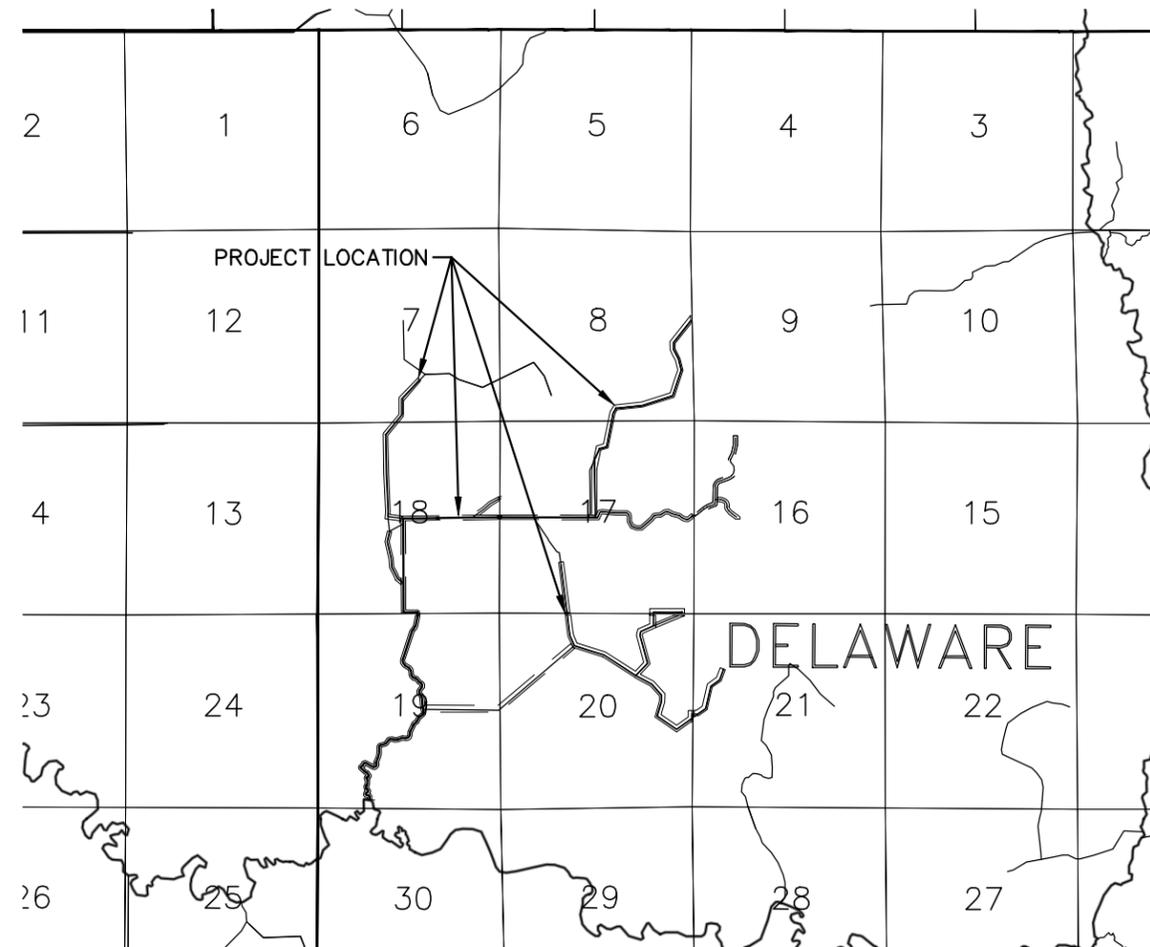


## BOIS DE SIOUX WATERSHED DISTRICT GRANT COUNTY, MINNESOTA



Consulting Engineering • Land Surveying  
925 10th Avenue East, Suite 1 • West Fargo, North Dakota  
[www.mooreengineeringinc.com](http://www.mooreengineeringinc.com)

VICINITY MAP



PROJECT No. 22549

This document was originally issued and sealed by JAMES GULES, Registration No. PE-----, on ----- and the original document is stored at Moore Engineering, Inc., #/###, W.D.

**PRELIMINARY**

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

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C-002	GENERAL NOTES
C-003	SWPPP
C-101	GENERAL LAYOUT
C-201	DETAILS
C-202	DETAILS
C-203	DETAILS
C-204	DETAILS
PLAN & PROFILE	
C-401	MAIN CHANNEL
C-402	MAIN CHANNEL
C-403	MAIN CHANNEL
C-404	ORIGINAL MAIN TILE & BRANCH NO. 1 SPLIT
C-405	BRANCH NO. 1
C-406	BRANCH NO. 1 FORK
C-407	BRANCH NO. 2
C-408	BRANCH NO. 2 - FORK 1
C-409	BRANCH NO. 2 - FORK 2 & FORK 4
C-410	BRANCH NO. 2
C-411	BRANCH NO. 3
C-411.2	BRANCH NO. 3
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C-413	BRANCH NO. 4
C-414	ORIGINAL MAIN TILE
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C-802	CROSS SECTIONS - MAIN CHANNEL
C-803	CROSS SECTIONS - MAIN CHANNEL
C-804	CROSS SECTIONS - MAIN CHANNEL
C-805	CROSS SECTIONS - MAIN CHANNEL
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PRELIMINARY



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 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**G-002**

FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

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### CIVIL LEGEND

- BENCHMARK
- IRON MONUMENT FOUND
- EXISTING GAS LINE MARKER
- EXISTING GAS GATE VALVE
- EXISTING POWER POLE
- EXISTING LIGHT POLE
- EXISTING LIGHT POLE W/SIGN
- EXISTING GUY WIRE
- EXISTING TRAFFIC SIGNAL ARM
- EXISTING SIGN
- EXISTING CULVERT W/FLARED END SECTION (F.E.S.)
- EXISTING FLARED END SECTION (F.E.S.)
- EXISTING CURB STOP
- EXISTING HYDRANT W/GATE VALVE
- EXISTING GATE VALVE
- EXISTING FITTINGS
- EXISTING PLUG
- EXISTING PROPANE TANK
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER CLEANOUT
- EXISTING STORM SEWER CATCH BASIN
- EXISTING STORM SEWER MANHOLE
- EXISTING WATER MAIN
- EXISTING WATER SERVICE W/CURB STOP
- EXISTING SANITARY SEWER
- EXISTING SANITARY FORCEMAIN
- EXISTING SANITARY SEWER SERVICE
- EXISTING STORM SEWER
- EXISTING STORM SEWER FORCEMAIN
- EXISTING STEAM PIPE
- EXISTING AIR CONDITIONER
- EXISTING UTILITY PEDESTAL
- EXISTING UTILITY MANHOLE
- EXISTING UTILITY VAULT
- EXISTING UNDERGROUND COMMUNICATIONS
- EXISTING UNDERGROUND FIBER
- EXISTING UNDERGROUND TELEPHONE
- EXISTING OVERHEAD TELEPHONE
- EXISTING UNDERGROUND TELEVISION
- EXISTING OVERHEAD TELEVISION
- EXISTING UNDERGROUND GAS
- EXISTING UNDERGROUND ELECTRIC
- EXISTING OVERHEAD POWER
- EXISTING BARBED WIRE FENCE
- EXISTING CHAIN LINK/STEEL FENCE
- EXISTING PVC/WOOD FENCE
- EXISTING SHRUB
- EXISTING STUMP
- EXISTING BOULDER
- EXISTING TREE/TREE CLUSTER
- EXISTING SPRINKLER HEAD
- EXISTING CLUSTER BOX UNIT (CBU)
- EXISTING MAILBOX
- EXISTING CURB AND GUTTER
- CURB AND GUTTER REMOVAL & REPLACEMENT
- REMOVE EXISTING SURFACE
- EXISTING ASPHALT SURFACE
- EXISTING CONCRETE SURFACE
- EXISTING DECORATIVE COLORED CONCRETE
- EXISTING GRANULAR SURFACE
- EXISTING SIDEWALK/MULTI-USE PATH (UNKNOWN SURFACE)
- EXISTING LANDSCAPING
- EXISTING RIPRAP
- EXISTING WETLANDS
- EXISTING PERMANENT POOL

- NEW LIGHT POLE
- NEW LIGHT POLE W/SIGN
- NEW GUY WIRE
- NEW SIGN
- TRAFFIC CONTROL - DRUM
- TRAFFIC CONTROL - TUBULAR MARKER
- NEW CULVERT W/FLARED END SECTION (F.E.S.)
- NEW FLARED END SECTION (F.E.S.)
- NEW CURB STOP
- NEW HYDRANT W/GATE VALVE
- NEW GATE VALVE
- NEW TAPPING SLEEVE
- NEW PLUG
- NEW SANITARY SEWER MANHOLE
- NEW SANITARY SEWER CLEANOUT
- NEW STORM SEWER CATCH BASIN
- NEW STORM SEWER MANHOLE
- NEW WATER MAIN
- NEW WATER SERVICE W/CURB STOP (S.B. ELEV.)
- NEW SANITARY SEWER
- NEW SANITARY FORCEMAIN
- NEW SANITARY SEWER SERVICE (S.S. ELEV.)
- NEW STORM SEWER
- NEW STORM SEWER FORCEMAIN
- NEW STEAM PIPE
- INSULATION PER DETAIL
- NEW BARBED WIRE FENCE
- NEW CHAIN LINK/STEEL FENCE
- NEW PVC/WOOD FENCE
- NEW INFLOW CURB AND GUTTER
- NEW OUTFLOW CURB AND GUTTER
- NEW ASPHALT SURFACE
- NEW CONCRETE SURFACE
- NEW CONCRETE APPROACH/DRIVEWAY
- NEW DECORATIVE COLORED CONCRETE
- NEW GRANULAR SURFACE
- NEW CRUSHED CONCRETE SURFACE
- NEW CONCRETE SIDEWALK/MULTI-USE PATH
- NEW DETECTABLE WARNING PANEL
- NEW RIPRAP
- NEW PERMANENT POOL
- NEW LANDSCAPING
- MILLING - 2" UNIFORM
- MILLING - 2" TAPERED
- ASPHALT PATCH
- LEVELING COURSE
- OVERLAY
- CHIPSEAL AND FOG COAT
- NEW CONCRETE VALLEY GUTTER
- NEW MEDIAN NOSE APRON
- NEW ADA RAMP W/WARNING PANEL
- NEW CLUSTER BOX UNIT (CBU)
- NEW MAILBOX
- NEW LARGE DECIDUOUS TREE
- NEW SMALL DECIDUOUS TREE
- NEW SHRUB
- NEW LARGE EVERGREEN TREE
- NEW SMALL EVERGREEN TREE

- DRAINAGE BREAK LINE
- EXISTING DRAINAGE DIRECTION
- FINISHED DRAINAGE DIRECTION & SLOPE
- FINISHED GRADE
- EXISTING CONTOUR ELEVATION
- FINISHED CONTOUR ELEVATION
- GRADE ELEVATIONS
- GRASS BUFFER
- PERMANENT STABILIZATION AREA
- SEDIMENTATION CONTROL WATTLE
- SEDIMENTATION CONTROL FENCE
- ROCK CHECK
- STABILIZED CONSTRUCTION ENTRANCE
- CONCRETE WASHOUT
- INLET PROTECTION DEVICE

- ABBREVIATIONS:**
- BOC = BACK OF CURB
  - BOW = BACK OF WALK
  - C = COMMUNICATION
  - CB# = STORM SEWER CATCH BASIN
  - CL = CENTERLINE
  - CSP = CORRUGATED STEEL PIPE
  - CO# = SANITARY SEWER CLEANOUT
  - CS# = CONTROL STRUCTURE
  - DIA = DIAMETER
  - DIP = DUCTILE IRON PIPE
  - E = ELECTRICAL
  - ECC = EDGE OF CRUSHED CONCRETE
  - EG = EXISTING GRADE
  - EOC = EDGE OF CONCRETE
  - EOG = EDGE OF GRAVEL
  - EOP = EDGE OF PAVEMENT
  - EOW = EDGE OF WALK
  - EX = EXISTING
  - F = FIBER OPTIC
  - FES = FLARED END SECTION
  - FG = FINISHED GRADE
  - FL = FLOWLINE
  - FM = FORCEMAIN
  - G = GAS LINE
  - HP = HIGH POINT
  - INV = INVERT
  - LP = LOW POINT
  - MA = MATCH
  - M# = STORM SEWER MANHOLE
  - MT# = STORM SEWER TEE MANHOLE
  - MM# = STORM SEWER MULTI-MANHOLE
  - MC = MIDPOINT OF CURVE
  - OHP = OVERHEAD POWER
  - OHT = OVERHEAD TELEPHONE
  - OHTV = OVERHEAD TELEVISION
  - PC = POINT OF CURVATURE
  - PRC = POINT OF REVERSE CURVE
  - PVC = POLYVINYL CHLORIDE PIPE
  - PT = POINT OF TANGENCY
  - RIM = RIM OF STRUCTURE
  - S# = SANITARY SEWER MANHOLE
  - S.B. ELEV. = STOP BOX ELEVATION
  - S.S. ELEV. = SANITARY SEWER SERVICE INVERT
  - S.S. = SANITARY SEWER
  - S.T. = STORM SEWER
  - STA = ALIGNMENT STATION
  - T = TELEPHONE
  - TOC = TOP OF CONCRETE
  - TOP = TOP OF PAVEMENT
  - TOP = TOP OF PIPE
  - TOP = TOP OF WALK
  - TR# = SANITARY TELEVISION RISER
  - TRANS = TRANSFORMER
  - TV = TELEVISION
  - U = UTILITY (UNKNOWN UTILITY)

PRELIMINARY



LEGEND  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	----
RECORD:	----
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	----

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FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

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**SITE CLEARING**

1. THE CONTRACTOR SHALL EXERCISE CARE IN THEIR CONSTRUCTION OPERATIONS TO ENSURE THAT TREES, SHRUBS, FENCES, BUILDINGS AND GRASSES WITHIN THE RIGHT-OF-WAY AND CONSTRUCTION EASEMENT NOT DESIGNATED FOR REMOVAL ARE NOT DISTURBED. ANY CHANGE TO THESE ITEMS SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
2. TREES AND BRANCHES MAY BE GROUND UP ON-SITE AND USED AS TEMPORARY OR PERMANENT MULCH.
3. SITE CLEARING ACTIVITIES SHALL BE CONDUCTED AT LOCATIONS INDICATED ON THE PLANS, AND AS DIRECTED BY THE ENGINEER.

**UTILITIES**

1. NOT ALL UTILITIES MAY BE SHOWN. PRIOR TO DIGGING, IT IS THE CONTRACTOR'S RESPONSIBILITY TO CALL FOR UTILITY LOCATES AND TO IMMEDIATELY NOTIFY THE ENGINEER OF ANY CONFLICTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY AND COORDINATE THEIR ACTIVITIES AND SCHEDULE ALL UTILITY RELOCATIONS. UTILITY LOCATES CAN BE REQUESTED FROM "MN - GOPHER STATE ONE CALL".
2. CONTRACTOR MAY NEED TO WORK IN CONJUNCTION WITH UTILITY COMPANIES DURING CONSTRUCTION. CONTRACTOR MUST NOTIFY ENGINEER PRIOR TO DOING WORK WITH ANY AND ALL UTILITY COMPANIES. THERE SHALL BE NO CHANGE ORDERS FOR SCHEDULING CONFLICTS WITH UTILITY COMPANIES.
3. THE CONTRACTOR SHALL LOCATE ALL BURIED UTILITIES ON THE SITE PRIOR TO DIGGING AND SHALL PROTECT THEM DURING CONSTRUCTION.
4. UTILITY PEDESTALS THAT ARE PLACED PRIOR TO CONSTRUCTION ARE AS IS. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF SOILS AROUND PEDESTALS. CONTRACTOR IS RESPONSIBLE FOR DAMAGE TO PEDESTALS DURING CONSTRUCTION.

**CONSTRUCTION LIMITS**

1. THE CONTRACTOR SHALL LIMIT WORK TO WITHIN THE CONSTRUCTION EASEMENTS AND RIGHT OF WAY SHOWN ON THE PLANS. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE EXPENSE FOR WORK DONE OUTSIDE OF STAKED RIGHT-OF-WAY OR EASEMENT AREA.
2. CONTRACTOR VEHICLES, EQUIPMENT, AND MATERIALS SHALL BE STORED WITHIN THE CONSTRUCTION LIMITS.

**SIGNS AND DELINEATORS**

1. ALL EXISTING SIGNS, DELINEATORS, MAILBOXES, AND BRIDGE END MARKERS WITHIN THE PROJECT LIMITS SHALL BE REMOVED, SALVAGED, AND RESET. ANY ITEMS REMOVED SHALL BE NEATLY STOCKPILED ON THE RIGHT-OF-WAY OR EASEMENT AREA AND ARE TO REMAIN THE PROPERTY OF THE OWNER. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
2. ANY DAMAGED SIGNS SHALL BE REPLACED AT CONTRACTORS EXPENSE.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF THE CONTRACTOR FEELS THE SIGNS WERE DAMAGED PRIOR TO CONSTRUCTION AND SHOULD BE REPLACED.

**HAUL ROADS**

1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE THE SUITABILITY OF ROUTES WITH THE AGENCY HAVING CONTROL OF THE ROADS AND ACQUIRE THEIR APPROVAL PRIOR TO SUBMITTING A BID AND DOING THE WORK.
2. TEMPORARY HAUL ROADS AND RAMPS REQUIRED SHALL BE INCIDENTAL TO THE PROJECT.
3. ANY DAMAGE TO ROADS AS A RESULT OF HAULING SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE AND AT NO COST TO THE OWNER.

**SPOIL AREAS**

1. EXCAVATED MATERIAL, UNLESS OTHERWISE USED ON THE PROJECT, SHALL BE STORED WITHIN CONSTRUCTION LIMITS.
2. SPOIL AREAS SHALL NOT IMPEDE EXISTING DRAINAGE. THE CONTRACTOR WILL BE LIABLE FOR DAMAGE FROM ANY BLOCKED DRAINAGE.
3. SHALLOW DIVERSION DITCHES MAY BE REQUIRED AROUND SPOIL AREAS IN ORDER TO DIVERT DRAINAGE. IF NEEDED, DIVERSION DITCHES SHALL BE INCIDENTAL TO THE PROJECT.

**PIPE ENDS AND BEDDING**

1. INSTALLED CULVERTS 36" AND SMALLER SHALL HAVE FLARED END SECTIONS AND DO NOT REQUIRE GRANULAR (SELECT) BACKFILL UNLESS INDICATED OTHERWISE ON THE SUBSEQUENT PLAN SHEETS.
2. INSTALLED CULVERTS 42" (CMPA 42" EQUIVALENT) AND LARGER SHALL HAVE BEVELED END SECTIONS AND REQUIRE GRANULAR (SELECT) BACKFILL UNLESS INDICATED OTHERWISE ON THE SUBSEQUENT PLAN SHEETS.

**CHANNEL APPEARANCE**

1. THE FINAL CONSTRUCTED CHANNEL SECTION SHALL FORM NEAT LINES WHEN VIEWED FROM ONE END OF A SEGMENT TO THE OTHER END OF A SEGMENT.
2. WAVINESS, BUMPS, OR DIVOTS SHALL NOT EXCEED MORE THAN 0.2' FROM THE DESIRED CHANNEL PROFILE.

**PROJECT SCHEDULE**

1. CHANNEL CONSTRUCTION SHALL BEGIN AT THE DOWNSTREAM END AND PROCEED UPSTREAM.
2. IF THE CONTRACTOR WANTS TO WORK IN MORE THAN ONE AREA OF THE PROJECT AT ONE TIME, THE CONTRACTOR MUST NOTIFY THE ENGINEER IN WRITING PRIOR TO DOING THE WORK. THE ENGINEER MAY OR MAY NOT GRANT THE CONTRACTOR'S REQUEST.
3. CONTRACTOR SHALL LIMIT THE AMOUNT OF EXCAVATED CHANNEL THAT IS OPEN AT ONE TIME TO LESS THAN 3 DITCH MILES UNLESS OTHERWISE APPROVED BY THE ENGINEER. CONTRACTOR SHALL EXCAVATE, LEVEL SPOIL BANKS, INSTALL SIDE INLET CULVERTS, AND SEED (OR PROVIDE TEMPORARY COVER) THE CHANNEL BEFORE STARTING CONSTRUCTION ON THE FOURTH MILE.

**PROJECT MAINTENANCE**

1. THE CONTRACTOR SHALL HOLD A PRE-CONSTRUCTION MEETING PRIOR TO COMMENCING WORK ON THIS SITE.
2. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR CHANNEL MAINTENANCE, WEED CONTROL, EROSION CONTROL AND REPAIR, SILT REMOVAL AND SPOILING, RE-GRADING BOTTOM AND RE-GRADING SIDE SLOPES UNTIL SEED IS ESTABLISHED. IT SHOULD BE THE INTENT TO ESTABLISH SEED GROWTH AS SOON AS CHANNEL AREAS ARE COMPLETED. MOST LIKELY, AREAS TO BE LEFT UNSEEDED OVER THE WINTER MONTHS WILL REQUIRE SOME CHANNEL SHAPING, RE-GRADING, SILT REMOVAL AND EROSION REPAIR IN THE SPRING.
3. CONTRACTOR IS RESPONSIBLE FOR WEED CONTROL WITHIN CONSTRUCTION LIMITS THROUGHOUT DURATION OF PROJECT AND IT SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT. THIS MAY REQUIRE TILLING OR SPRAYING THE PROJECT SITE.

**DISPOSAL NOTES:**

1. NO MATERIAL, OTHER THAN SOIL, SHALL BE WASTED ON THE SITE OR IN THE DESIGNATED SPOIL AREAS.
2. REMOVED PIPES, BRIDGE DECKS, BRIDGE PIERS, EXISTING WEIR MATERIALS, TREES, ROOTS, PLASTIC, WOOD, METAL, TIRES AND OTHER CONSTRUCTION MATERIAL OR DEBRIS SHALL BE PROPERLY DISPOSED OF OFF SITE. THIS WORK SHALL BE INCIDENTAL TO THE PROJECT.
3. ANY REMOVED ITEMS BECOME THE PROPERTY OF THE CONTRACTOR AND ARE THE CONTRACTOR'S RESPONSIBILITY ONCE OFF THE SITE.
4. NO SOIL SHALL BE REMOVED FROM THE CONSTRUCTION LIMITS WITHOUT APPROVAL FROM THE ENGINEER.

**SURVEY NOTES:**

1. CONTRACTOR REQUESTED SURVEYS CONDUCTED AFTER CONSTRUCTION IS COMPLETE FOR THE PURPOSE OF VERIFYING EXCAVATION AND EMBANKMENT QUANTITIES SHALL BE AT THE CONTRACTOR'S EXPENSE.
2. IF CONTRACTOR UTILIZES GPS EQUIPMENT FOR SHAPING PURPOSES, CONTRACTOR MAY REQUEST DIGITAL FILES PER SPECIFICATION 013300.
3. ENGINEER REQUIRES A 48 HOUR NOTICE FOR ANY CONTRACTOR REQUESTED SURVEY. CONTRACTOR SHALL COORDINATE WITH RPR FOR SCHEDULING.

**TRAFFIC CONTROL:**

1. THE CONTRACTOR SHALL PROVIDE, IMPLEMENT, INSTALL, MAINTAIN, AND REMOVE ALL NECESSARY TRAFFIC CONTROL DEVICES AS REQUIRED BY THE CONTRACTOR'S CONSTRUCTION MEANS AND METHODS.
2. THE CONTRACTOR SHALL PROVIDE, MAINTAIN, AND REMOVE TEMPORARY APPROACHES, CROSSINGS, AND INTERSECTIONS AS NECESSARY DURING CONSTRUCTION.
3. THE CONTRACTOR SHALL PROVIDE A METHOD OF PROTECTING TRAFFIC AND PEDESTRIANS FROM CONSTRUCTION AREAS AND SHALL ALLOW ACCESS TO ALL AREAS BY FIRE, POLICE, AND OTHER EMERGENCY PERSONNEL.
4. CONTRACTOR SHALL PROVIDE FLAGGERS IF NEEDED. FLAGGERS SHALL BE INCIDENTAL TO THE PROJECT.
5. ANY TRAFFIC CONTROL DEVICES USED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH LATEST EDITION OF THE MN MUTCD.

**SIDE INLET CULVERT NOTES:**

1. ALL EXISTING SIDE INLET CULVERTS, FLARED END SECTIONS, AND FLAP GATES ALONG THE FIELD SHALL BE REMOVED UNLESS SPECIFIED OTHERWISE IN THE PLANS.
2. QUANTITY, LOCATION, SIZE, AND INVERT ELEVATIONS OF ALL NEW SIDE INLET CULVERTS SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.
3. NEW SIDE INLET CULVERTS SHALL BE INSTALLED AS SHOWN IN THE TYPICAL DETAILS.
4. NEW SIDE INLET CULVERTS SHALL HAVE RIPRAP INSTALLED AT THE OUTLET OF EACH PIPE AS SHOWN IN THE TYPICAL DETAILS.
5. FOR CULVERTS THAT ARE EXTENDED, RELOCATE EXISTING CULVERT MARKERS TO END OF CULVERT EXTENSION, WHERE APPLICABLE, AND SALVAGE AND REINSTALL FLAPGATES INCIDENTAL TO THE PROJECT.
6. ALL ITEMS ASSOCIATED WITH INSTALLING NEW SIDE INLET CULVERTS, FLARED END SECTIONS, FLAP GATES, RIPRAP, AND RIPRAP FILTER BLANKET SHALL BE PAID FOR AT THE BID ITEM PRICE IN THE BID PROPOSAL.

**REPLACEMENT OF STRIPPED TOPSOIL AND VEGETATION:**

1. SALVAGING AND REUSING EXISTING TOPSOIL WILL BE REQUIRED.
2. TOPSOIL SHALL BE REPLACED WITHIN THE EASEMENT FOR CONSTRUCTION AND FUTURE MAINTENANCE AND AS DIRECTED BY THE ENGINEER.
3. TOPSOIL AND STRIPPED VEGETATION SHALL BE TILLED AND SPREAD AS NECESSARY TO PROVIDE A SMOOTH, UNIFORM APPEARANCE AND TO PREPARE FOR SEEDING.
4. STRIPPED VEGETATION SHALL BE WASTED ON AREAS DESIGNATED BY THE ENGINEER, OR HAULED OFF SITE.

**DRAIN TILE NOTES:**

1. EXISTING DRAIN TILE INFRASTRUCTURE ON THE SITE, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE ADDRESSED IN ACCORDANCE WITH SECTION 5.5 AND ARTICLE 8 OF THE GENERAL CONDITIONS. UPON WRITTEN REQUEST, OWNER WILL PROVIDE CONTRACTOR WITH COPIES OF ALL KNOWN UTILITY PERMITS ASSOCIATED WITH DRAIN TILE INFRASTRUCTURE ON THE SITE AND CONTACT INFORMATION FOR ALL LANDOWNERS IMMEDIATELY ADJACENT TO THE SITE.

**MINIMUM BERM ELEVATION:**

1. SPOIL BANK ELEVATION SHALL NOT EXCEED THE MINIMUM BERM ELEVATION, OR EXISTING FIELD ELEVATION IF HIGHER, FOR A DISTANCE OF 100'± ON THE UPSTREAM END OF EACH SECTION ROAD CROSSING. SEE DETAIL.

PRELIMINARY



GENERAL NOTES  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---

PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

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FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

SWPPP AND CONSTRUCTION ACTIVITY INFORMATION

PROJECT DESCRIPTION: 103E DITCH REPAIR TO JUDICIAL DITCH 6. PROJECT INCLUDES CLEANING OF THE CHANNEL BOTTOM AND ADJUSTING SIDE SLOPES FOR STABILITY. THIS PROJECT WILL ALSO INCLUDE FILLING ROAD SLOPE, CONSTRUCTING BERMS ALONG THE DITCH SYSTEM, AND PLACING CULVERTS TO ALLOW DRAINAGE FROM THE FIELDS TO THE DITCH SYSTEM.

POTENTIAL FOR POLLUTANTS: DURING CONSTRUCTION THE DITCH CHANNEL HAS AN INCREASED POTENTIAL TO CONVEY SOIL MATERIAL TO THE RECEIVING WATER. ADDITIONALLY THERE IS THE POTENTIAL FOR SPILLS AND POLLUTANTS ASSOCIATED WITH CONSTRUCTION EQUIPMENT ON SITE.

LOCATION: GRANT COUNTY, T128N, 43W; SECTIONS 7, 8, 17, 18, 19, 20, 21

RECEIVING WATERS: TRIBUTARY TO MUSTINKA RIVER

IMPAIRED WATERS: MUSTINKA RIVER

SPECIAL WATERS: NONE.

DESIGNATED TROUT STREAM: NONE.

CALCAREOUS FENS: THERE ARE NO CALCAREOUS FENS WITHIN THE PROJECT LIMITS.

OUTSTANDING RESOURCE VALUE WATERS (ORVWS): THERE ARE NO ORVWS WITHIN THE PROJECT LIMITS.

TOTAL MAXIMUM DAILY LOAD (TMDL) WATERS: NONE.

ENVIRONMENTALLY SENSITIVE AREAS: THIS PROJECT WILL HAVE NO WETLAND IMPACTS.

CONTRACTORS RESPONSIBILITIES:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH, MONITORING, AND MAINTENANCE OF THE REQUIREMENT OF THE MPCA GENERAL STORM WATER PERMIT FOR CONSTRUCTION ACTIVITY.

THE CONTRACTOR MUST IDENTIFY A CERTIFIED EROSION AND SEDIMENT CONTROL SUPERVISOR TO ACT AS SITE MANAGER. THIS PERSON MUST BE KNOWLEDGEABLE AND EXPERIENCED IN THE APPLICATION OF EROSION PREVENTION AND SEDIMENT CONTROL BMP'S. THIS PERSON IS TO OVERSEE THE IMPLEMENTATION OF THE SWPPP, THE INSTALLATION, INSPECTION, AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMP'S BEFORE, DURING, AND AFTER CONSTRUCTION. THIS PERSON IS RESPONSIBLE FOR AMEND THE SWPPP AS NEEDED DURING CONSTRUCTION AND THE SWPPP IS TO REMAIN IN EFFECT UNTIL THE PROJECT IS COMPLETE, THE ENTIRE SITE HAS UNDERGONE FINAL STABILIZATION, AND THE MPCA PERMIT HAS BEEN TERMINATED (SEE FINAL STABILIZATION).

PROJECT CONTACTS:

PROJECT ENGINEER: KELLY OLSON - 701-551-1024

OWNER: BOIS DE SIOUX WATERSHED DISTRICT - TROY FRIDGEN - 320-563-4185

SWPPP DESIGNER: JAMES GULER - 701-551-1061

SWPPP SITE MANAGER: TO BE DETERMINED

SWPPP BMP INSTALLER: TO BE DETERMINED

MPCA CONTACTS: MATTEW KING 218-846-8103, LYNN DUJINDAM 651-757-2533

EROSION/SEDIMENT CONTROL PRACTICES:

1. THE EROSION PREVENTION AND SEDIMENT CONTROL BMP'S SHALL BE INSTALLED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND CAPTURE SEDIMENT ON SITE.
2. SLOPES ARE TO BE LEFT ROUGH, NOT SMOOTH, UNTIL PERMANENT STABILIZATION IS IMPLEMENTED.
3. TOPSOIL AND EROSION CONTROL BMP'S SHALL BE PLACED WITHIN 7 DAYS OF COMPLETION OF EMBANKMENT.
4. ALL EXPOSED SOIL AREAS WITH A CONTINUOUS POSITIVE SLOPE WITHIN 200-FEET OF A SURFACE WATER, MUST HAVE TEMPORARY EROSION PROTECTION OR PERMANENT COVER FOR THE SOIL WITHIN 24-HOURS OF CONNECTING TO THE SURFACE WATER. ALL EXPOSED SOIL AREAS MUST BE STABILIZED NO LATER THAN 7 DAYS AFTER TEMPORARY OR FINAL WORK IN THE AREA HAS BEEN COMPLETED.
5. TEMPORARY SOIL STOCKPILES MUST HAVE SILT FENCE OR OTHER EFFECTIVE SEDIMENT CONTROLS, AND CANNOT BE PLACED IN SURFACE WATERS, INCLUDING STORM WATER CONVEYANCES SUCH AS CURB AND GUTTER SYSTEMS, CONDUITS, DITCHES OR WETLANDS.
6. ALL EQUIPMENT LEAVING THE SITE SHALL BE CLEAN OF LOOSE DEBRIS AND SOIL. CONTRACTOR SHALL MINIMIZE VEHICLE TRAFFIC FROM THE SITE TO THE ROAD AS MUCH AS PRACTICAL. IF CONTRACTOR MUST TRAVEL FROM SITE TO THE ROAD THE CONTRACTOR WILL INSTALL A ROCK ENTRANCE PAD AS NECESSARY. ALL SOIL AND OTHER DEBRIS TRACKED ONTO ADJACENT ROADWAYS IS TO BE REMOVED DAILY.
7. SILT FENCE, SILT CURTAIN, AND TEMPORARY SEDIMENT BASINS MUST BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE.
8. SEDIMENT CONTROL MUST BE ESTABLISHED ON ALL DOWN GRADIENT PERIMETER SURFACES PRIOR TO ANY GRADING ACTIVITY.
9. INLET PROTECTION SHALL BE PLACED AT ALL STORM SEWER SYSTEM INLETS PRIOR TO ANY WORK IN THOSE AREAS.
10. WATERING OF ALL EXPOSED SOILS WILL BE REQUIRED, WHEN DETERMINED NECESSARY, TO REDUCE DUST NUISANCE.

AMENDMENTS OF SWPPP:

1. CONTRACTOR'S SITE MANAGER SHALL AMEND THE SWPPP AS NEEDED. PROVIDE UPDATED VERSIONS TO THE OWNER AND PROJECT ENGINEER.
2. REASONS FOR AMENDMENTS TO THE SWPPP (NOT ALL INCLUSIVE LIST):
  - a. THERE HAS BEEN A CHANGE IN DESIGN, CONSTRUCTION, OPERATION, MAINTENANCE, AND/OR WHEN SEASONAL ADJUSTMENTS ARE NECESSARY
  - b. INSPECTIONS REVEAL INADEQUACIES IN THE PLAN TO MINIMIZE SOIL LOSS
  - c. SWPPP IS NO LONGER CONSISTENT WITH THE TERMS AND CONDITIONS OF THE PERMIT AND IS INEFFECTIVE AT MEETING THE PERMIT GOALS
  - d. AMENDMENTS OR SUPPLEMENTAL BMP ACTION PLAN TO THE SWPPP IN RESPONSE TO MPCA

DESCRIPTION OF INSPECTIONS:

1. CONTRACTOR MUST PROVIDE AND MAINTAIN RAIN GAGE ON SITE. MUST BE VISIBLE AND AVAILABLE FOR VIEWING AT ALL TIME BY OWNER REPRESENTATIVE.
2. INSPECTIONS SHALL BE PERFORMED ONCE EVERY 7-DAYS DURING ACTIVE CONSTRUCTION AND PERFORMED WITHIN 24-HOURS OF A RAIN EVENT GREATER THAN 0.5-INCHES IN 24-HOURS.
3. IN SPRING INSPECTION SHALL BE COMPLETED AS SOON AS FIRST RUNOFF EVENT OCCURS PRIOR RESUMING CONSTRUCTION
4. INCLUDE IN THE INSPECTION REPORT:
  - A. DATE AND TIME OF INSPECTION (INCLUDE RAINFALL AMOUNT AND DURATION IF APPLICABLE)
  - B. NAME OF PERSON(S) CONDUCTING INSPECTIONS
  - C. LOCATION OF ANY DISCHARGES OBSERVED DURING THE INSPECTION. (DESCRIBE AND PHOTOGRAPH)
  - D. THE FINDINGS FROM INSPECTION AND RECOMMENDATIONS FOR CORRECTIVE ACTIONS TAKEN INCLUDING: DATES, TIMES, PARTY COMPLETING
  - E. ISSUES THAT HAVE NOT BEEN ADDRESSED FROM PREVIOUS ACTIONS
  - F. DOCUMENTATIONS OF AMENDMENTS TO SWPPP AND PLANS

DESCRIPTION OF MAINTENANCE:

1. ALL EROSION AND SEDIMENT CONTROL BMP'S MUST BE INSPECTED TO ENSURE INTEGRITY AND EFFECTIVENESS.
2. ALL NON-FUNCTIONAL BMP'S MUST BE REPAIRED, REPLACED, OR SUPPLEMENTED WITH FUNCTIONAL BMP'S.

3. ALL SILT FENCE MUST BE REPAIRED, REPLACED OR SUPPLEMENTED WHEN THEY BECOME NON-FUNCTIONAL OR THE SEDIMENT REACHES 1/3 OF THE HEIGHT OF THE FENCE. THESE REPAIRS MUST BE MADE WITHIN 24-HOURS OF DISCOVERY, OR AS SOON AS FIELD CONDITIONS ALLOW ACCESS.
4. TEMPORARY AND PERMANENT SEDIMENT BASINS MUST BE DRAINED AND THE SEDIMENT REMOVED WHEN THE DEPTH OF THE SEDIMENT COLLECTED IN THE BASIN REACHES 2/3 THE STORAGE VOLUME. DRAINAGE AND REMOVAL MUST BE COMPLETED WITHIN 72-HOURS OF DISCOVERY, OR AS SOON AS FIELD CONDITIONS ALLOW.
5. SURFACE WATERS, INCLUDING DRAINAGE DITCHES AND CONVEYANCE SYSTEMS, MUST BE INSPECTED FOR EVIDENCE OF SEDIMENT BEING DEPOSITED BY EROSION. THE CONTRACTOR MUST REMOVE ALL DELTAS AND SEDIMENT DEPOSITED IN SURFACE WATERS, INCLUDING DRAINAGE WAYS, CATCH BASINS, AND OTHER DRAINAGE SYSTEMS, AND RE-STABILIZE THE AREAS WHERE SEDIMENT REMOVAL RESULTS IN EXPOSED SOIL. THE REMOVAL AND STABILIZATION MUST TAKE PLACE WITHIN 7-DAYS OF DISCOVERY UNLESS PRECLUDED BY LEGAL, REGULATORY, OR PHYSICAL ACCESS CONSTRAINTS. THE PERMITTEE IS RESPONSIBLE FOR CONTACTING ALL LOCAL, REGIONAL, STATE AND FEDERAL AUTHORITIES AND RECEIVING ANY APPLICABLE PERMITS, PRIOR TO CONDUCTING ANY WORK.
6. CONSTRUCTION SITE VEHICLE EXIT LOCATIONS MUST BE INSPECTED FOR EVIDENCE OF OFF-SITE SEDIMENT TRACKING ONTO PAVED SURFACES. TRACKED SEDIMENT MUST BE REMOVED FROM ALL OFF-SITE PAVED SURFACES, WITHIN 24-HOURS OF DISCOVERY.
7. EXISTING IMPERVIOUS AREA TO REMAIN THE SAME AS POST CONSTRUCTION IMPERVIOUS AREA.

POLLUTION PREVENTION MANAGEMENT MEASURES:

1. WASTE RECEPTACLES WITH COVERS ARE REQUIRED ON SITE FOR ANY SOLID WASTE GENERATED DURING THE CONSTRUCTION PROCESS. THESE RECEPTACLES MUST BE EMPTIED PERIODICALLY AND THE TRASH MUST BE DISPOSED OF PROPERLY.
2. HAZARDOUS MATERIALS WILL BE LIMITED TO GASOLINE, DIESEL, FUEL, AND MOTOR OIL. THE CONTRACTOR MUST MAKE THE NECESSARY ARRANGEMENTS TO STORE THESE HAZARDOUS MATERIALS IN A MANNER THAT IS COMPLIANT WITH THE MPCA REGULATIONS. SPILLS MUST BE REPORTED TO THE MPCA DUTY OFFICER AT 800-422-0798.
3. EXTERNAL WASHING OF TRUCKS AND OTHER CONSTRUCTION VEHICLES WILL NOT BE ALLOWED ON THE PROJECT SITE.
4. THE CONTRACTOR IS REQUIRED TO PROVIDE PORTABLE RESTROOM FACILITIES. THESE FACILITIES WILL REQUIRE PERIODIC CLEANING AND PROPER DISPOSAL OF WASTE. THESE FACILITIES MUST BE POSITIONED SO THAT THEY ARE SECURE.
5. IF CONCRETE IS POURED ON THE PROJECT, THEN A CONCRETE WASHOUT AREA SHALL BE LOCATED WITHIN PROJECT LIMITS AND APPROPRIATELY SIGNED/DELINATED. WASHOUT MATERIAL SHALL BE REMOVED AND AREA BACKFILLED, SEEDED, AND MULCHED.
6. NO ENGINE DEGREASING ALLOWED ON SITE.
7. ALL EQUIPMENT SHALL ARRIVE ON SITE IN A CLEAN, OPERABLE MANNER. EXCESS DIRT, VEGETATION, OIL, GREASE, OR ANY OTHER CONTAMINANTS SHALL BE CLEANED OFF PRIOR TO ENTERING PROJECT SITE.

DISTURBED AND IMPERVIOUS AREA:

1. THIS PROJECT WILL DISTURB APPROXIMATELY 150 ACRES OF THE DITCH CHANNEL AND ADJACENT AGRICULTURAL FIELD. APPROXIMATELY 75 ACRES OF THE DISTURBED ARE WILL BE SEEDED WITH PERMANENT VEGETATION. THE REMAINING ACRES WILL GO BACK INTO AGRICULTURAL PRODUCTION. THERE IS NO OVERALL INCREASE IN IMPERVIOUS AREA FROM THIS PROJECT.

TEMPORARY SEDIMENT BASIN:

1. THIS PROJECT WILL DISTURB AN AREA OF MORE THAN 5 ACRES AT ONE TIME. AT THE OUTLET OF THE PROJECT THE DRAINAGE BASIN IS APPROXIMATELY 7.8 SQUARE MILES. THE REQUIRED VOLUME TO STORE THE 2 YEAR 24 HOUR EVENT IS 1,800 CFT PER ACRE DRAINED = 206 AC\*FT. GIVEN THE SIZE OF THIS WATERSHED, THE LARGE REQUIRED VOLUME, THE TOPOGRAPHY OF THE PROJECT SITE, AND ITS LONG/LINEAR LAYOUT THIS REQUIREMENT MAY BE INFEASIBLE. AS AN ALTERNATE, SMALL TEMPORARY SEDIMENT BASINS WILL BE INSTALLED ON THE UPSTREAM SIDE OF EACH ROCK CHECK. ADDITIONALLY, STRAW WATTLES WILL BE INSTALLED ALONG THE ENTIRE PROJECT AND AT SWALE INLETS TO MINIMIZE SEDIMENT TRANSPORT. FINALLY THE GOAL OF THIS PROJECT IS TO BUILD BERMS ALONG THE CHANNEL AND INSTALL SIDE INLET CULVERTS AND RIPRAP AT SPECIFIC LOCATIONS TO ALLOW WATER TO ENTER THE DITCH. THESE SIDE INLET CULVERTS SLOW THE FLOW FROM THE FIELD INTO THE DITCH AND ALLOW SEDIMENT TO SETTLE IN THE FIELD. THESE ELEMENTS MEET MN BOARD OF WATER AND SOIL RESOURCES REQUIREMENTS AND WERE AWARDED CLEAN WATER FUND GRANT TO HELP FUND THE PROJECT.

PERMANENT STORMWATER MANAGEMENT: N/A

FINAL STABILIZATION:

1. ALL DISTURBED AREAS ARE TO BE RESTORED AND PERMANENTLY STABILIZED. FINAL STABILIZATION IS CONSIDERED ACHIEVED WHEN THE FOLLOWING GUIDELINES ARE MET:
  - a. FINAL TURF ESTABLISHMENT HAS REACHED 70 PERCENT VEGETATIVE GROWTH IN ALL AREAS.
  - b. UPON FINAL TURF ESTABLISHMENT ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMP'S ARE REMOVED.
  - c. ALL SEDIMENT COLLECTED FROM TEMPORARY EROSION AND SEDIMENT CONTROL BMP'S IS REMOVED.
  - d. ALL SEDIMENT AND OTHER DEBRIS THAT HAS COLLECTED IN THE STORM SEWER SYSTEM IS REMOVED.
  - e. ALL CULVERTS SHALL HAVE RIPRAP INSTALLED UPSTREAM AND DOWNSTREAM OF THEM WITHIN 3 DAYS OF BEING INSTALLED.
2. NOTICE OF TERMINATION MUST BE SUBMITTED TO THE MPCA WITHIN 30 DAYS OF THE PROJECT MEETING PERMIT TERMINATION CONDITIONS

ANTICIPATED EROSION CONTROL QUANTITIES:

1. CONTRACTOR SHALL MAINTAIN A STOCKPILE OF APPROPRIATE BMP'S ON-SITE FOR USE IN EMERGENCY SITUATIONS. THE STOCKPILE SHOULD INCLUDE EROSION CONTROL BLANKET, SILT FENCE, SPARE RIPRAP, AND SEEDING MATERIAL.
2. FOR THE PROJECT EROSION CONTROL FEATURES, INCLUDING INSTALLATION, MAINTENANCE, AND REMOVAL WILL BE PAID AS LUMP SUM UNDER THE STORM WATER MANAGEMENT PAY ITEM UNLESS OTHERWISE IDENTIFIED IN THE PROJECT SPECIFICATIONS. ANTICIPATED QUANTITIES ARE AS FOLLOWS:
  - TEMPORARY ROCK CHECKS - 6 EA
  - PERMANENT ROCK CHECKS - 3 EA
  - SEDIMENTATION CONTROL WATTLE - 9" - 2,380 LF
  - EROSION CONTROL BLANKET, MNDOT SPEC CATEGORY 3N, STRAW, NETTING 2S - 2,850 SY
  - SEDIMENTATION CONTROL FENCE - 100 LF. INCIDENTAL TO STORM WATER MANAGEMENT BID ITEM.
  - MULCH - MNDOT TYPE 3 - 150 TONS. INCIDENTAL TO SEEDING BID ITEM. ANY TEMPORARY MULCHING IS INCIDENTAL TO STORM WATER MANAGEMENT PAY ITEM
  - TEMPORARY STABILIZED CONSTRUCTION ENTRANCE - 6 EA

PRELIMINARY

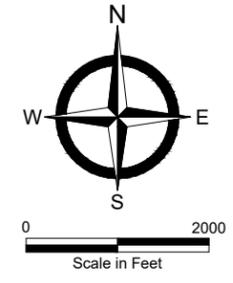
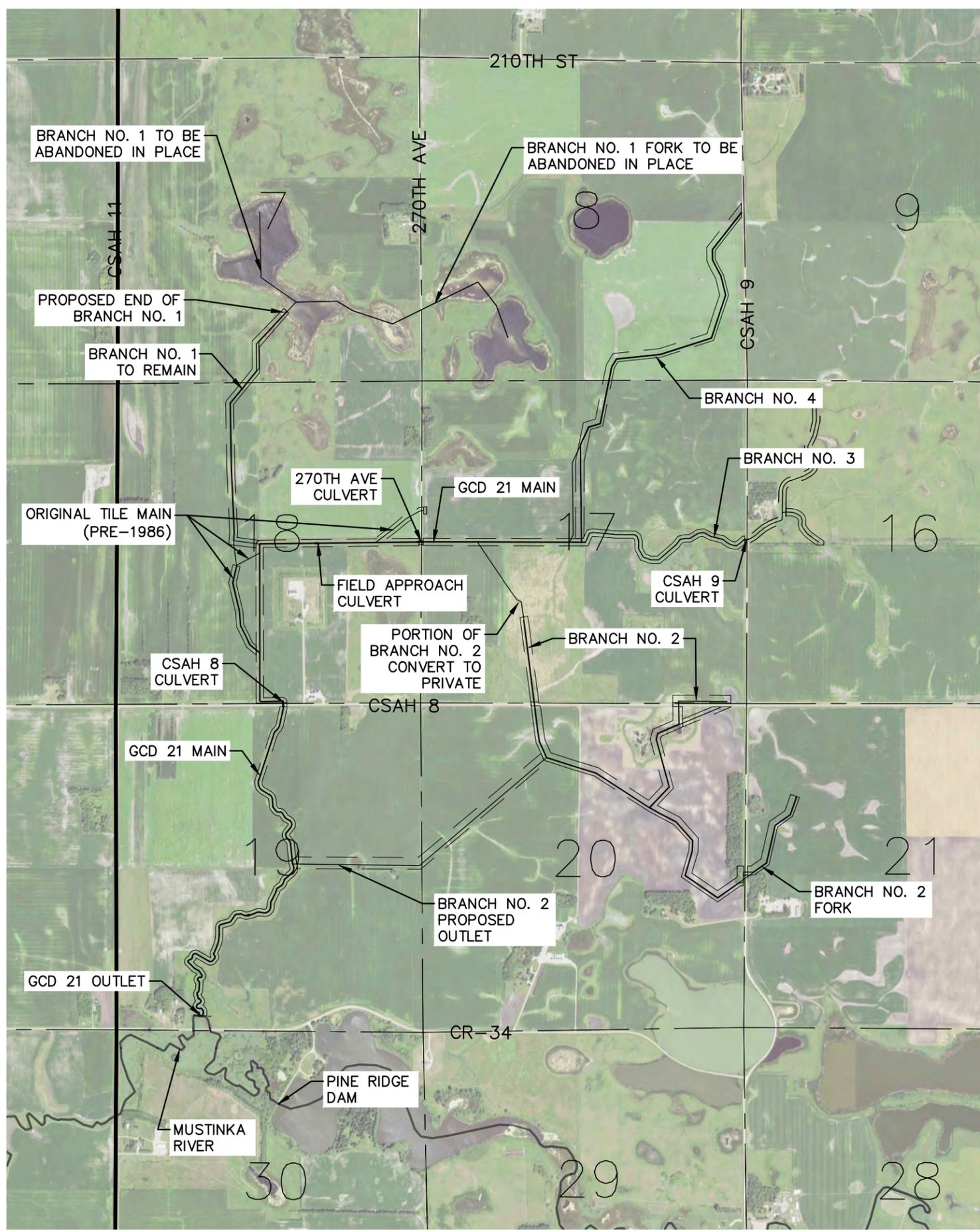


SWPPP  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	----
RECORD:	----
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	----

C-003

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



PRELIMINARY



- EROSION CONTROL NOTES:**
1. INSTALL TEMPORARY ROCK CHECK PER DETAIL ON DOWNSTREAM END OF EACH MILE.
  2. INSTALL STRAW WATTLES IN CHANNEL AT APPROXIMATELY 1,500' SPACING THROUGHOUT THE ENTIRE PROJECT. SPACING MAY BE ADJUST AS NEEDED.
  3. INSTALL STRAW WATTLE AS INLET PROTECTION FOR SIDE INLET CULVERT, AND/OR UTILIZE EROSION CONTROL BLANKET AS NECESSARY TO PROVIDE TEMPORARY COVER AT SWALE DITCHES ENTERING THE MAIN AND LATERAL CHANNELS UNTIL SIDE INLET CULVERT AND RIPRAP HAS BEEN PLACED. (TYPICAL ALL SWALE DITCHES; SEE SIDE INLET CULVERT SCHEDULE FOR ANTICIPATED LOCATIONS.)

**HORIZONTAL CONTROL**  
MINNESOTA COUNTY COORDINATE SYSTEM,  
NAD83: GRANT COUNTY.

**VERTICAL CONTROL**  
NORTH AMERICAN VERTICAL DATUM (NAVD) 88

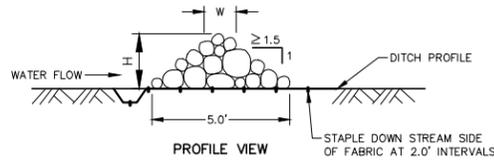
**BENCHMARKS/SURVEY CONTROL**  
PRIOR TO PROJECT START, OWNER WILL SET AND ESTABLISH BENCHMARKS AND SURVEY CONTROL FOR THE PROJECT.

GENERAL LAYOUT  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

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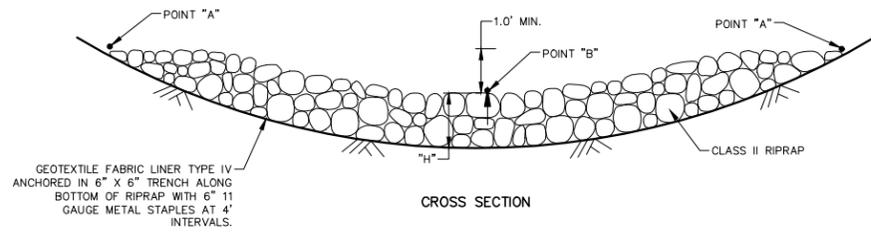
**C-101**

PRELIMINARY

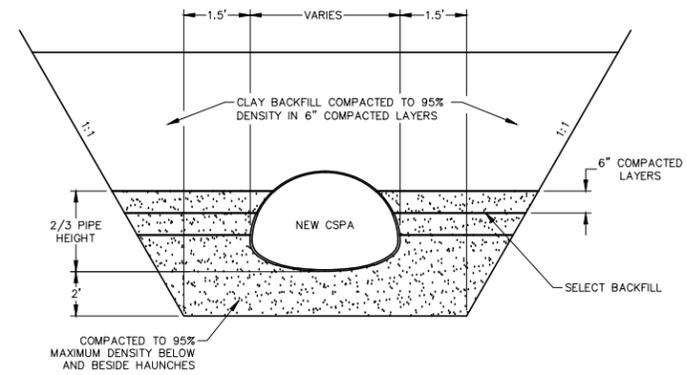


- NOTES:
- ROCK DITCH CHEK SHALL BE REMOVED FROM CLEAR ZONE AFTER SEEDING OR TURF IS ESTABLISHED AND PRIOR TO FINAL ACCEPTANCE.
  - POINT "A" MUST BE 1'-0" MIN. HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE CHECK AND NOT AROUND THE ENDS.

HEIGHT OF CHECK (H)	CLASS RIPRAP	TOP WIDTH (W)
2'-0"	II	12"-18"

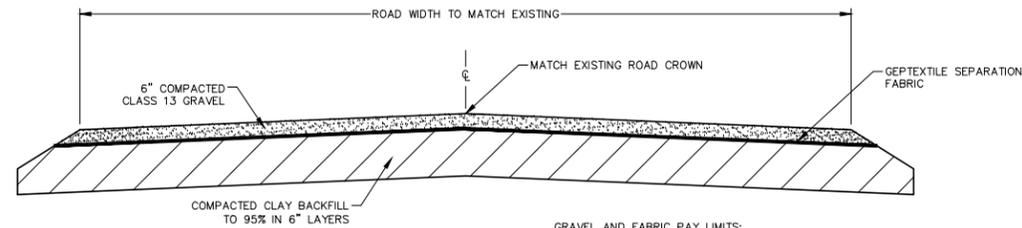


**TEMPORARY ROCK CHECK DETAIL**  
NO SCALE WRG-312500-05 02.15.17



- NOTES:
- EXTRA PRECAUTIONS SHALL BE TAKEN TO THOROUGHLY SHAPE THE FILL BENEATH THE BOTTOM OF THE PIPE OUT TO THE HAUNCHES TO FIT THE PIPES CURVED FORM.
  - THE ABOVE DIMENSIONS ARE SHOWN TO ESTABLISH MINIMUM REQUIREMENTS. NO EXTRA PAYMENT SHALL BE GIVEN FOR GOING OUTSIDE THOSE MINIMUMS.

**SECTION A-A (SINGLE ARCH)**  
NO SCALE XXXXX-XX 02.15.17



- GRAVEL AND FABRIC PAY LIMITS:
- GRAVEL AND FABRIC WIDTH SHALL BE WIDTH OF EXISTING ROAD.
  - DEPTH OF GRAVEL SHALL BE 6".
  - LENGTH OF FABRIC AND GEOTEXTILE INSTALLATION SHALL BE NO LONGER THAN LENGTH OF TRENCH NEEDED TO INSTALL CULVERTS AS SHOWN ABOVE IN SELECT BACKFILL PAY LIMIT DETAIL.

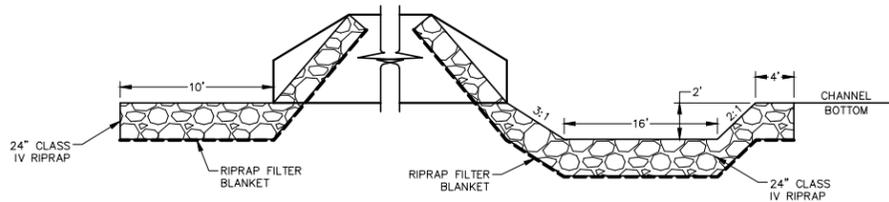
**TYPICAL GRAVEL ROAD SECTION**  
NO SCALE XXXXX-XX 12.15.17

DETAILS  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

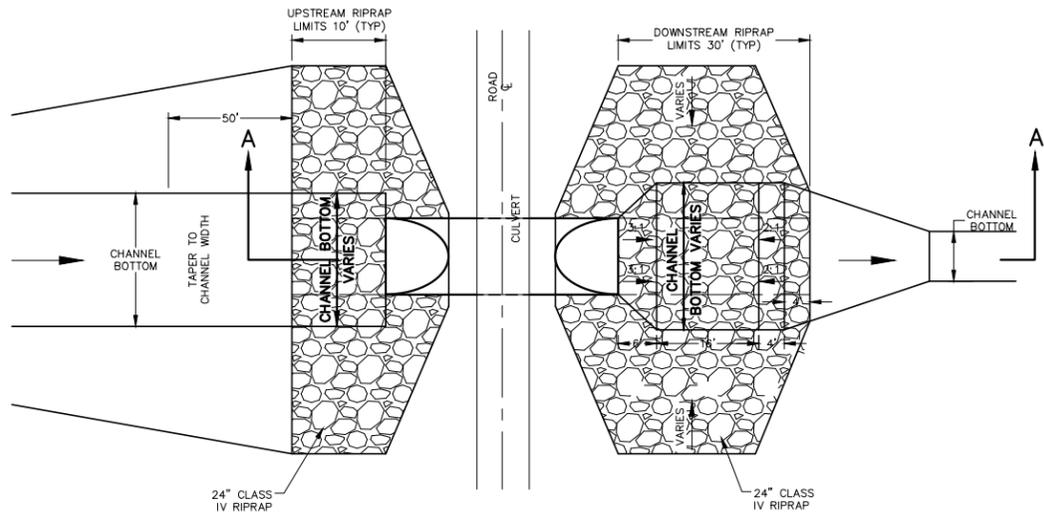
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DRAFTER:	KLO
REVIEWER:	---

C-201

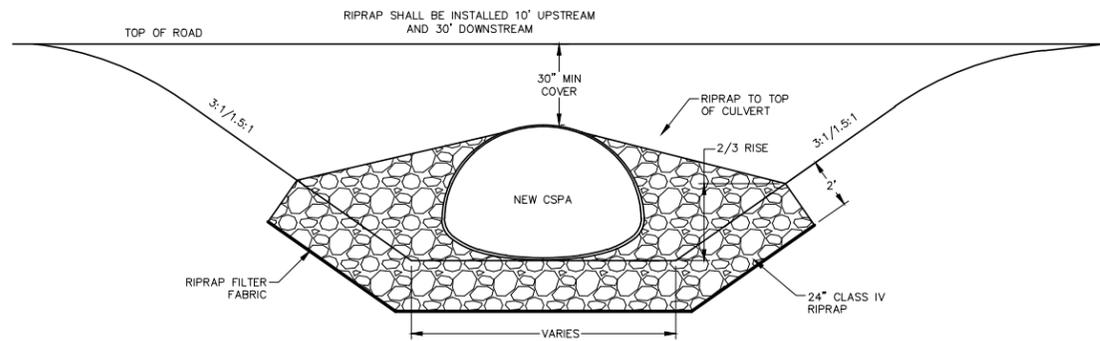
PRELIMINARY



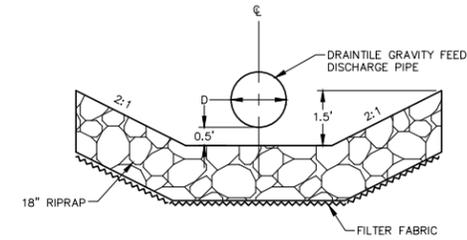
SECTION A-A  
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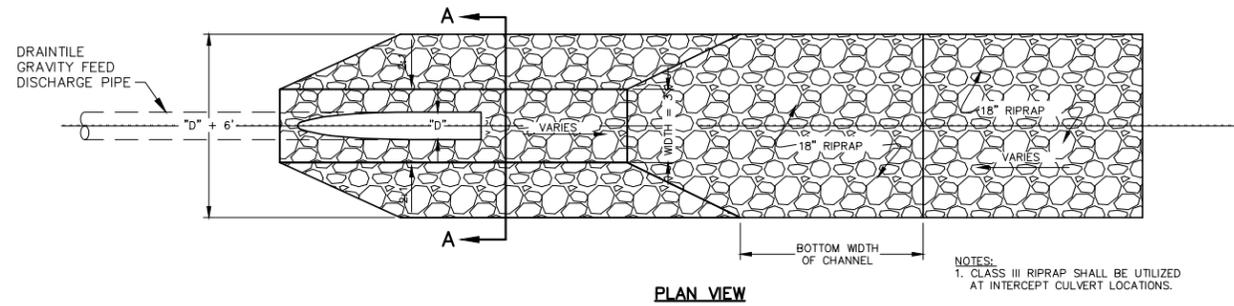
PLAN VIEW  
NO SCALE



RIPRAP DETAIL - SINGLE CSPA  
NO SCALE XXXXX-XX 02.23.17

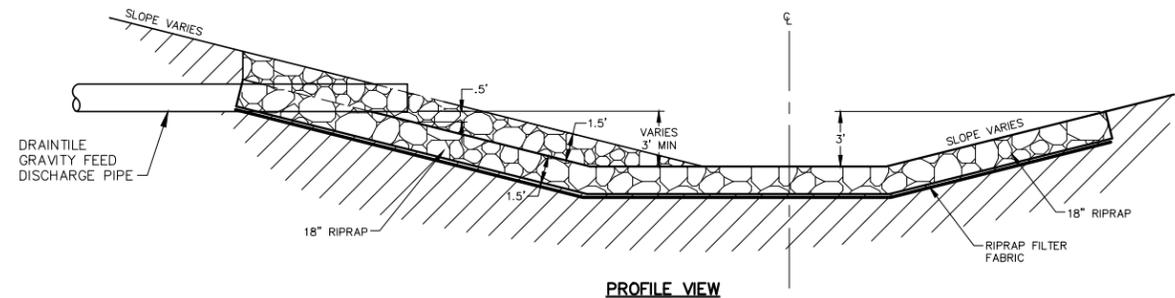


SECTION A-A



PLAN VIEW

NOTES:  
1. CLASS III RIPRAP SHALL BE UTILIZED AT INTERCEPT CULVERT LOCATIONS.



PROFILE VIEW

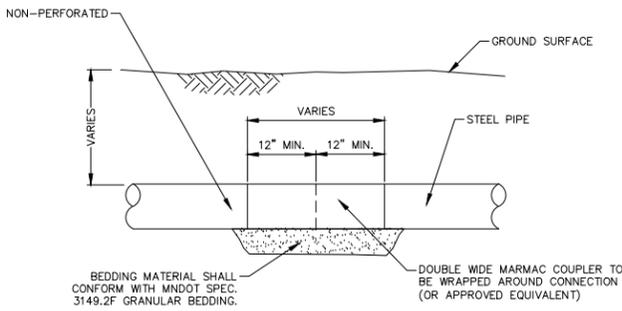
DRAINTILE GRAVITY FEED DISCHARGE RIPRAP DETAIL  
NO SCALE

DETAILS  
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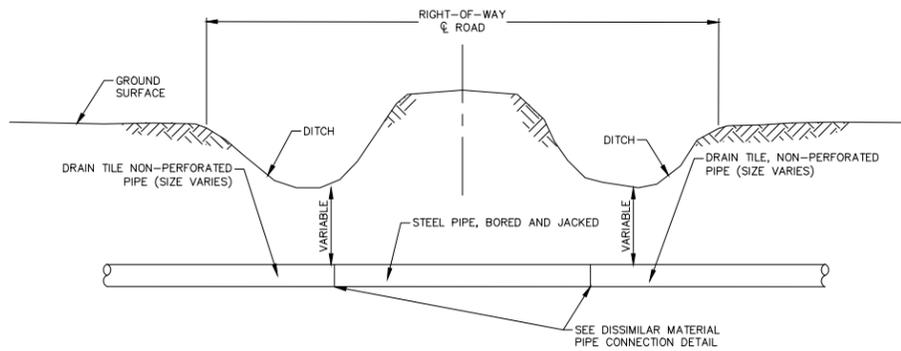
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PRELIMINARY



**DISSIMILAR MATERIAL PIPE CONNECTION (MARMAC)**

NO SCALE



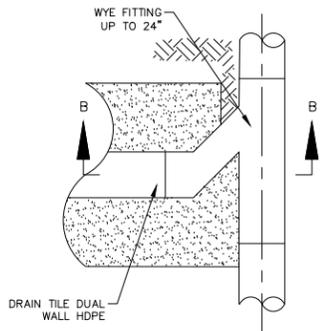
SCH. 40 STEEL PIPE DIMENSIONS

NOMINAL PIPE SIZE	OUTSIDE DIA. (INCHES)	INSIDE DIA. (INCHES)	PIPE WALL THICKNESS (INCHES)	(LBS./FT)
2'-0"	24	22.62	0.69	171.45

SOURCE = [HTTP://WWW.FRANKBLACKPIPE.COM/UPLOADS/PIPE\\_WEIGHT\\_CHART.PDF](http://www.FRANKBLACKPIPE.COM/UPLOADS/PIPE_WEIGHT_CHART.PDF)

**TYPICAL STEEL PIPE CROSSING**

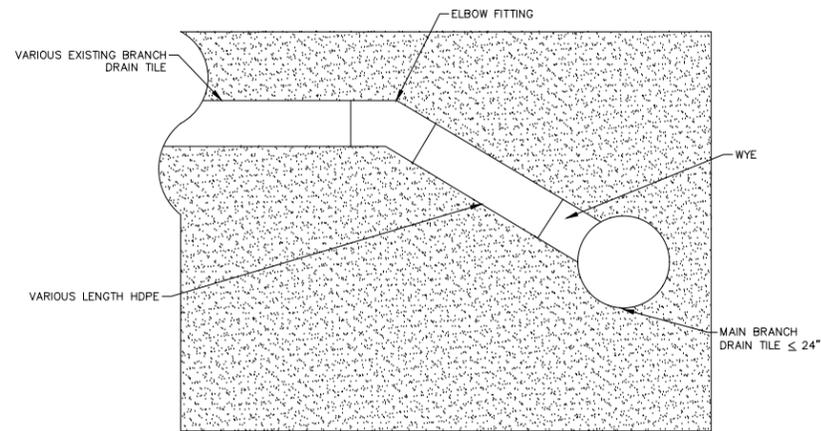
NO SCALE



PLAN VIEW

**LATERAL CONNECTION**

NO SCALE



PROFILE VIEW

**LATERAL CONNECTION FOR PIPE 24" AND SMALLER**

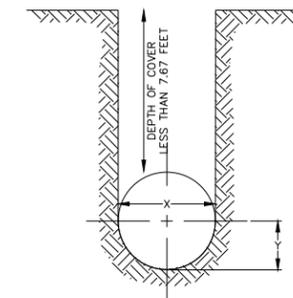
NO SCALE

DUAL WALL POLYETHYLENE MAXIMUM COVER (FEET (M))

DIAMETER IN (MM)	CLASS 1		CLASS 2			CLASS 3		
	COMPACTE D	DUMPED	95%	90%	85%	95%	90%	85%
4 (100)								
6 (150)	44 (13.4)	14 (4.3)	29 (8.8)	20 (6.1)	14 (4.3)	21 (6.4)	15 (4.6)	13 (3.9)
8 (200)	40 (12.2)	13 (3.9)	27 (8.2)	18 (5.5)	13 (3.9)	19 (5.8)	14 (4.2)	12 (3.7)
12 (300)	43 (13.1)	15 (4.6)	29 (8.8)	20 (6.1)	15 (4.6)	21 (6.4)	16 (4.9)	14 (4.2)
15 (375)	45 (13.7)	15 (4.6)	30 (9.1)	21 (6.4)	15 (4.6)	22 (6.7)	16 (4.9)	15 (4.6)
18 (450)	40 (12.2)	13 (3.9)	27 (8.2)	19 (5.8)	13 (3.9)	19 (5.8)	14 (4.2)	12 (3.7)
24 (600)	36 (11)	12 (3.7)	25 (7.6)	17 (5.2)	12 (3.7)	17 (5.2)	12 (3.7)	11 (3.4)
30 (750)	29 (8.8)	10 (3)	21 (6.4)	14 (4.2)	10 (3)	15 (4.6)	10 (3)	9 (2.7)
36 (900)	34 (10.4)	10 (3)	23 (7)	15 (4.5)	10 (3)	16 (4.9)	11 (3.4)	9 (2.7)
42 (1050)	31 (9.4)	10 (3)	23 (7)	15 (4.5)	10 (3)	16 (4.8)	11 (3.3)	9 (2.7)
48 (1200)	30 (9.1)	8 (2.4)	20 (6.1)	13 (3.9)	8 (2.4)	14 (4.2)	9 (2.7)	8 (2.4)
54 (1350)								
60 (1500)	33 (10.1)	9 (2.7)	22 (6.7)	14 (4.2)	9 (2.7)	15 (4.5)	10 (3)	8 (2.4)

NOTES:

- RESULTS BASED ON CALCULATIONS SHOWN IN THE STRUCTURES SECTION OF THE ADS DRAINAGE HANDBOOK. CALCULATIONS ASSUME NO HYDROSTATIC PRESSURE AND A DENSITY OF 120 PCF (1926 KG/M<sup>3</sup>) FOR OVERBURDEN MATERIAL.
- INSTALLATION ASSUMED TO BE IN ACCORDANCE WITH ASTM D2321 AND THE INSTALLATION SECTION OF THE DRAINAGE HANDBOOK.
- BACKFILL MATERIALS AND COMPACTION LEVELS NOT SHOWN IN THE TABLE MAY ALSO BE ACCEPTABLE. CONTACT ADS FOR FURTHER DETAIL.
- MATERIAL MUST BE ADEQUATELY "KNIFED" INTO HAUNCH AND IN BETWEEN CORRUGATIONS. COMPACTION AND BACKFILL MATERIAL IS ASSUMED UNIFORM THROUGHOUT ENTIRE BACKFILL ZONE.
- COMPACTION LEVEL SHOWN ARE FOR STANDARD PROCTOR DENSITY.
- FOR PROJECTS WHERE COVER EXCEEDS THE MAXIMUM VALUES LISTED ABOVE, CONTACT ADS FOR SPECIFIC DESIGN CONSIDERATIONS.
- CALCULATIONS ASSUME NO HYDROSTATIC PRESSURE. HYDROSTATIC PRESSURE WILL RESULT IN A REDUCTION ALLOWABLE FILL HEIGHT. REDUCTION IN ALLOWABLE FILL HEIGHT MUST BE ASSESSED BY THE DESIGN ENGINEER FOR THE SPECIFIC FIELD CONDITIONS.
- FILL HEIGHT FOR DUMPED CLASS I MATERIAL INCORPORATE AN ADDITIONAL DEGREE OF CONSERVATISM THAT IS DIFFICULT TO ASSESS DUE TO THE LARGE DRESS OF VARIATION IN THE CONSOLIDATION OF THIS MATERIAL AS IT IS DUMPED. THERE IS LIMITED ANALYTICAL DATA ON ITS PERFORMANCE. FOR THIS REASON, VALUES AS SHOWN ARE ESTIMATED TO BE CONSERVATIVELY EQUIVALENT @ CLASS 2, 85% SP.



ROUNDED TRENCH DIMENSIONS

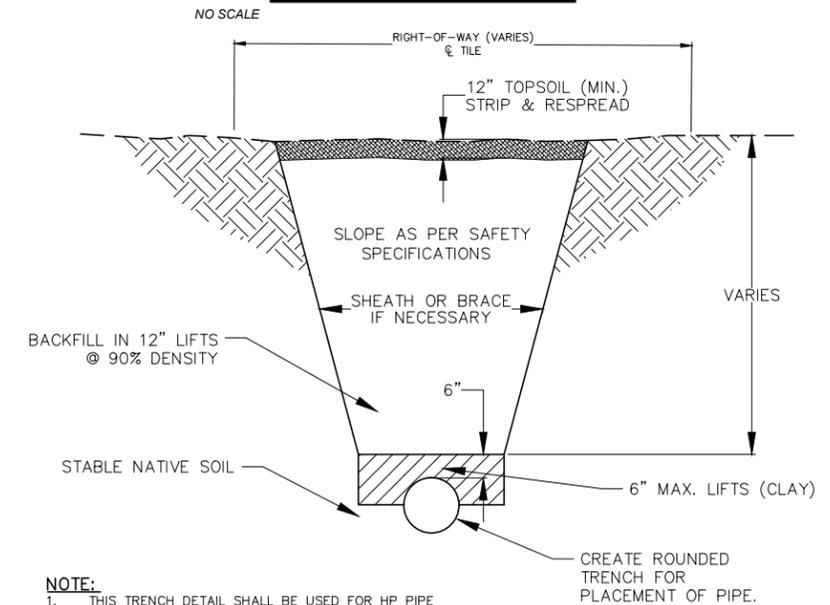
PIPE DIA. (INCHES)	WIDTH "X" (INCHES)	DEPTH "Y" (INCHES)
8	9.50	4.80
10	11.60	5.80
12	14.20	7.10
15	18.30	9.20
18	21.50	10.80
24	28.40	14.20
30	34.80	17.40
36	41.00	20.50
42	47	23.90
48	54.40	27.20
60	66.50	33.30

**ROUNDED TRENCH BOTTOM**

NOTES:

- SHAPED TRENCH FOR BURIAL DEPTHS LESS THAN 7.67 FEET.
- SHAPED TRENCH BOTTOM REFERS TO PIPE INSTALLED WITH A "SPOON" ATTACHMENT ON A BACKHOE BUCKET.

**DUAL WALL HDPE SHAPED TRENCH INSTALLATION DETAILS**



NOTE:

- THIS TRENCH DETAIL SHALL BE USED FOR HP PIPE INSTALLATION.
- IF SUBBASE IS DETERMINED TO BE UNSUITABLE, PIPE TO BE PLACED ON MINIMUM 4" DEPTH CLASS V MATERIAL.

**TRENCH DETAIL**

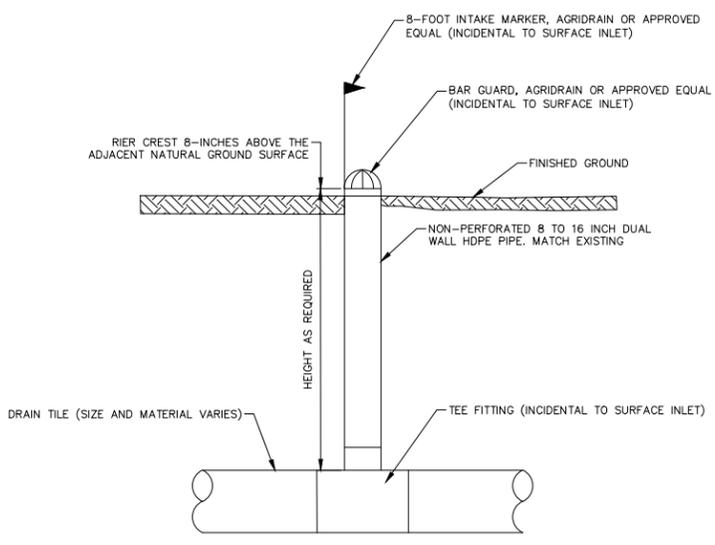
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DETAILS  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

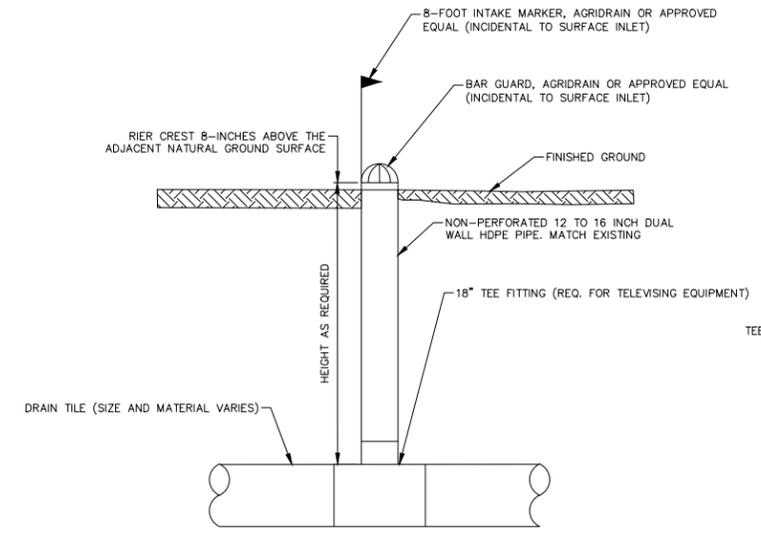
DATE:	12.12.23
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PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

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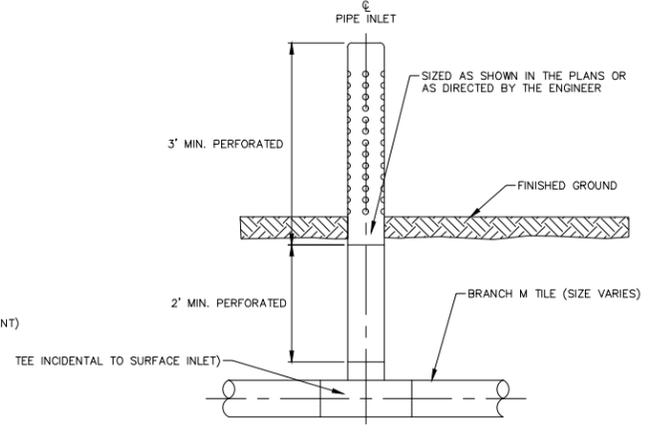
PRELIMINARY



**STANDARD SURFACE INLET**  
NO SCALE

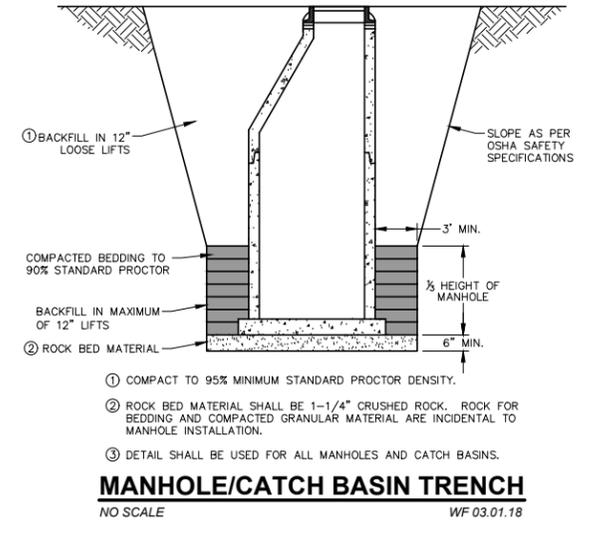


**TELEVISIONING SURFACE INLET**  
NO SCALE



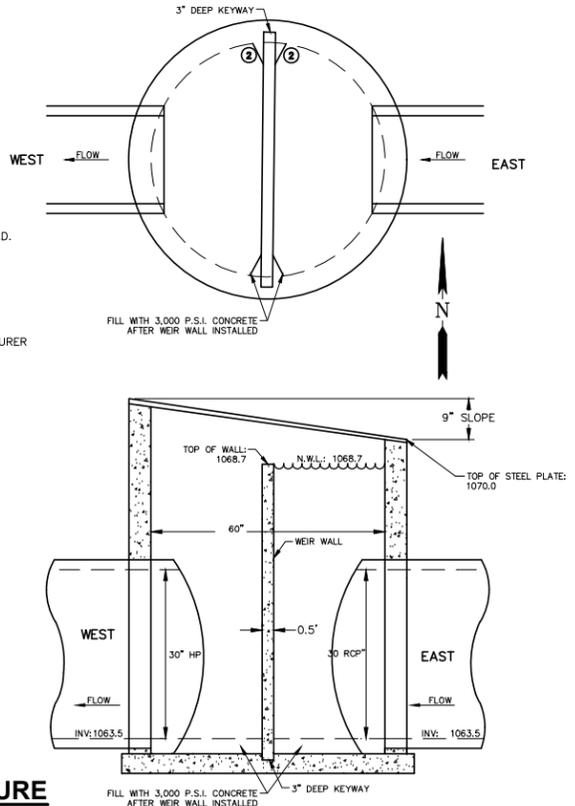
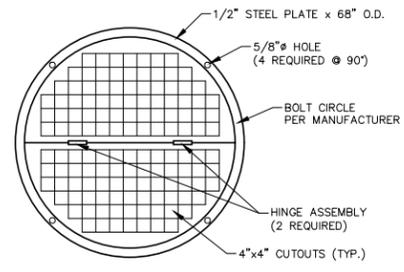
**HICKENBOTTOM INLET/VENT**  
NO SCALE

- NOTES:
1. THE NON-PERFORATED PIPE INLET AND TEE SHALL BE SIMILAR OR EQUAL TO MATERIAL FROM THE HICKENBOTTOM TILE.
  2. THE CONNECTIONS TO THE MAIN SHALL UTILIZE STANDARD MANUFACTURED FITTINGS.
  3. THE PERFORATED SECTION OF THE INLET SHALL HAVE 6 ROWS OF HOLES SPACED AT 2 INCHES, CENTER TO CENTER, AND HAVE A 1 INCH DIAMETER.
  4. INLET COMPONENT LENGTHS MAY BE SHORTENED OR LENGTHENED, TO OBTAIN THE REQUIRED HEIGHT OR DEPTH.



**MANHOLE/CATCH BASIN TRENCH**  
NO SCALE

- NOTES:
- 1 COMPACT TO 95% MINIMUM STANDARD PROCTOR DENSITY.
  - 2 ROCK BED MATERIAL SHALL BE 1-1/4" CRUSHED ROCK. ROCK FOR BEDDING AND COMPACTED GRANULAR MATERIAL ARE INCIDENTAL TO MANHOLE INSTALLATION.
  - 3 DETAIL SHALL BE USED FOR ALL MANHOLES AND CATCH BASINS.



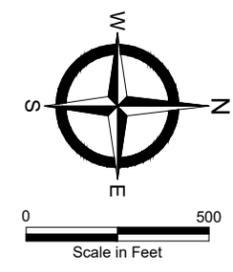
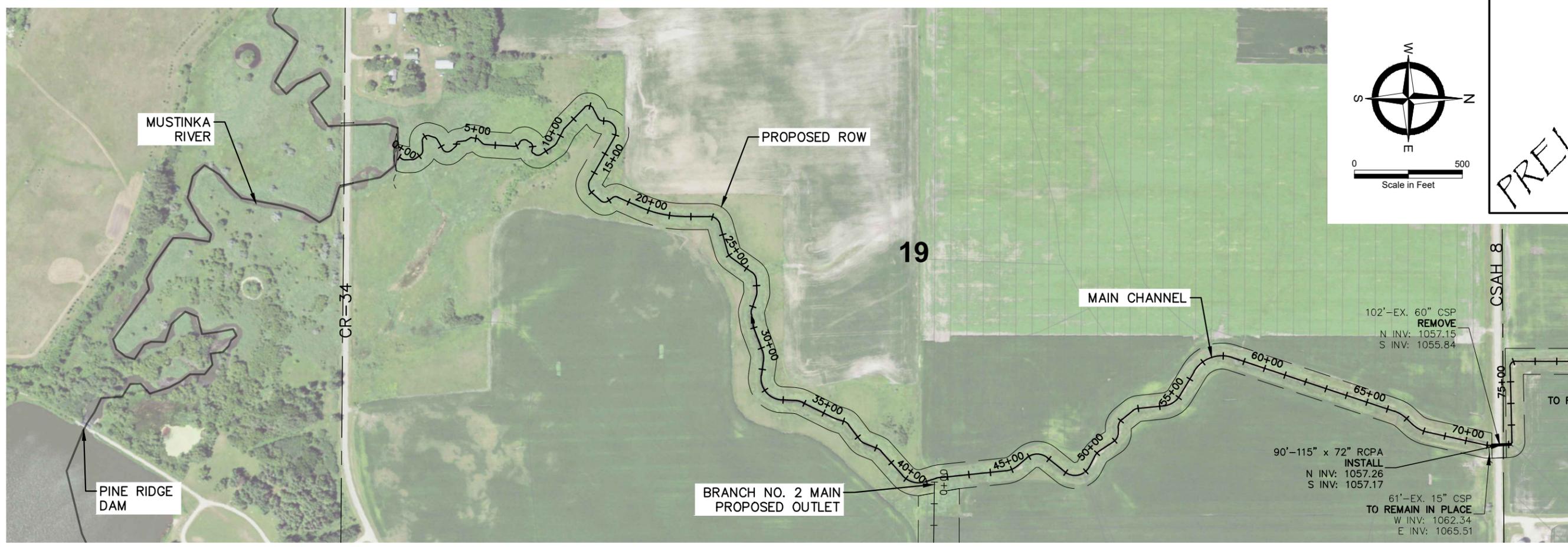
**CONCRETE INLET STRUCTURE**  
NO SCALE

- NOTES:
1. PRECAST MANUFACTURER TO VERIFY STRUCTURAL INTEGRITY OF STRUCTURE, I.E. PROVIDE THICKNESSES, REBAR DESIGN, ETC. TO COMPLY WITH CURRENT AASHTO AND AC CODES.
  2. SEE MANHOLE DETAIL FOR OTHER DETAILED INFORMATION.

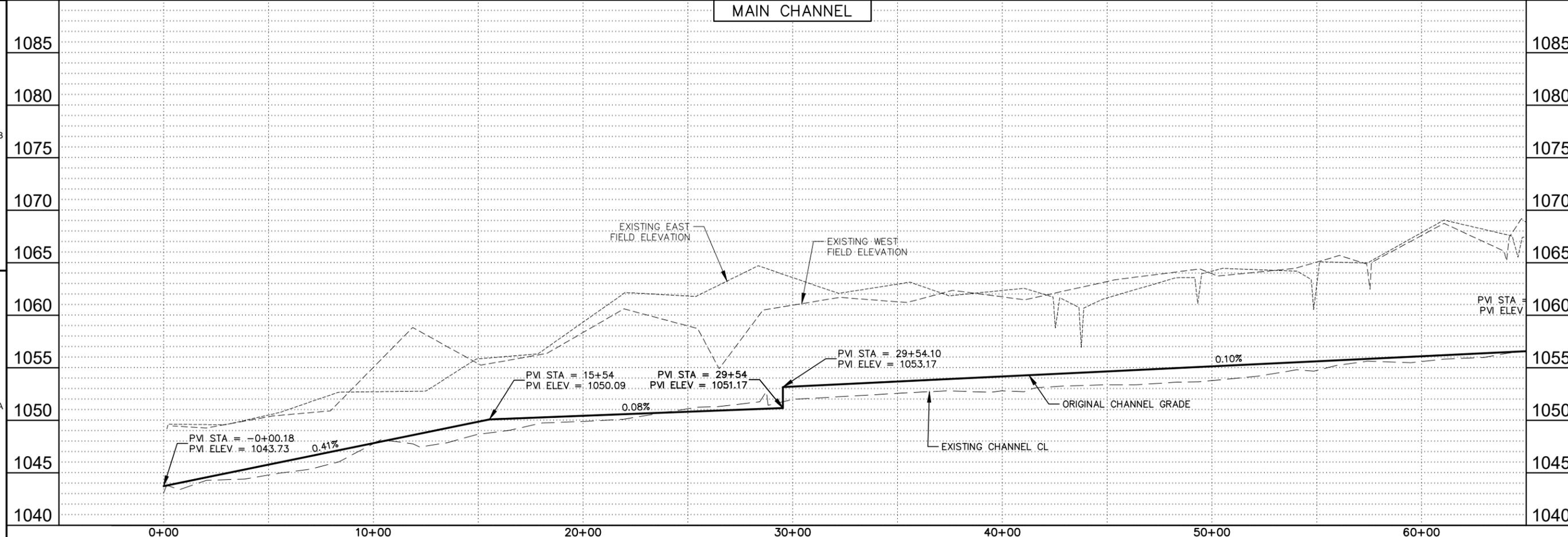
**DETAILS**  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

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DRAFTER:	KLO
REVIEWER:	---

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**PRELIMINARY**

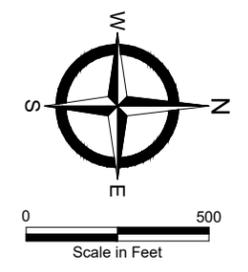
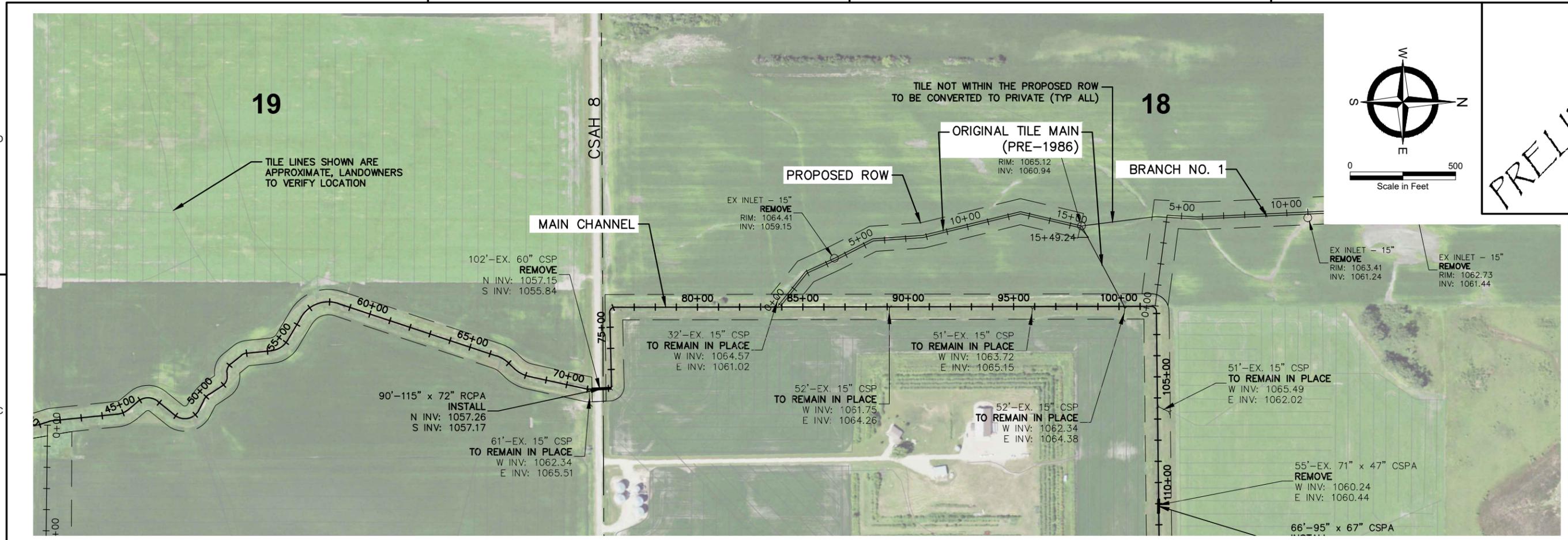


MAIN CHANNEL  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

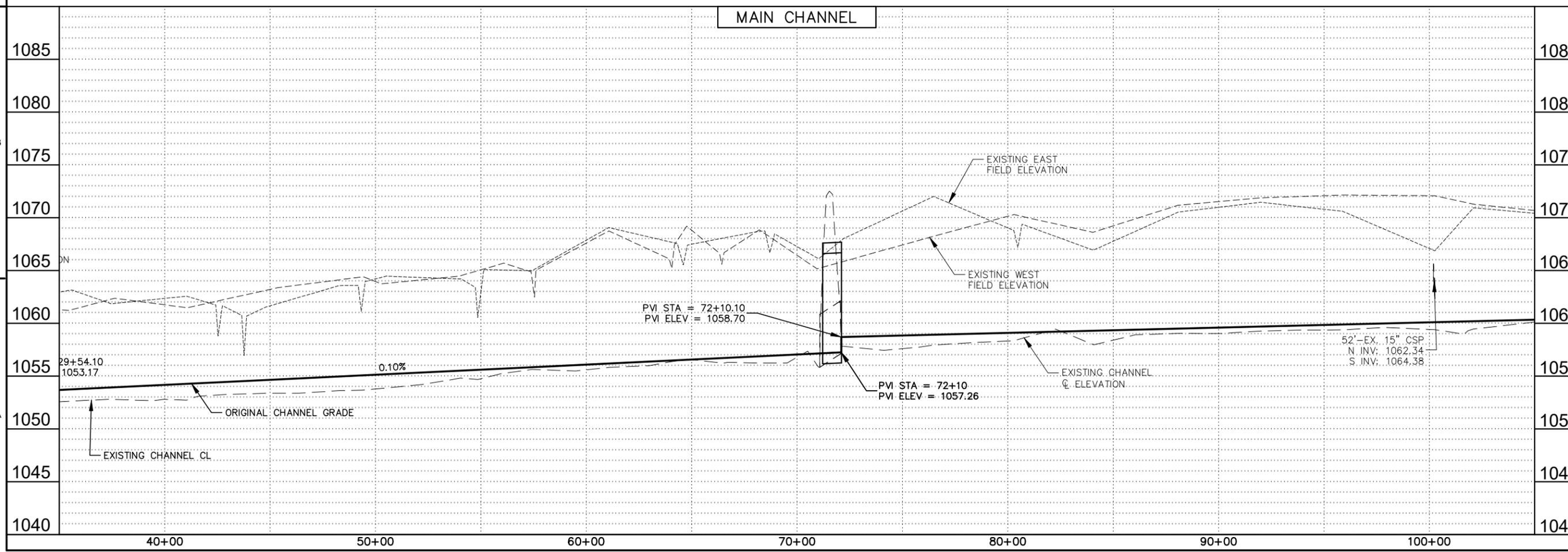
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REVIEWER:	---

**C-401**

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**PRELIMINARY**

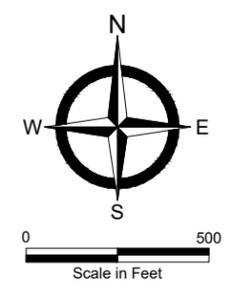
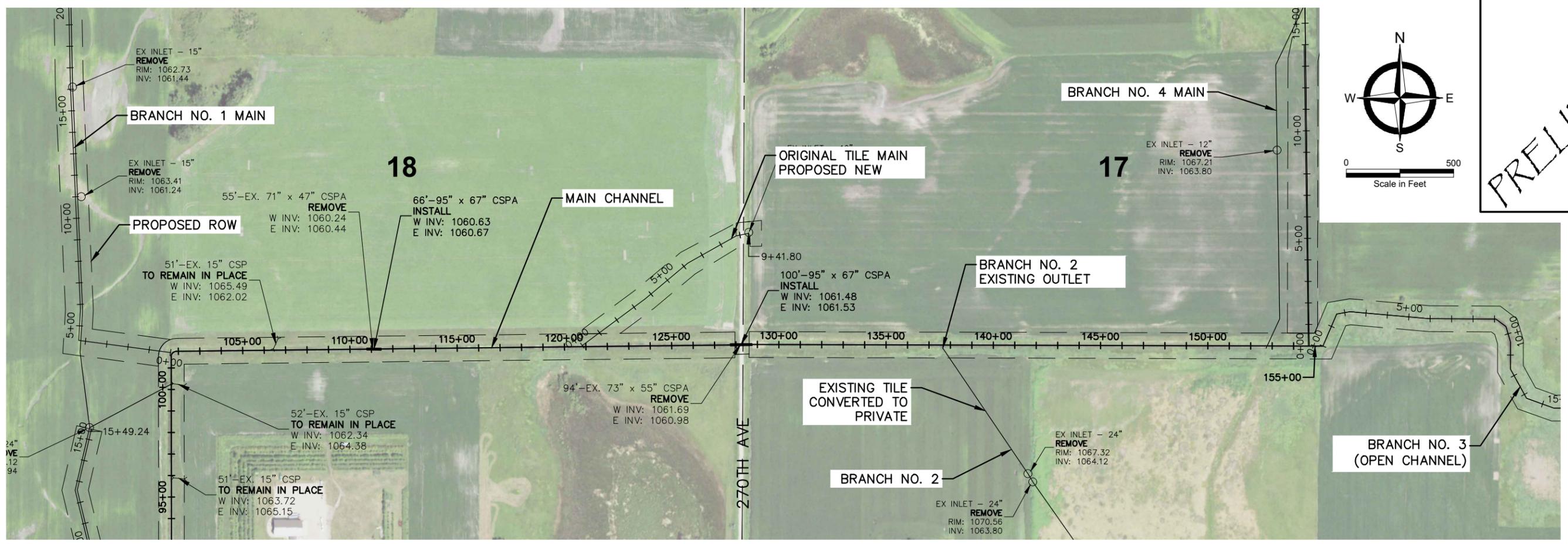


MAIN CHANNEL  
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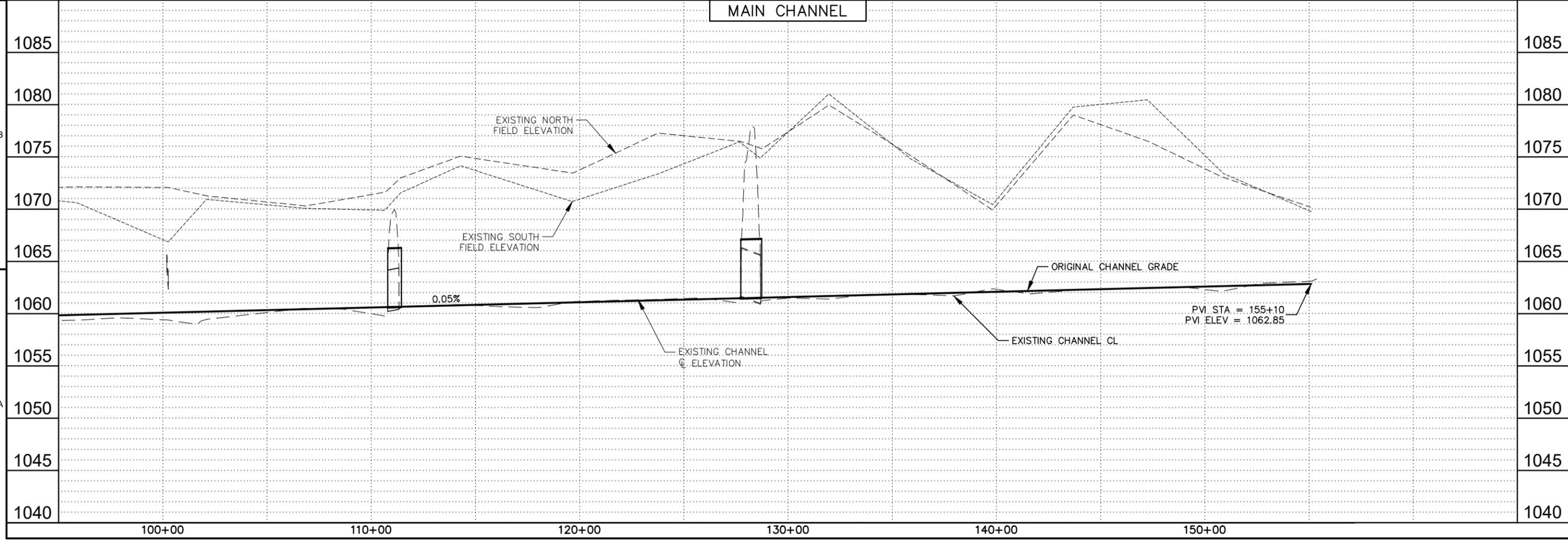
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**C-402**

FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

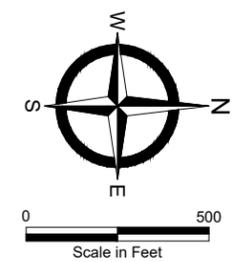
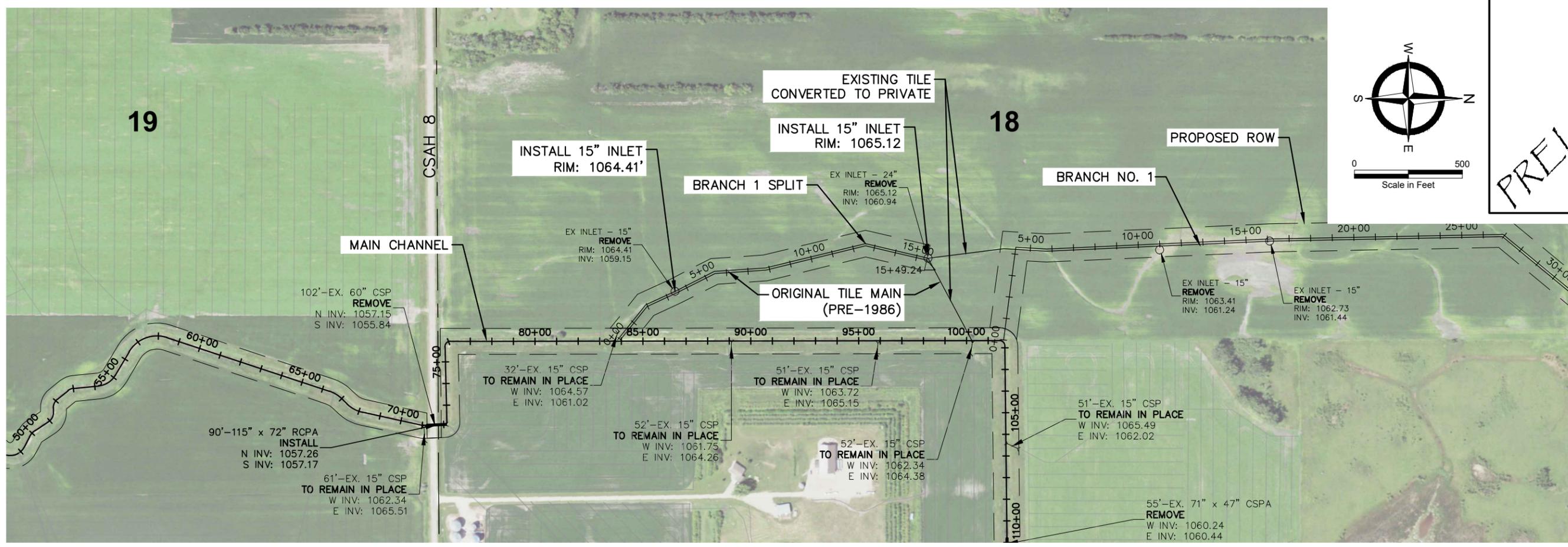


MAIN CHANNEL  
 GRANT CO. DITCH #21 IMPROVEMENT  
 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-403**

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

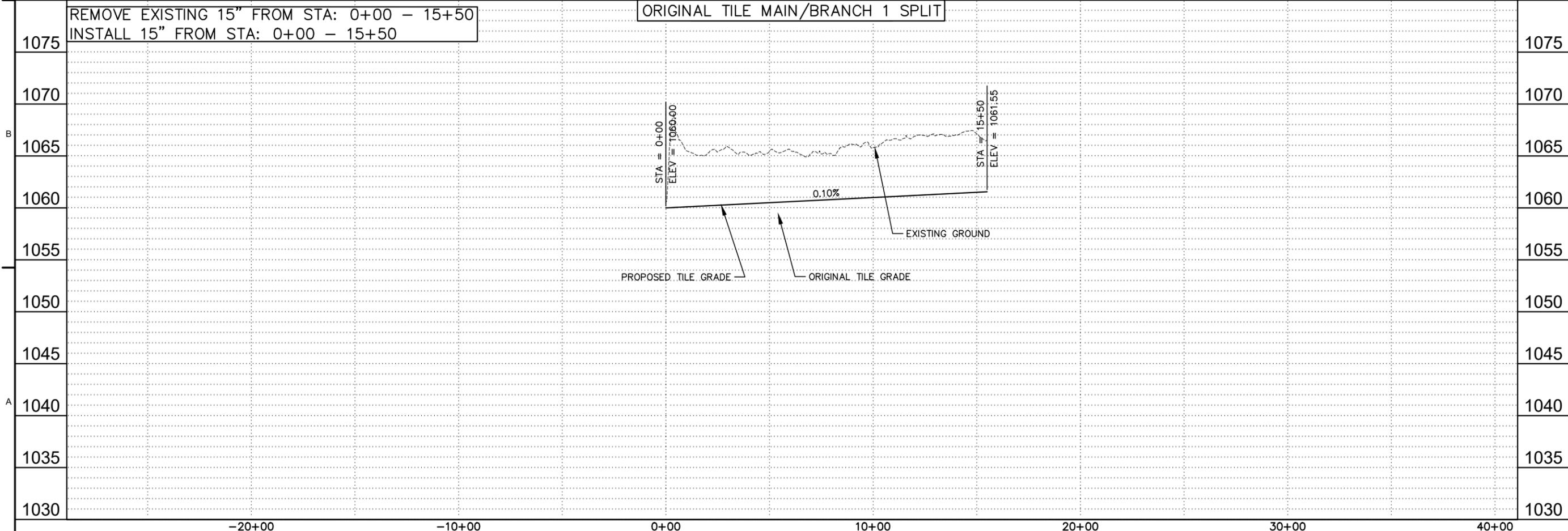


**PRELIMINARY**



REMOVE EXISTING 15" FROM STA: 0+00 - 15+50  
INSTALL 15" FROM STA: 0+00 - 15+50

ORIGINAL TILE MAIN / BRANCH 1 SPLIT

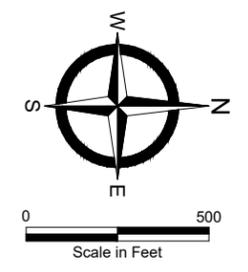
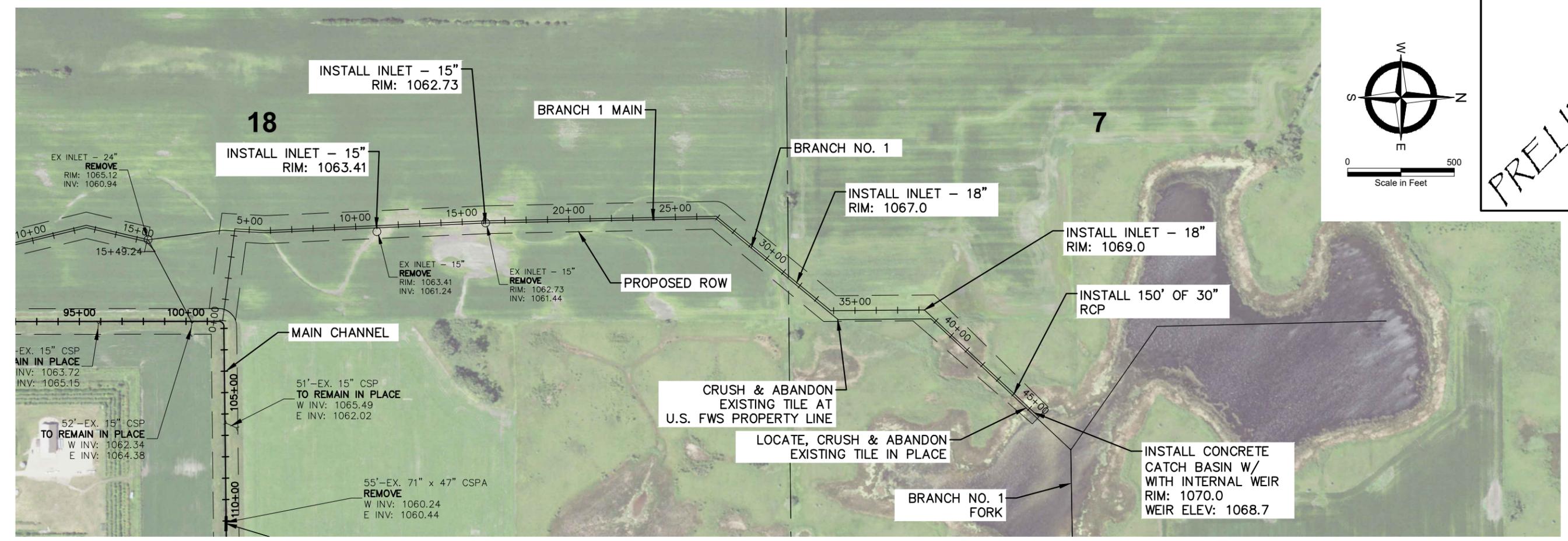


ORIGINAL MAIN TILE & BRANCH NO. 1 SPLIT  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

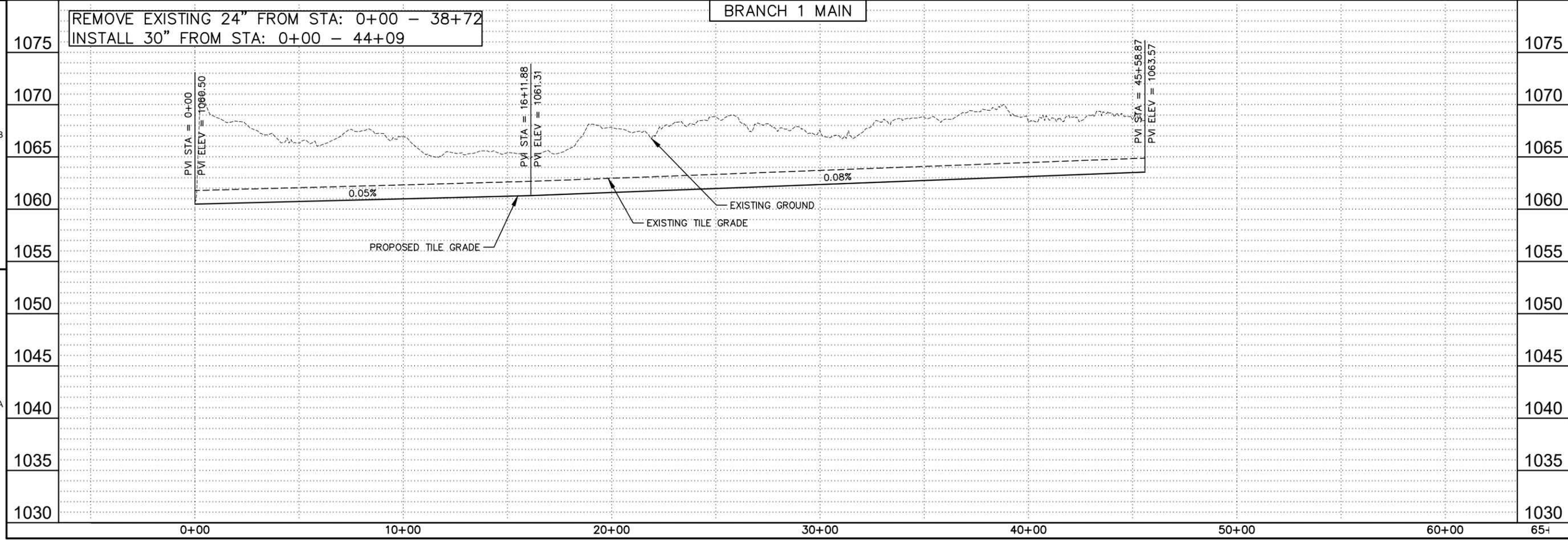
DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-404**

FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

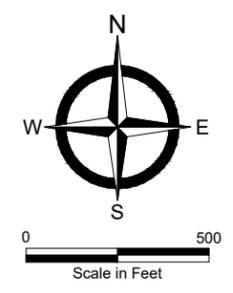
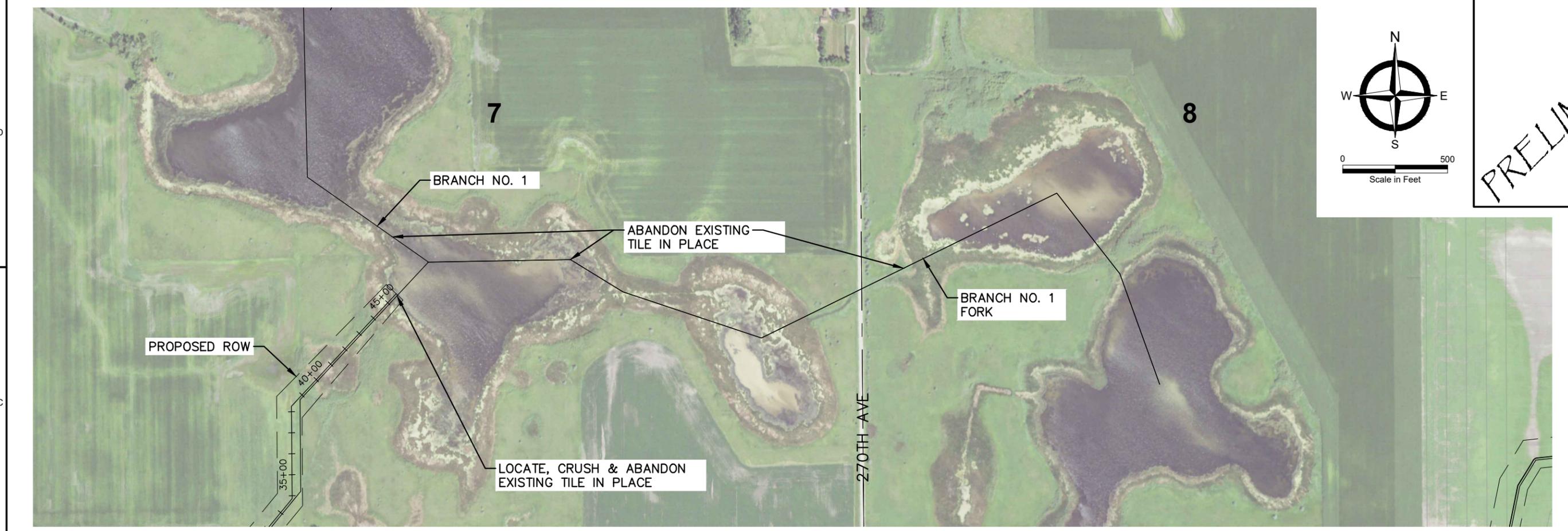


BRANCH NO. 1  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

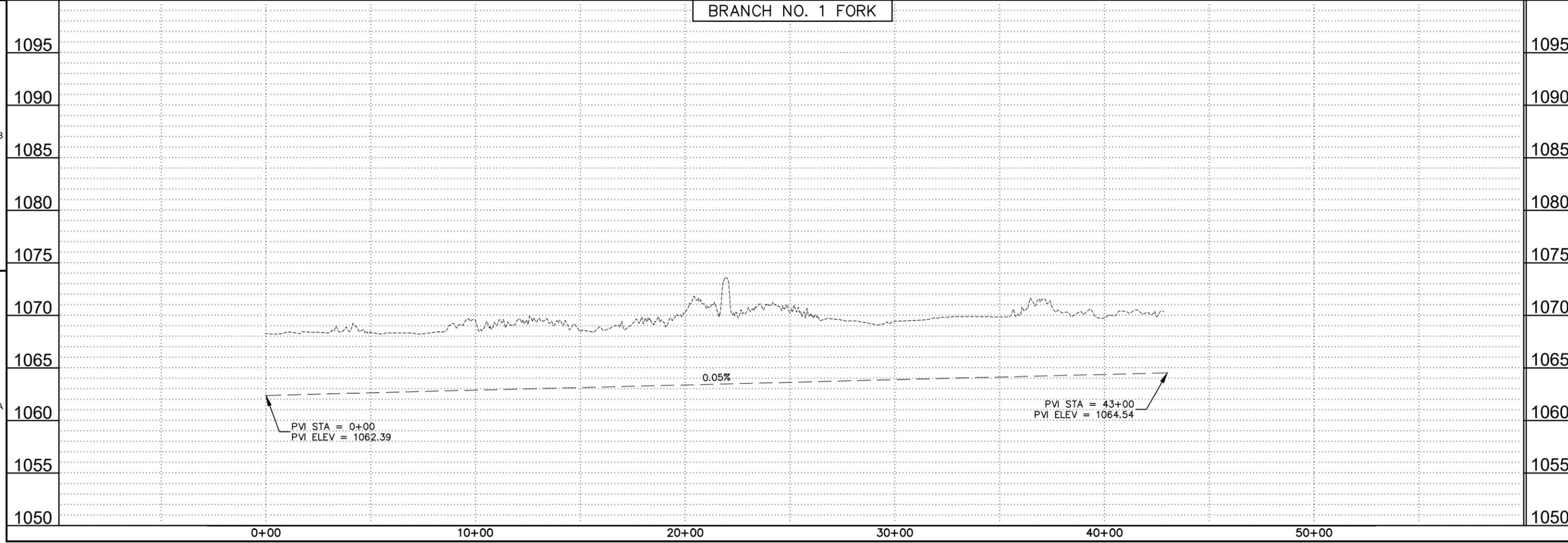
DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-405**

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

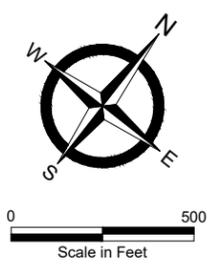
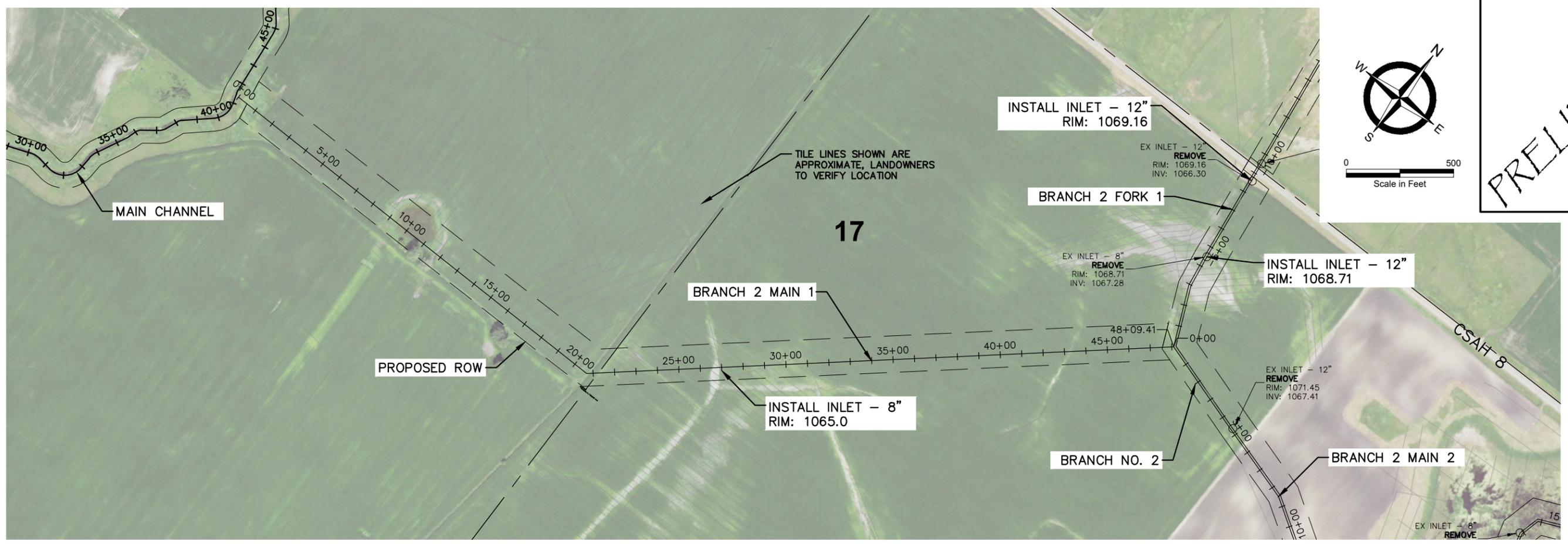


BRANCH NO. 1 FORK  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-406**

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

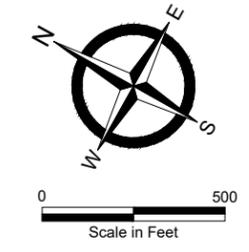
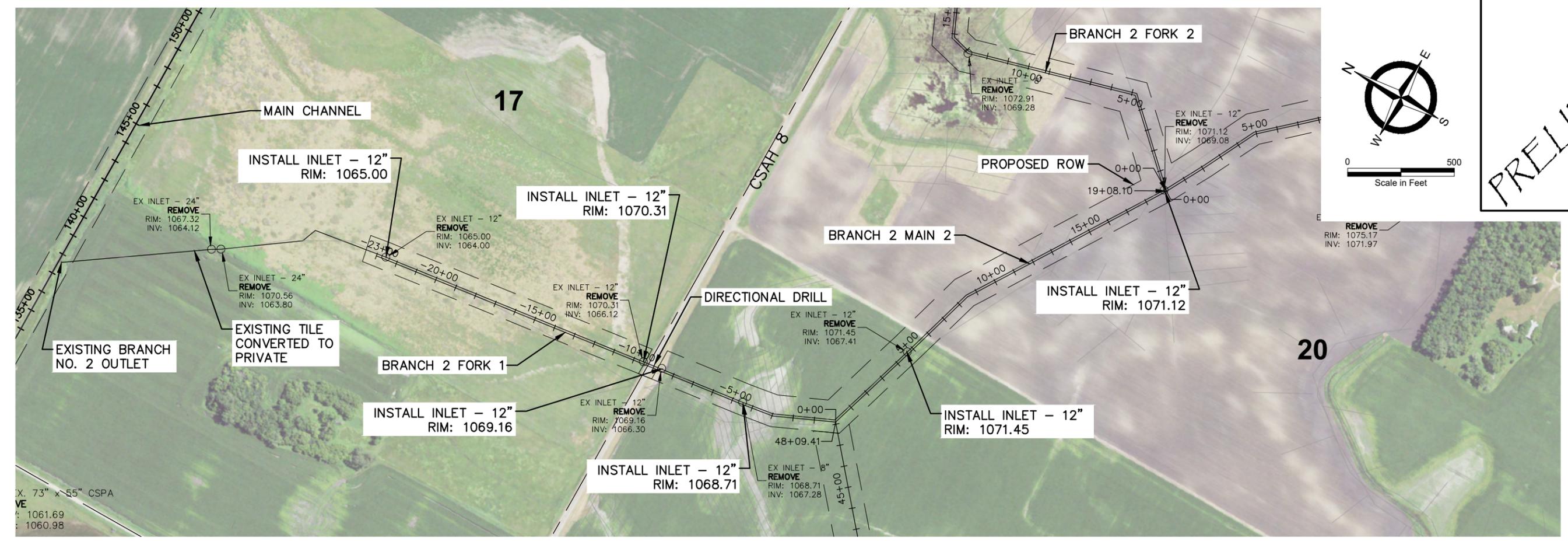


BRANCH NO. 2  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-407**

FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

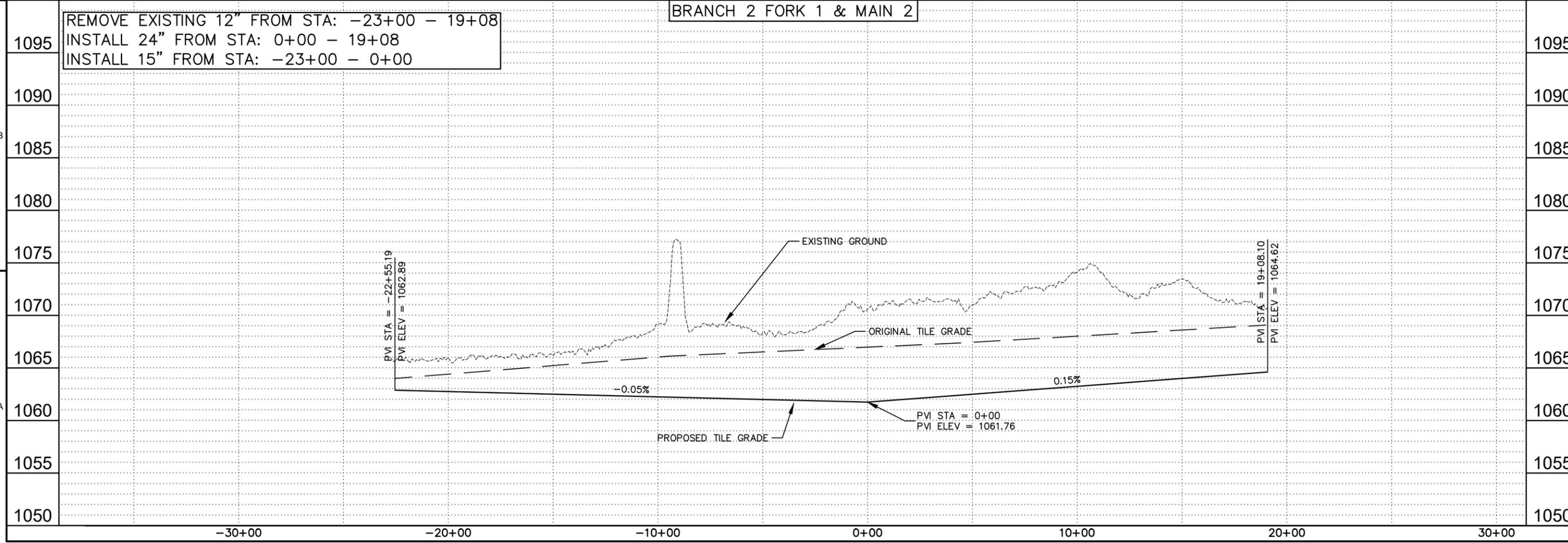


PRELIMINARY



REMOVE EXISTING 12" FROM STA: -23+00 - 19+08  
 INSTALL 24" FROM STA: 0+00 - 19+08  
 INSTALL 15" FROM STA: -23+00 - 0+00

BRANCH 2 FORK 1 & MAIN 2

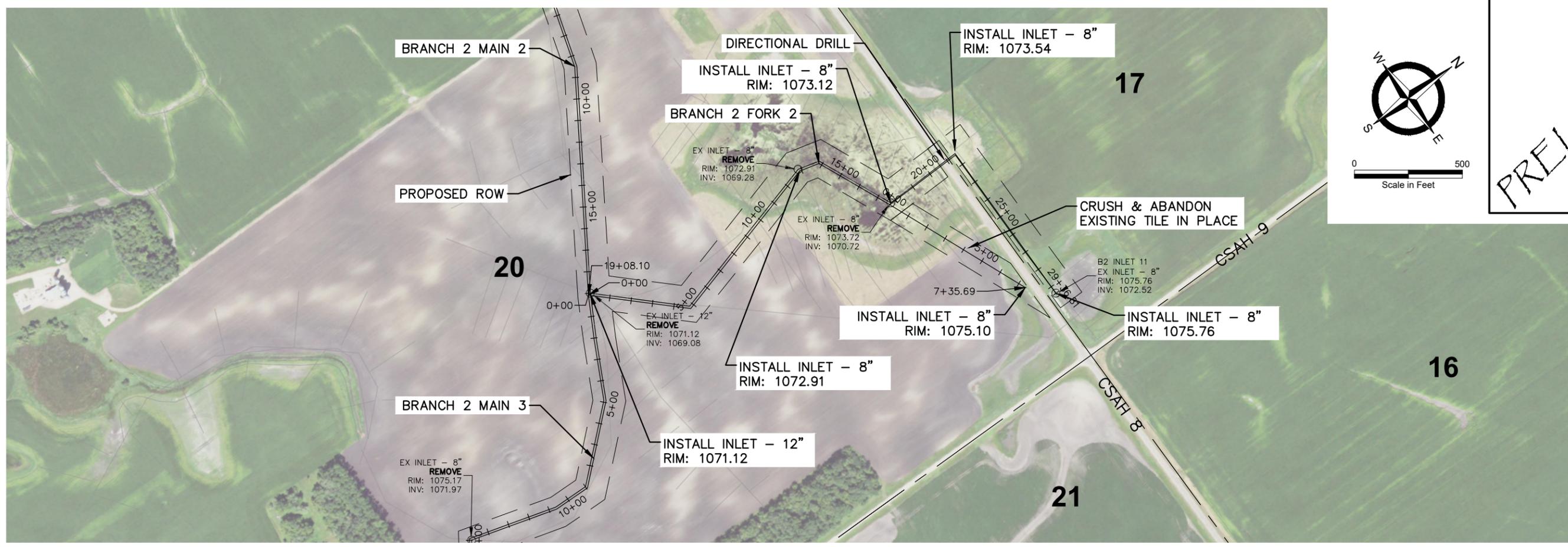


BRANCH NO. 2 - FORK 1  
 GRANT CO. DITCH #21 IMPROVEMENT  
 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

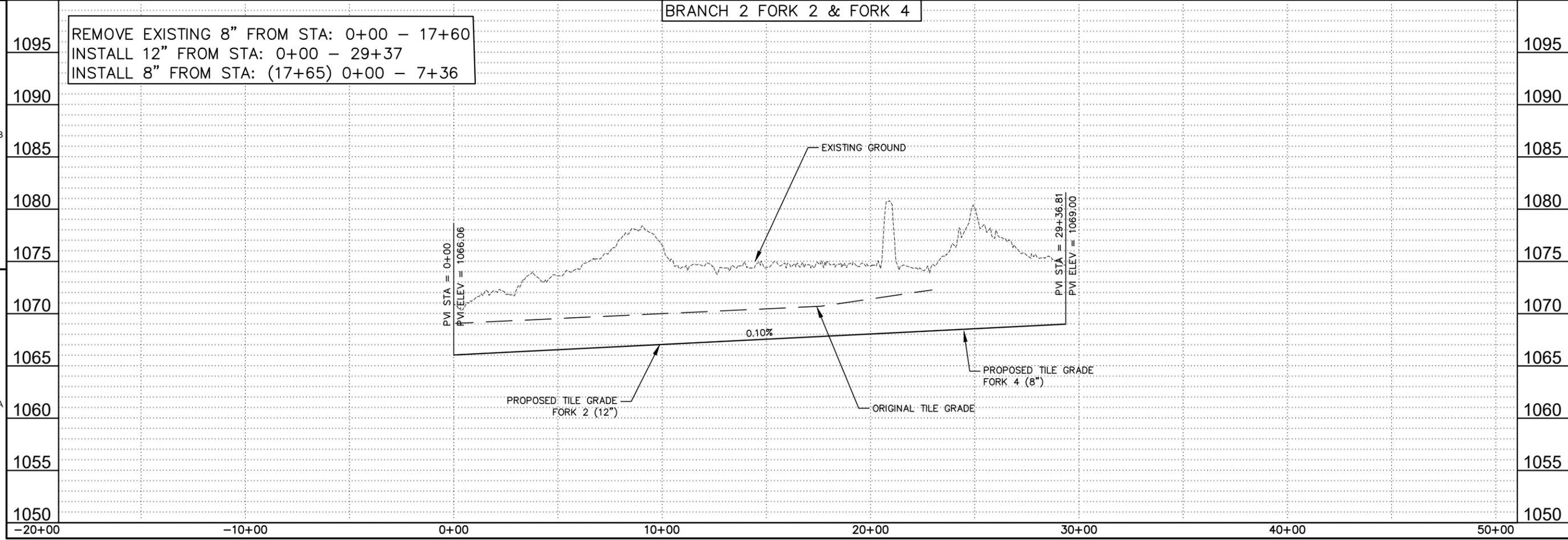
DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-408**

FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

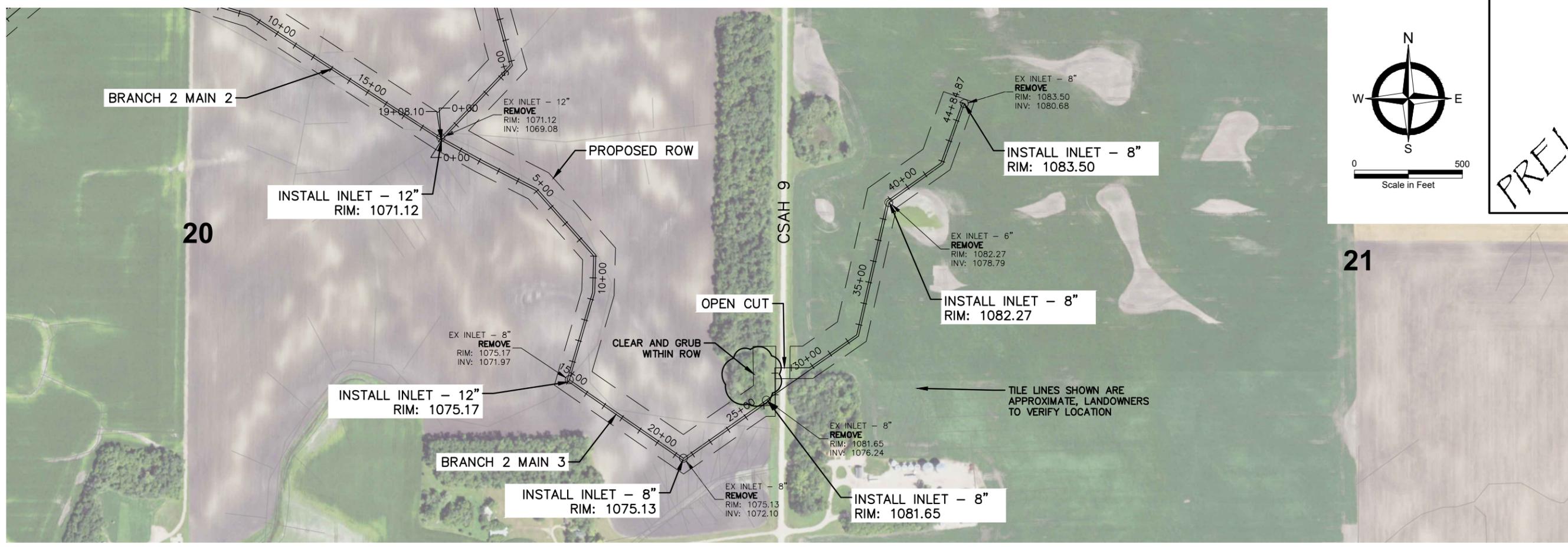


**BRANCH NO. 2 - FORK 2 & FORK 4**  
**GRANT CO. DITCH #21 IMPROVEMENT**  
**BOIS DE SIOUX WATERSHED DISTRICT**  
**GRANT COUNTY, MINNESOTA**

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-409**

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

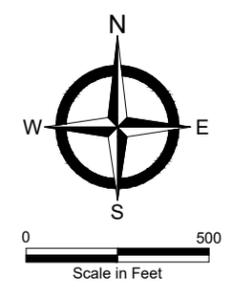
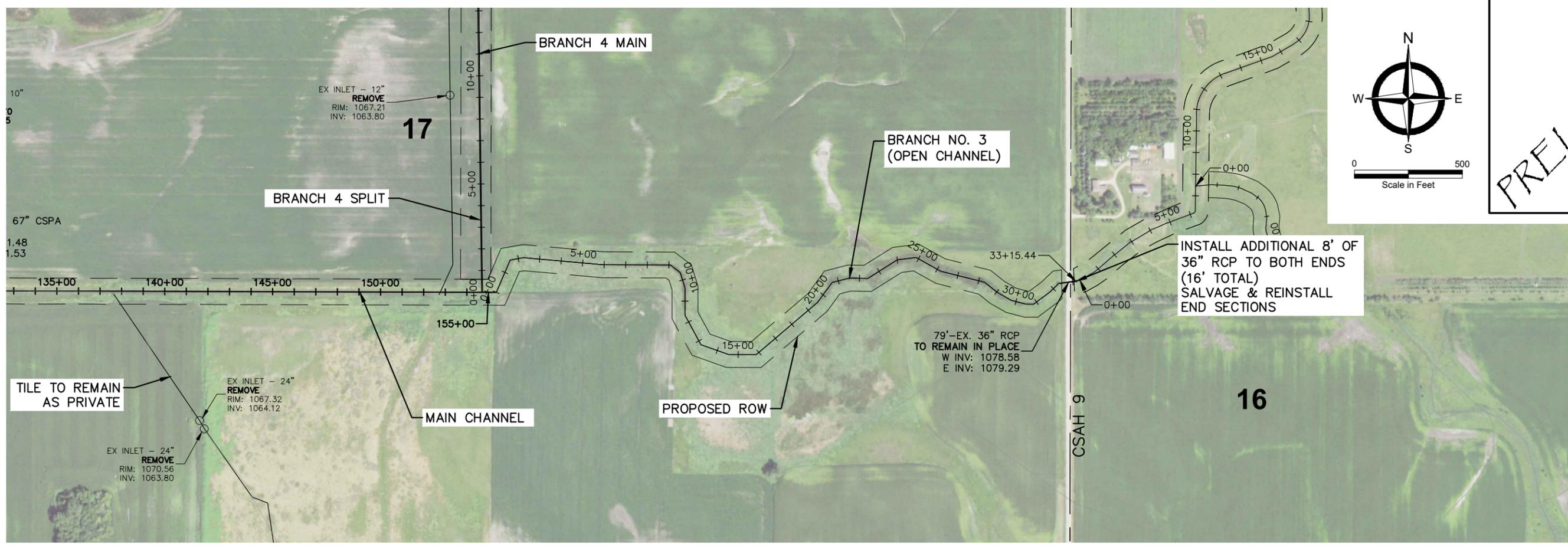


BRANCH NO. 2  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

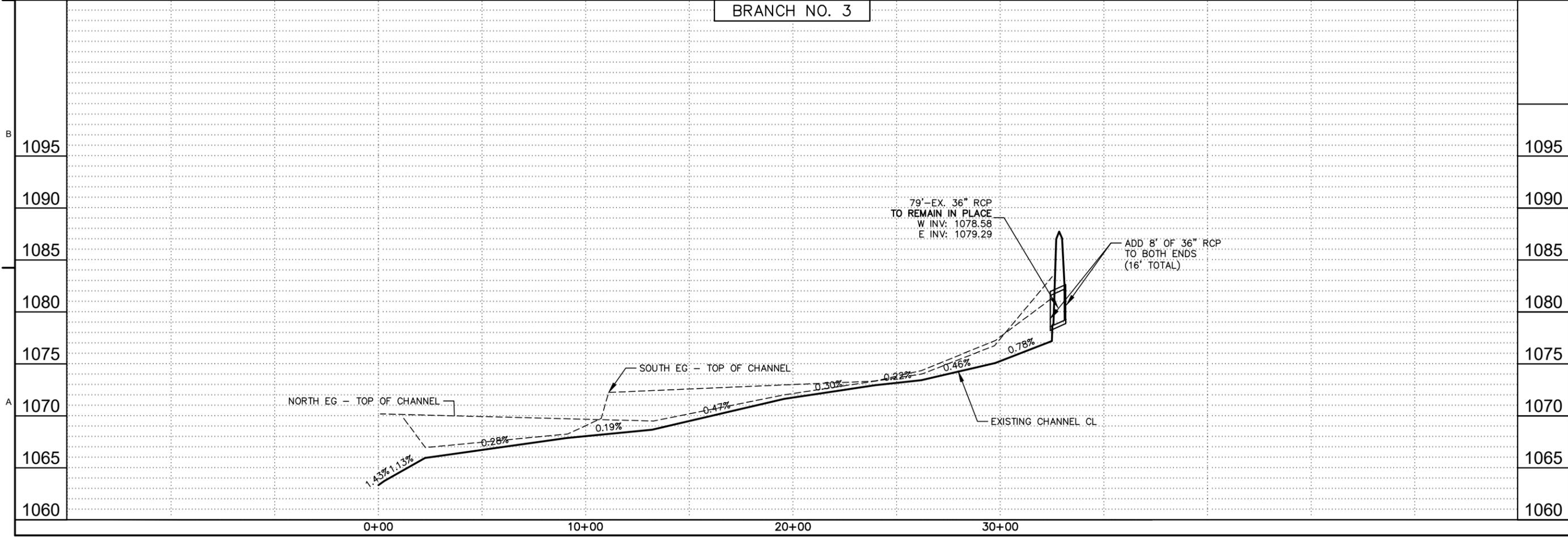
DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-410**

FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

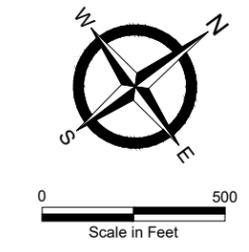
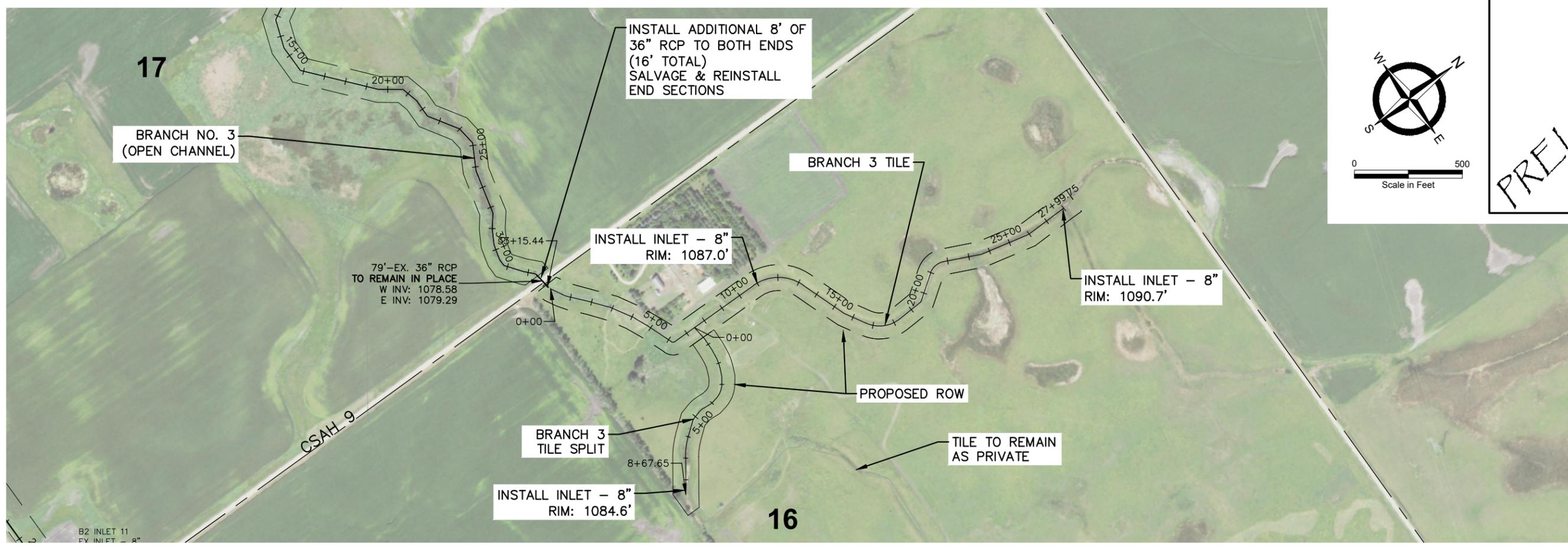


BRANCH NO. 3  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-411**

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

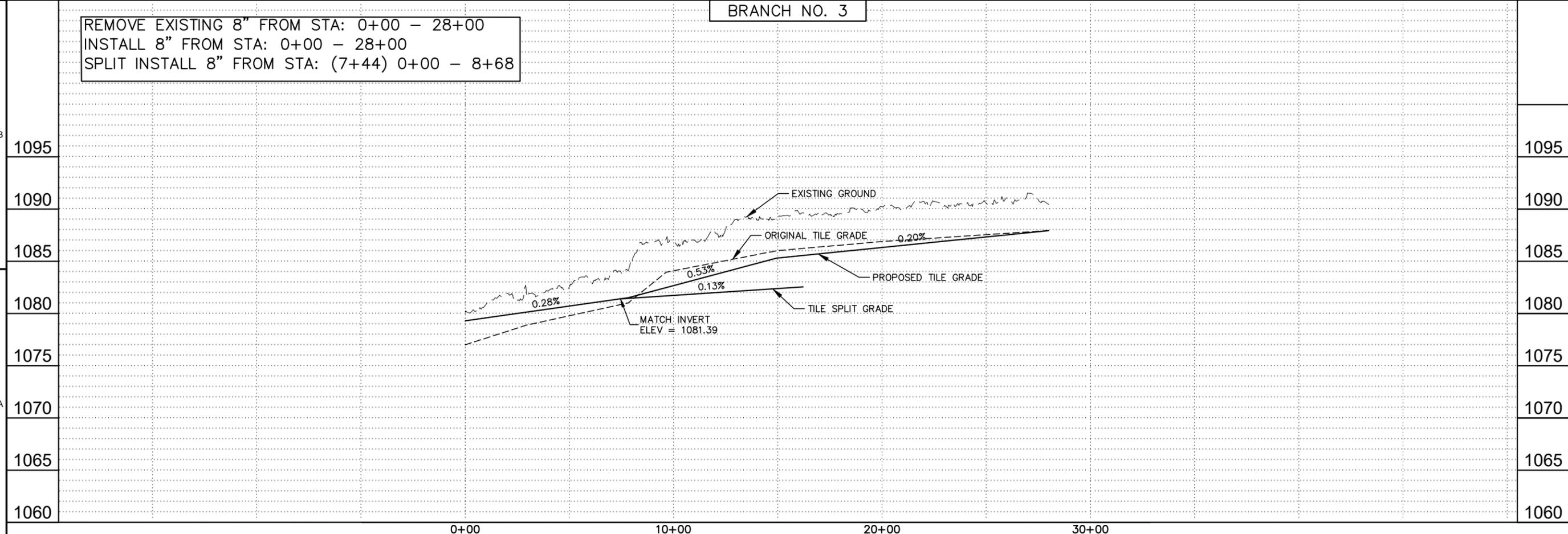


**PRELIMINARY**



REMOVE EXISTING 8" FROM STA: 0+00 - 28+00  
 INSTALL 8" FROM STA: 0+00 - 28+00  
 SPLIT INSTALL 8" FROM STA: (7+44) 0+00 - 8+68

**BRANCH NO. 3**

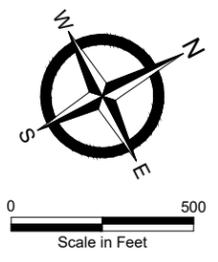
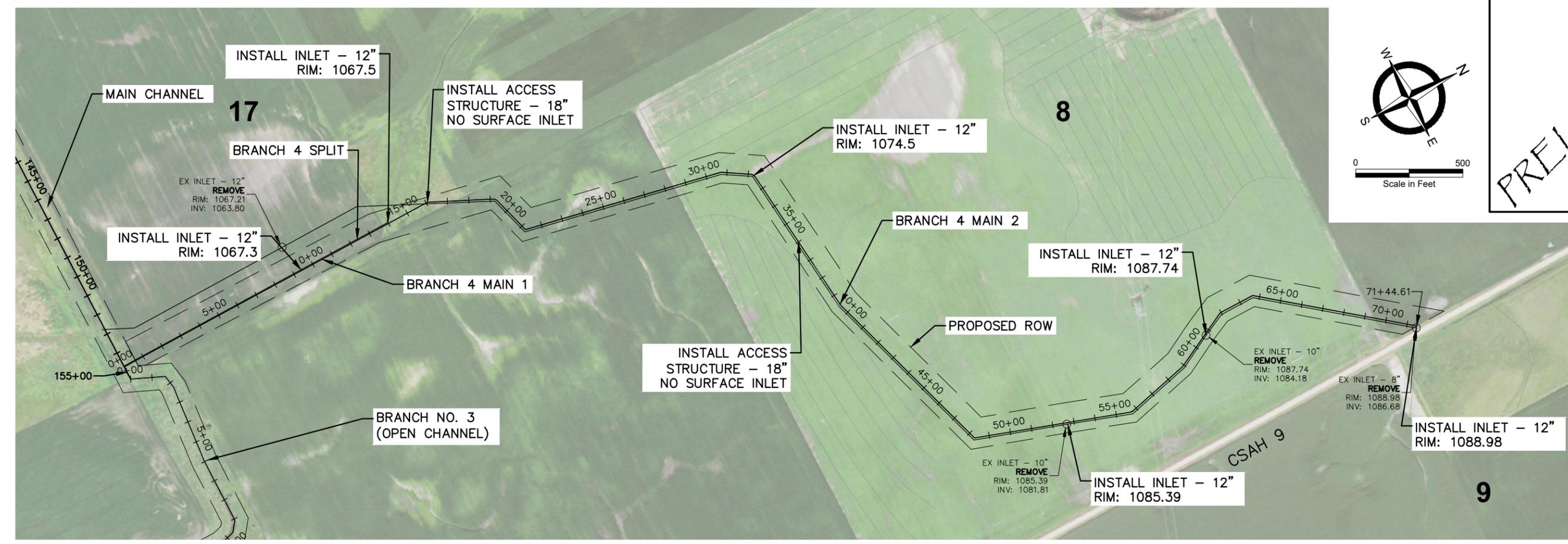


BRANCH NO. 3 TILE  
 GRANT CO. DITCH #21 IMPROVEMENT  
 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

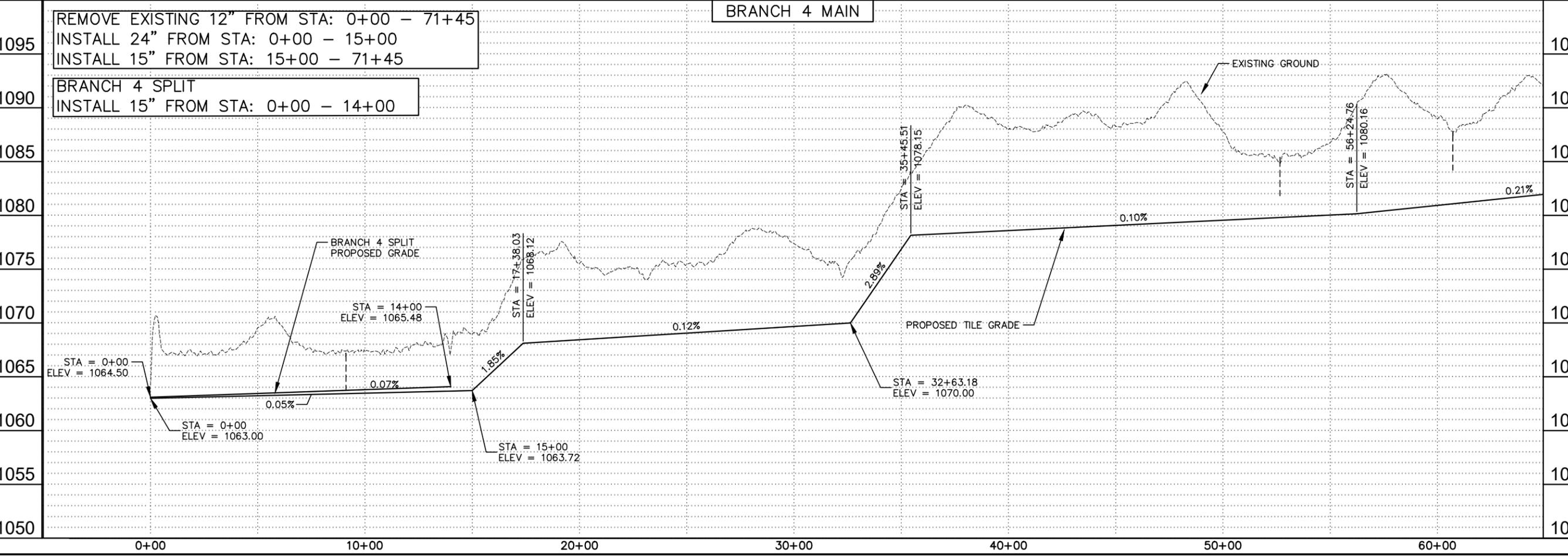
DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-411.2**

FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

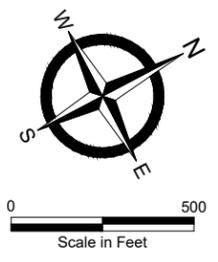
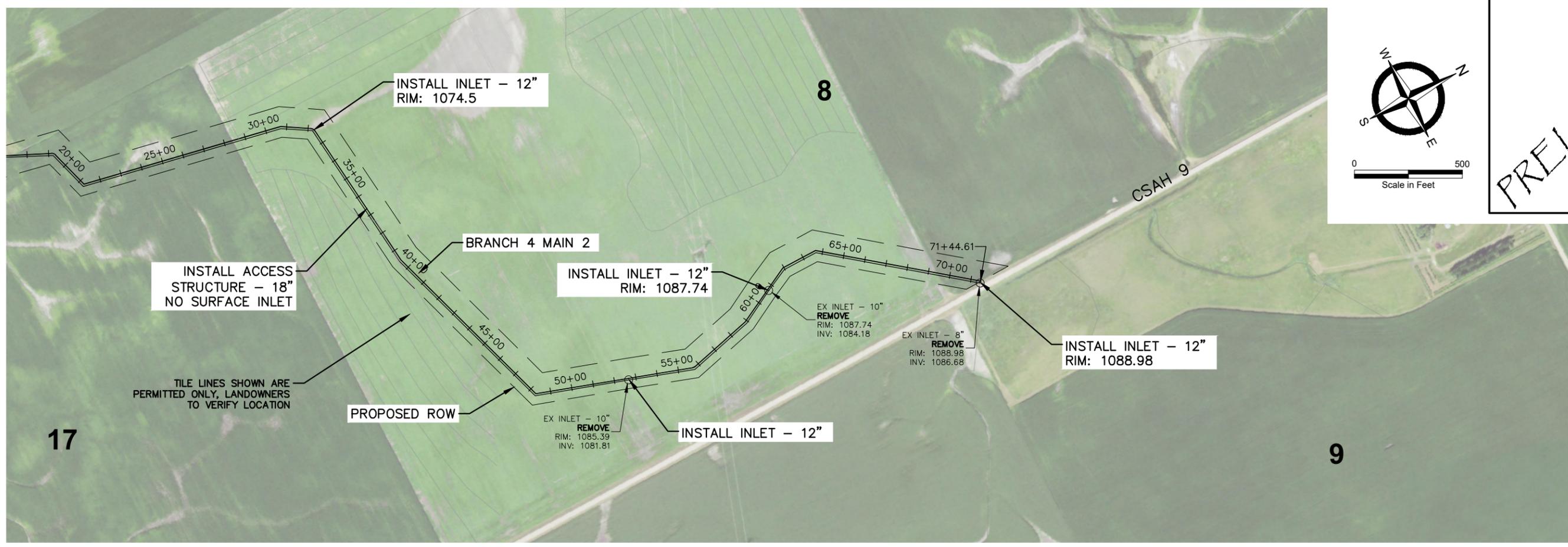


BRANCH NO. 4 & BRANCH 4 SPLIT  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

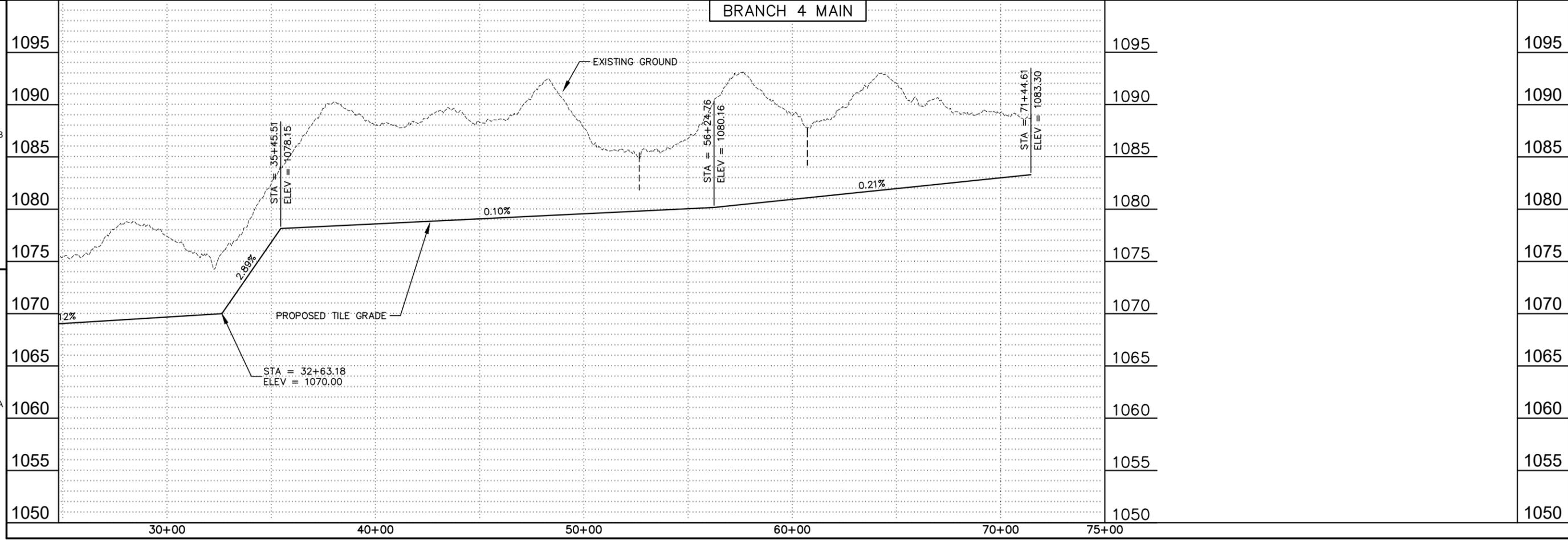
DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-412**

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**

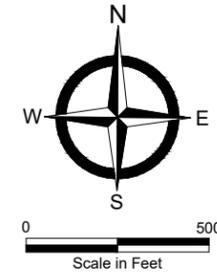
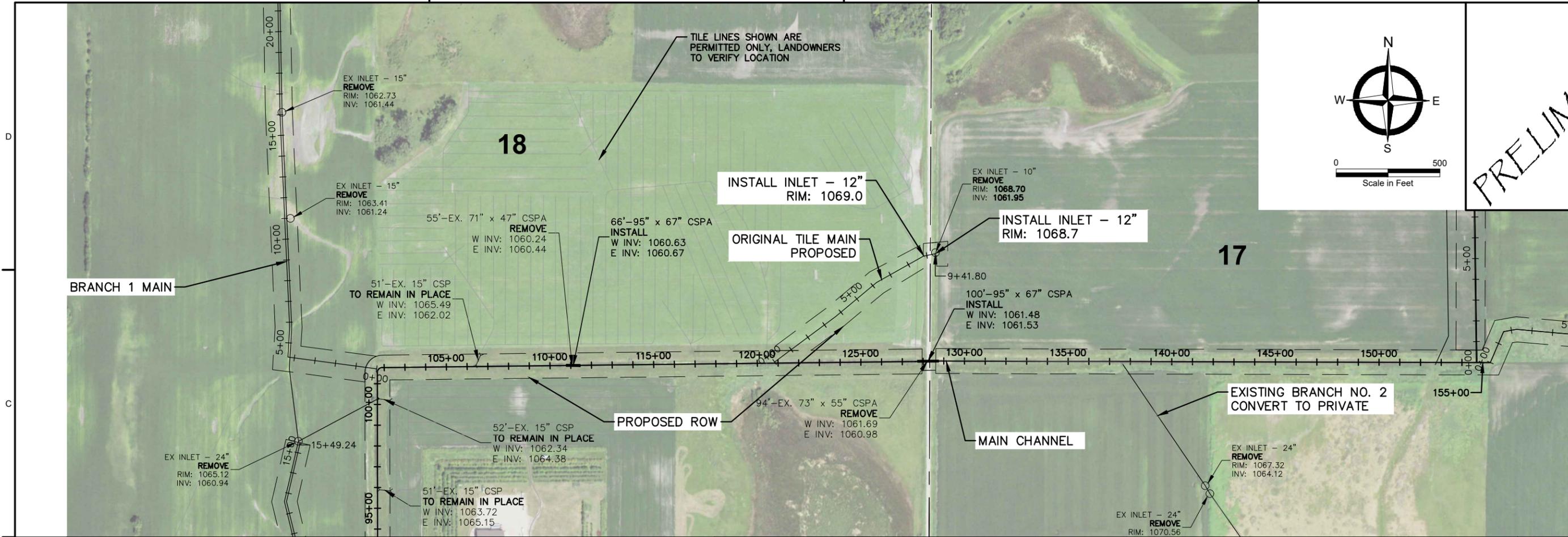


BRANCH NO. 4  
 GRANT CO. DITCH #21 IMPROVEMENT  
 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-413**

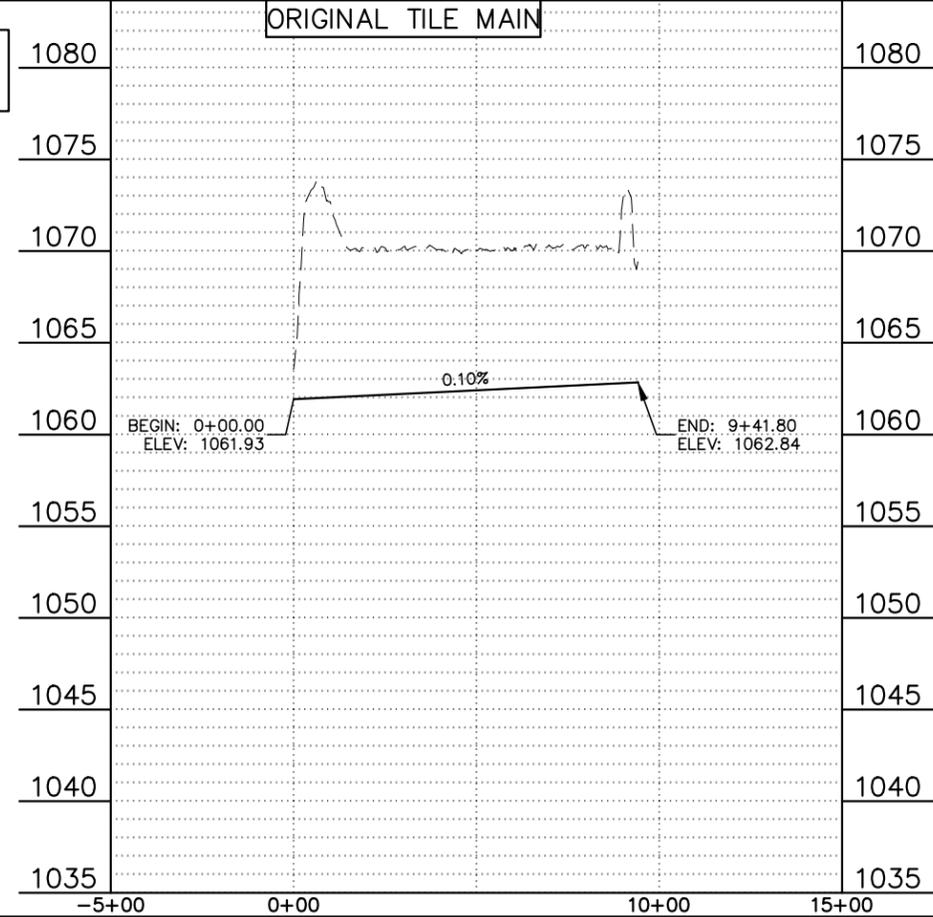
FILE LOCATION: R:\Projects\22000\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



**PRELIMINARY**



REMOVE EXISTING WITHIN ROW  
INSTALL 12" FROM STA: 0+00 - 9+42



ORIGINAL MAIN TILE  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

**C-414**

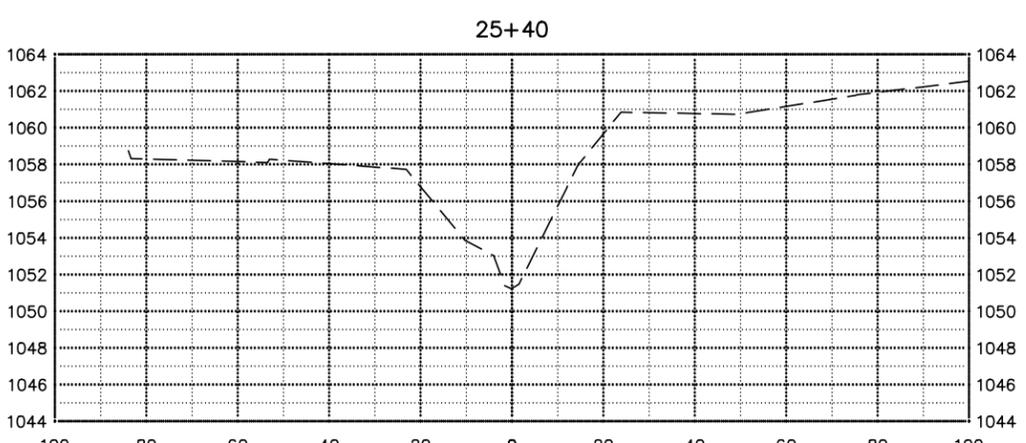
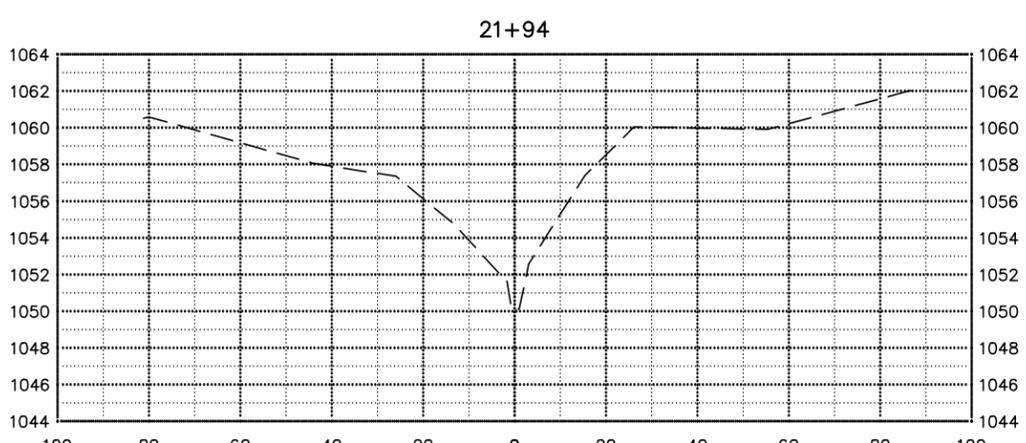
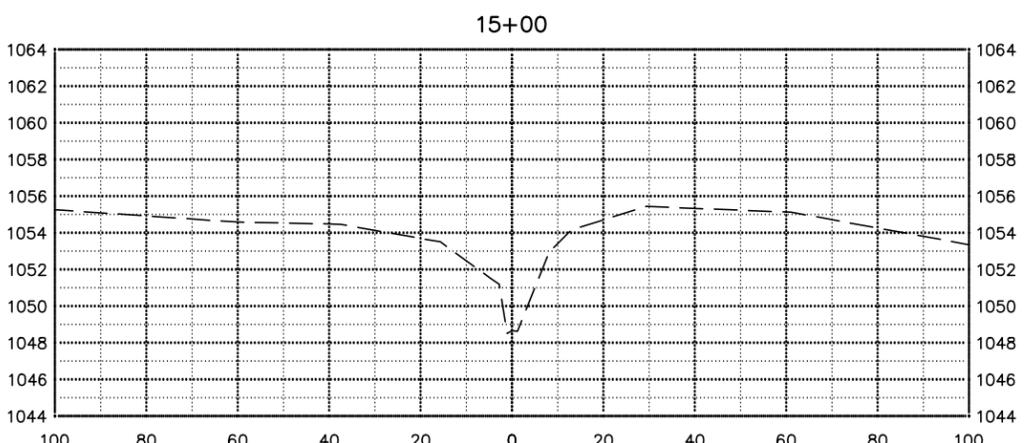
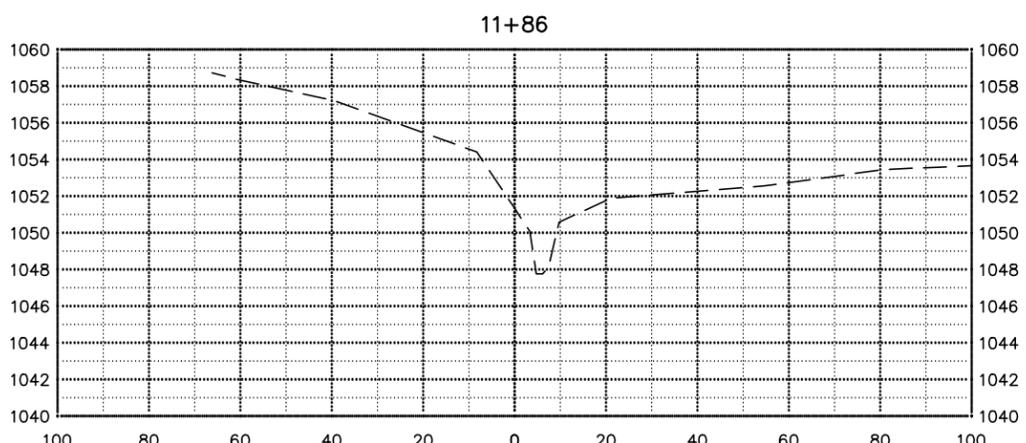
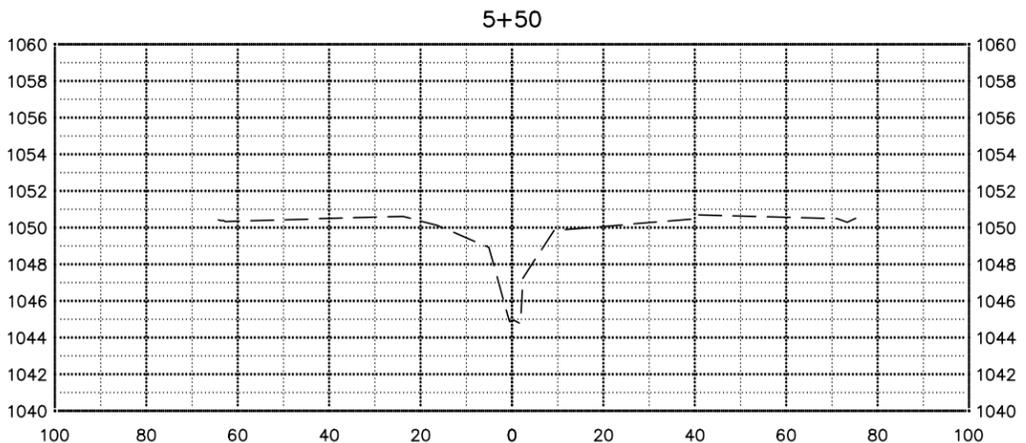
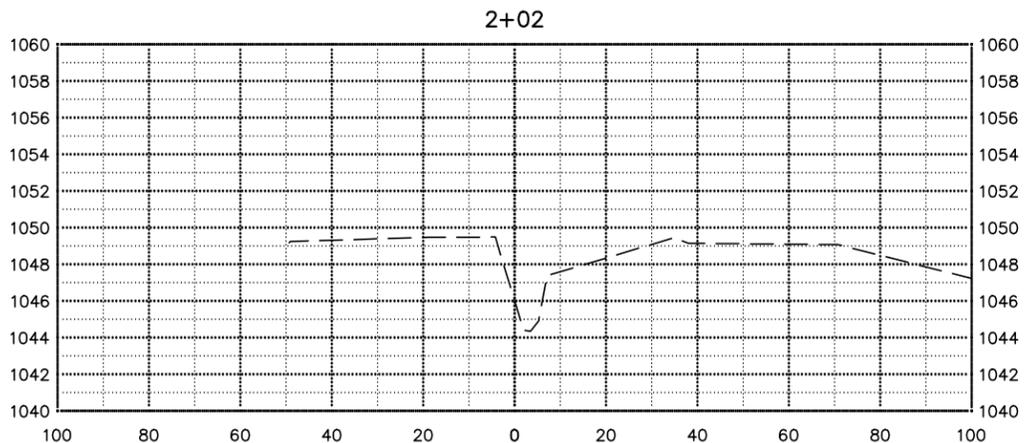
FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

D

C

B

A



PRELIMINARY



CROSS SECTIONS - MAIN CHANNEL  
 GRANT CO. DITCH #21 IMPROVEMENT  
 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

C-801

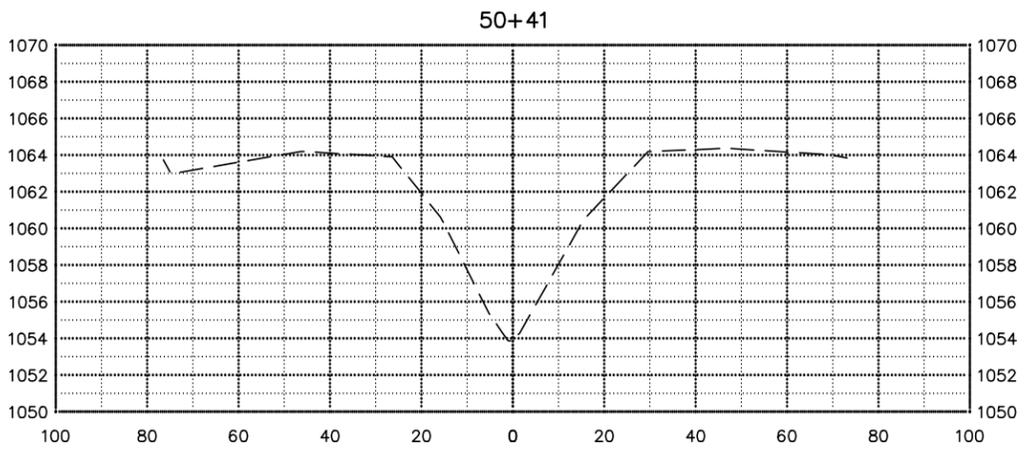
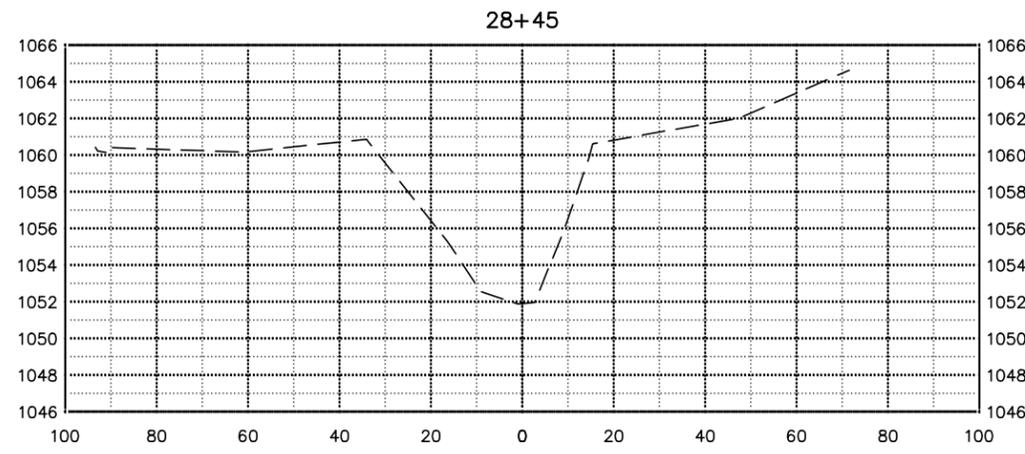
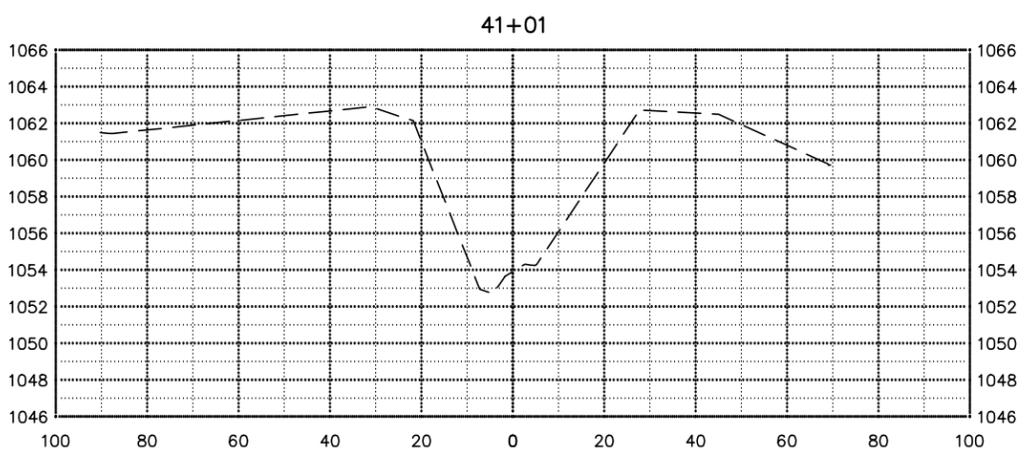
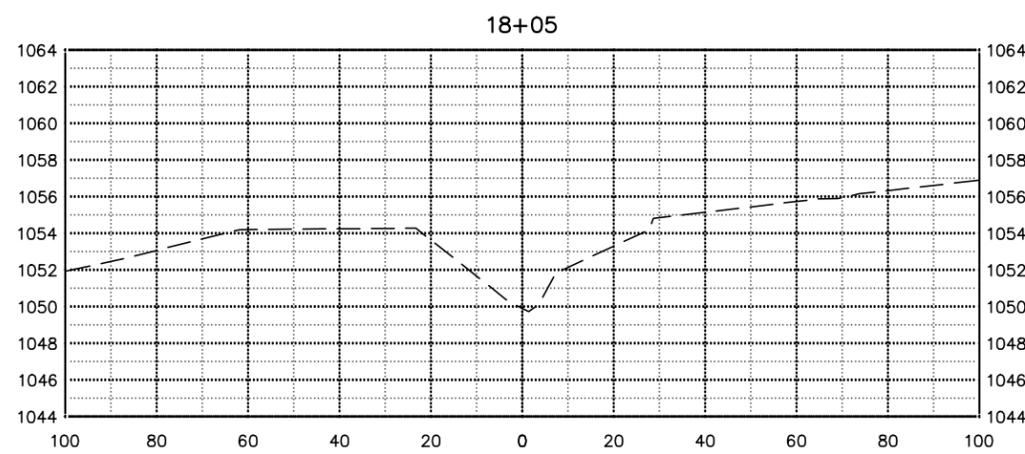
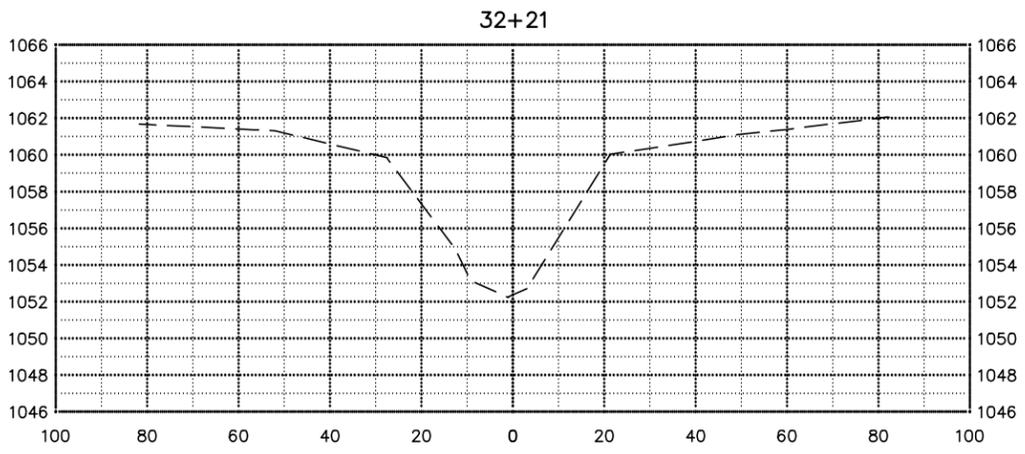
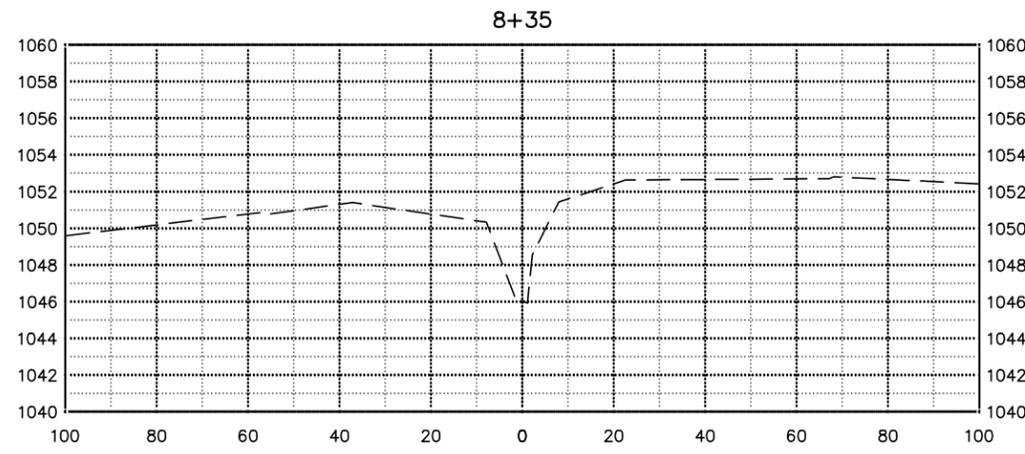
FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

D

C

B

A



PRELIMINARY



CROSS SECTIONS - MAIN CHANNEL  
 GRANT CO. DITCH #21 IMPROVEMENT  
 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

C-802

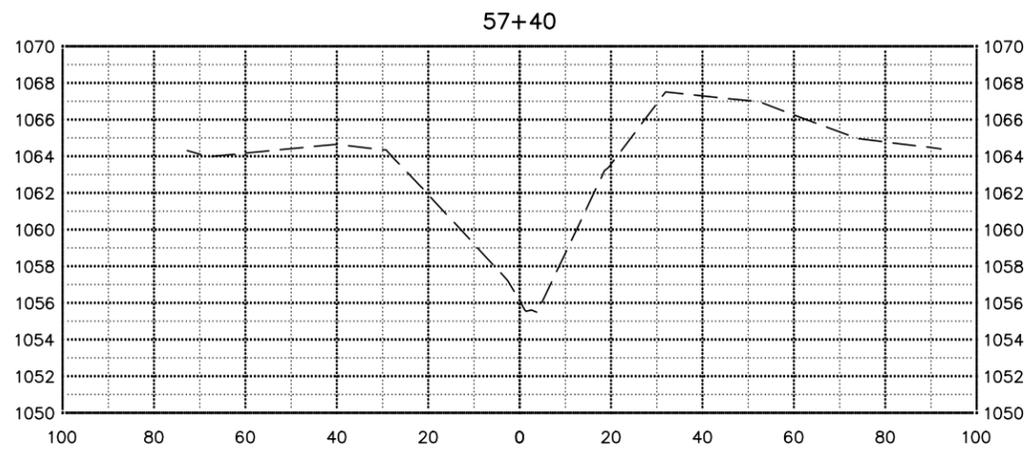
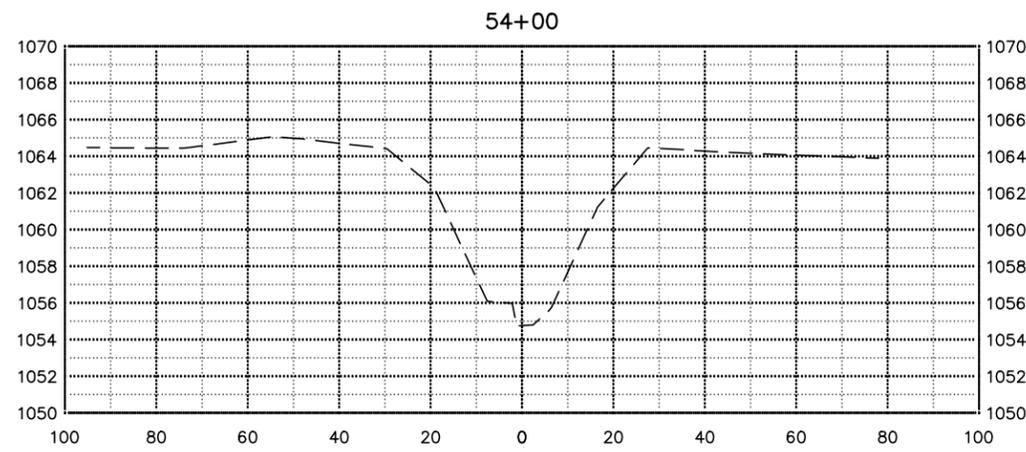
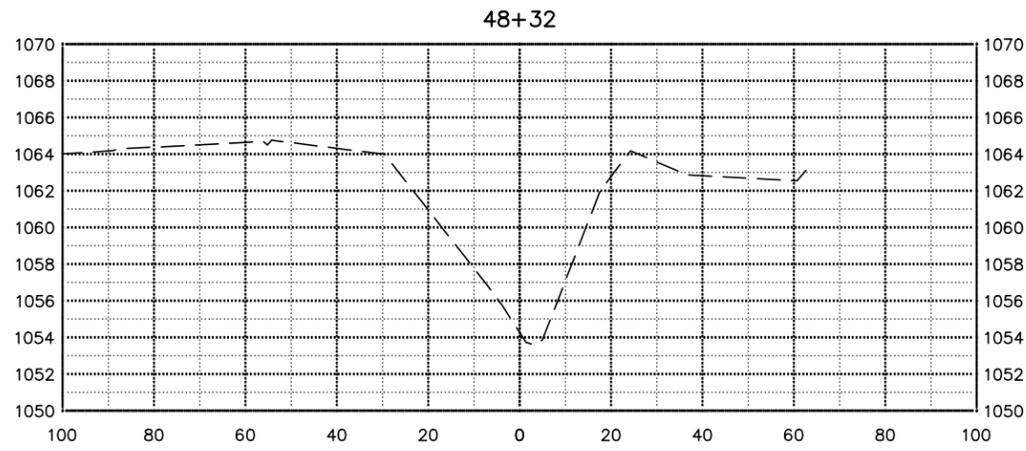
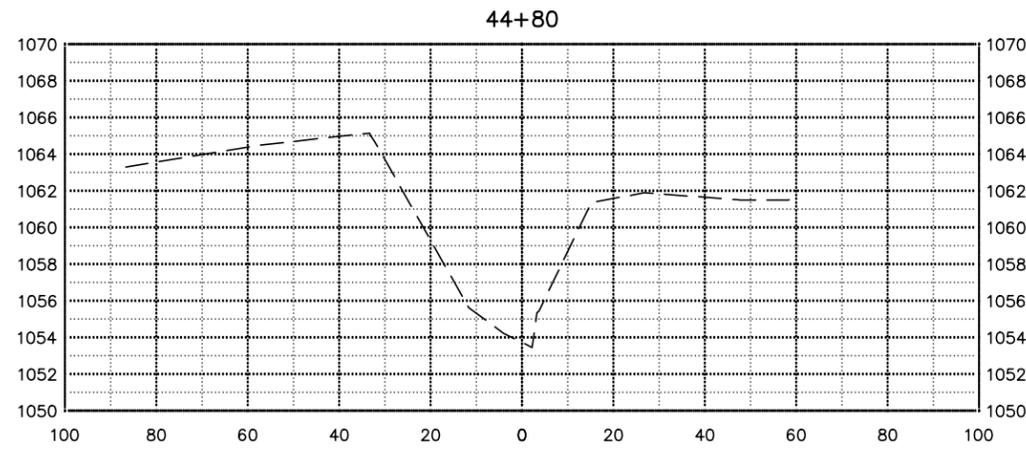
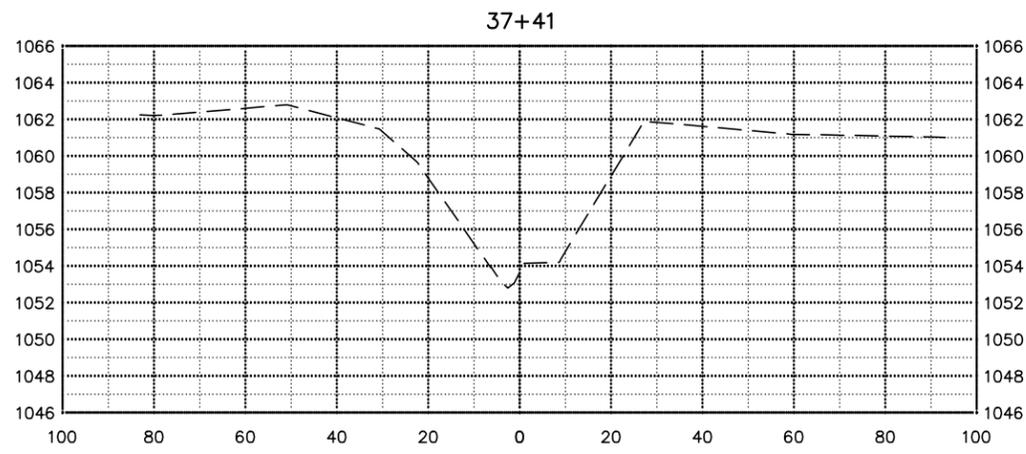
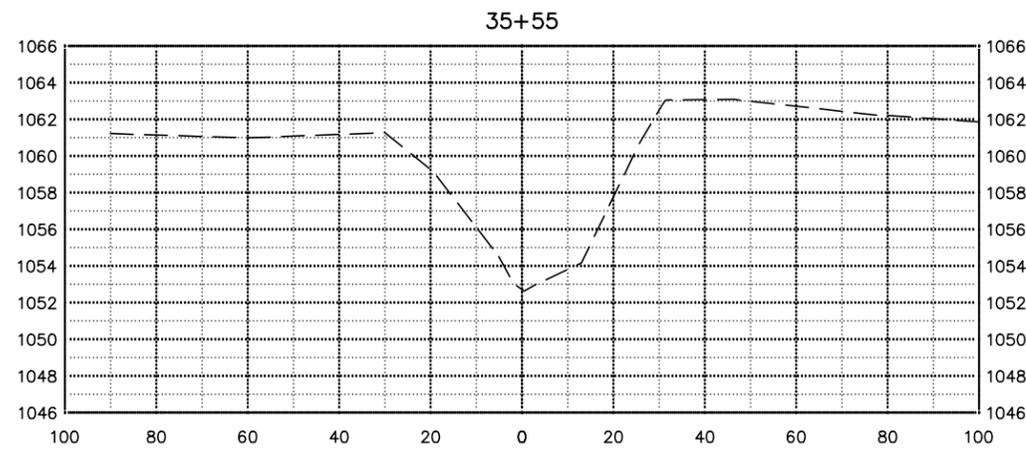
FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

D

C

B

A



PRELIMINARY

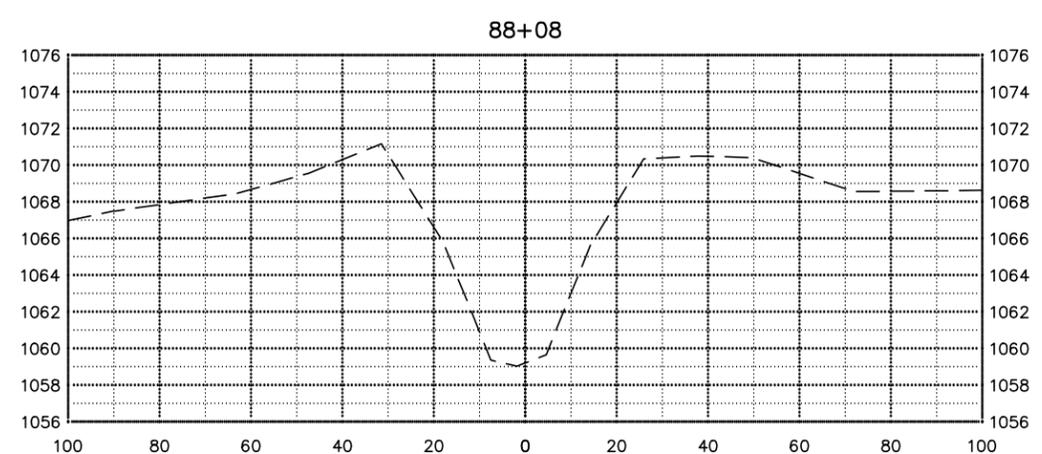
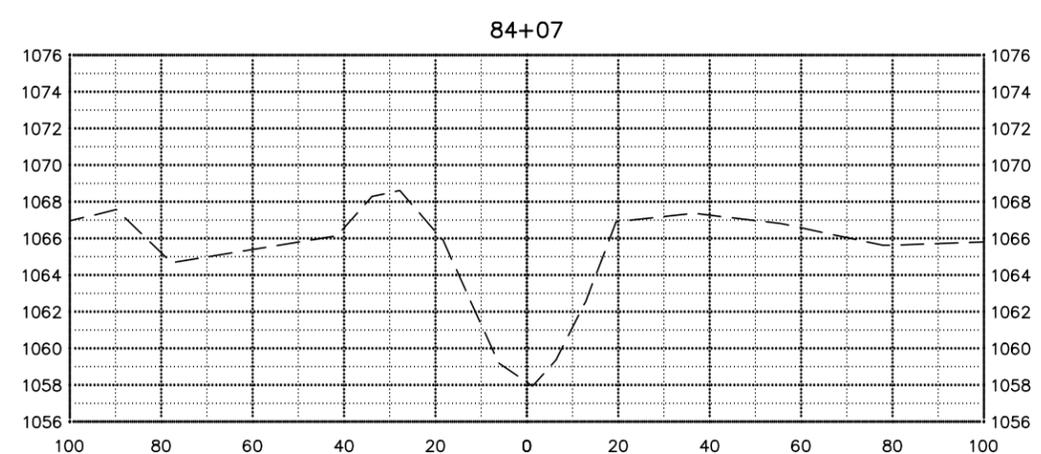
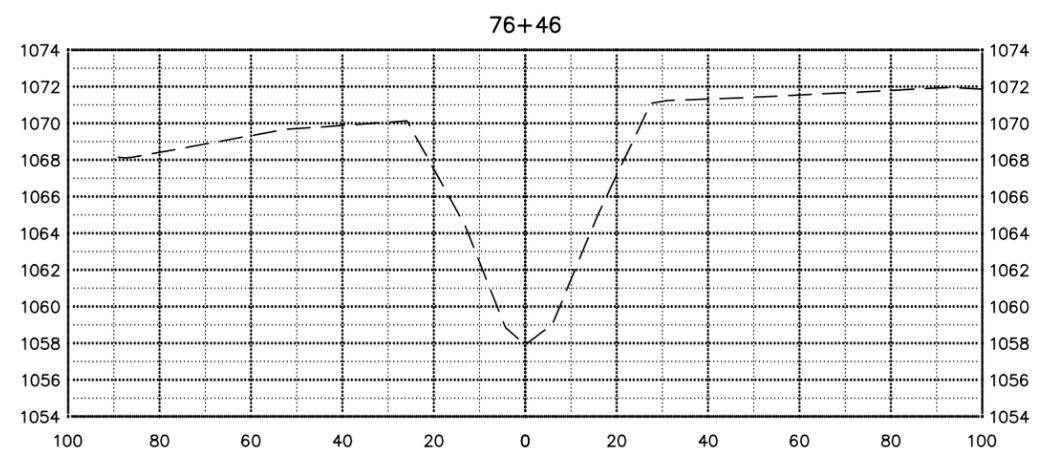
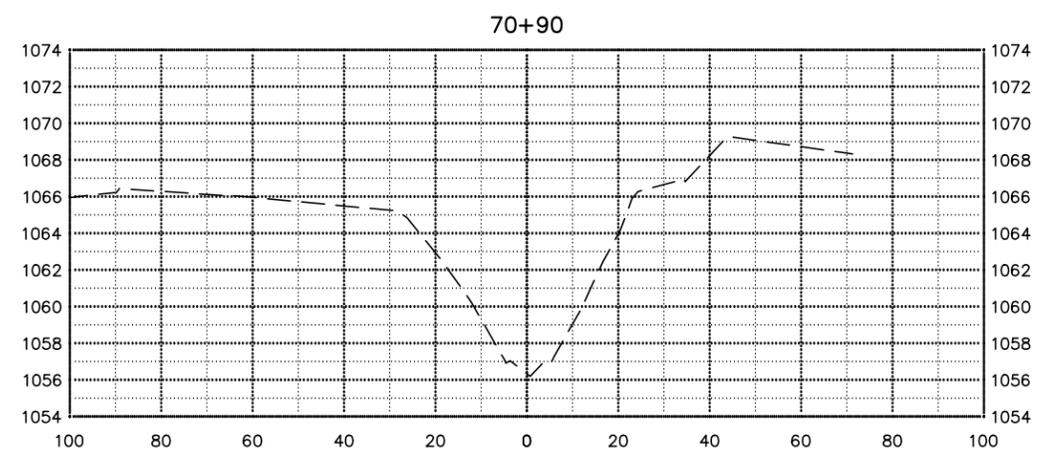
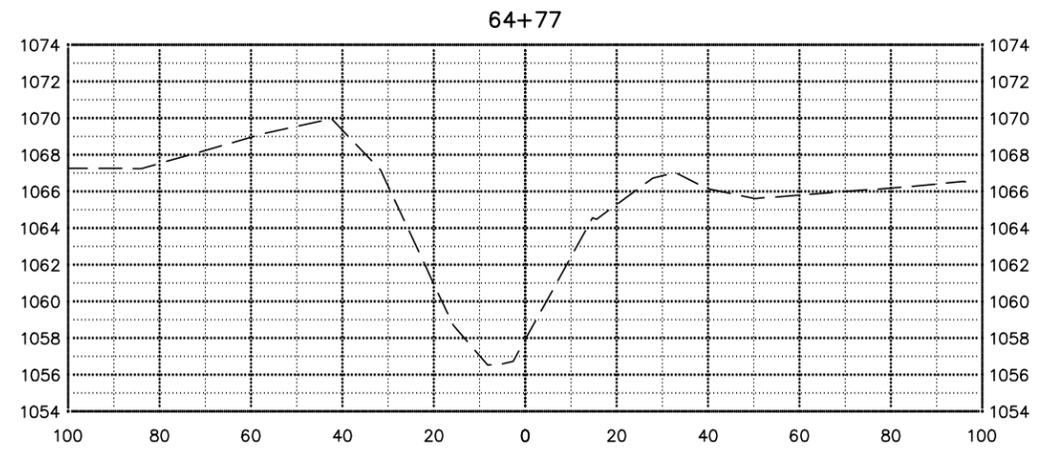
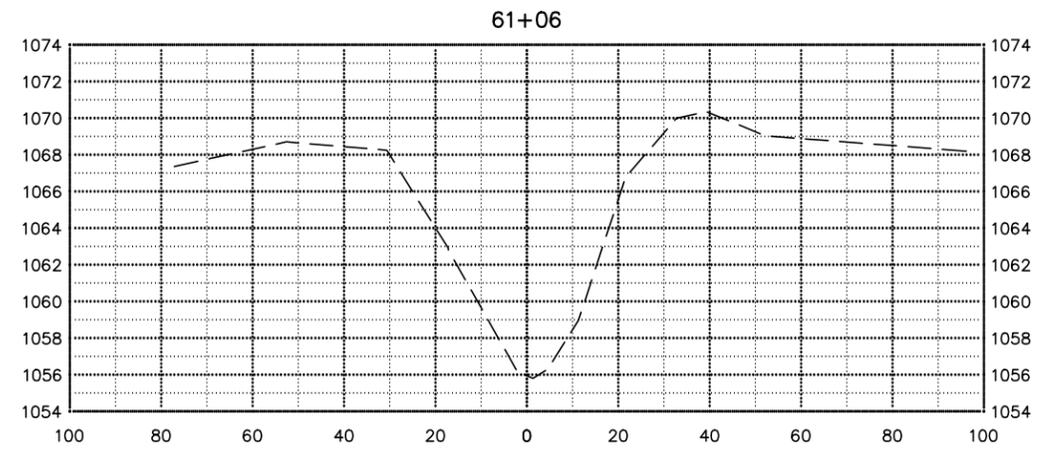


CROSS SECTIONS - MAIN CHANNEL  
 GRANT CO. DITCH #21 IMPROVEMENT  
 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

C-803

FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg



PRELIMINARY



CROSS SECTIONS - MAIN CHANNEL  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

C-804

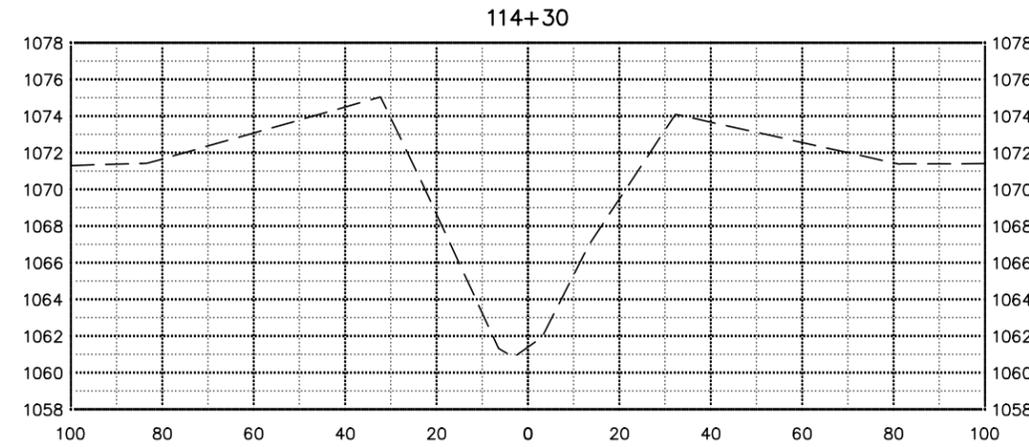
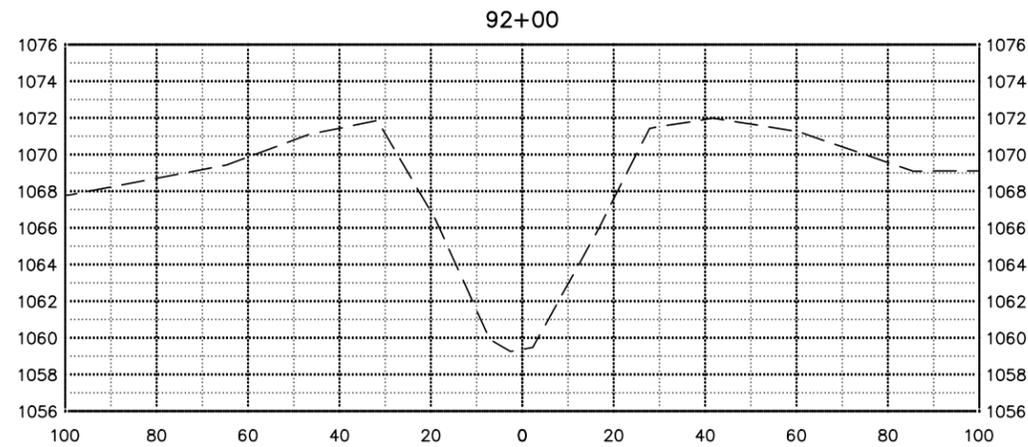
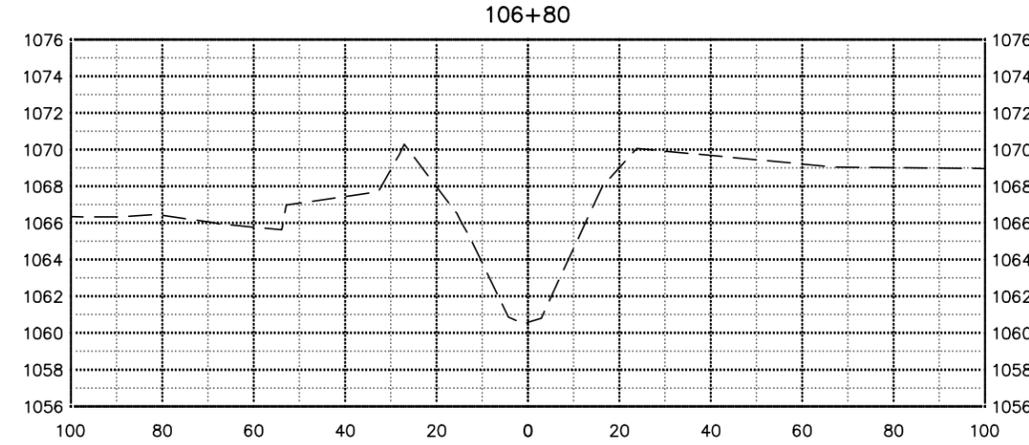
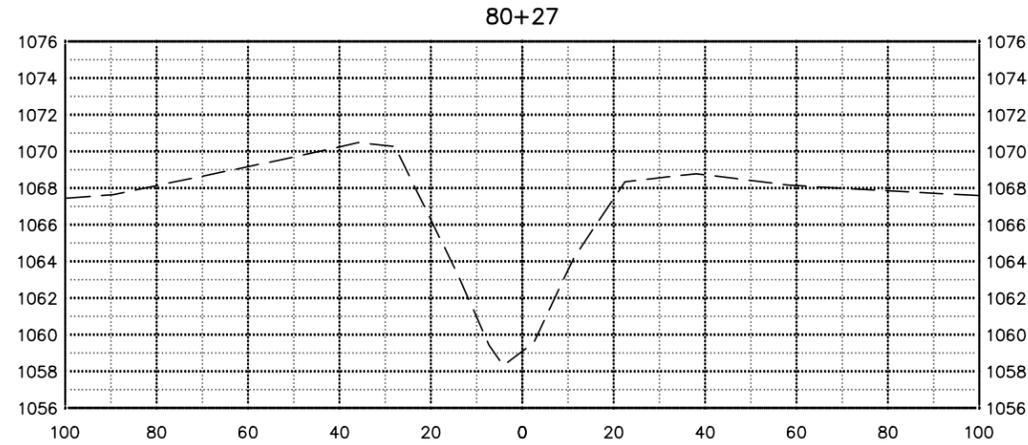
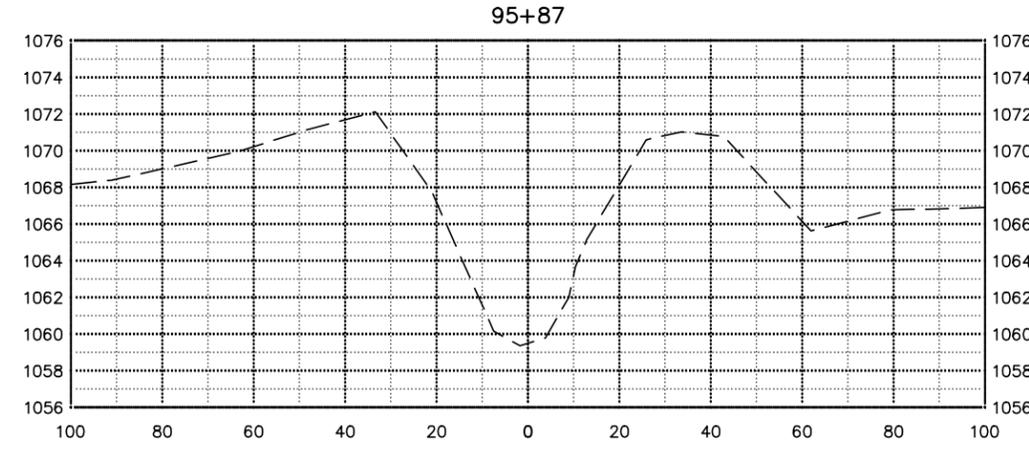
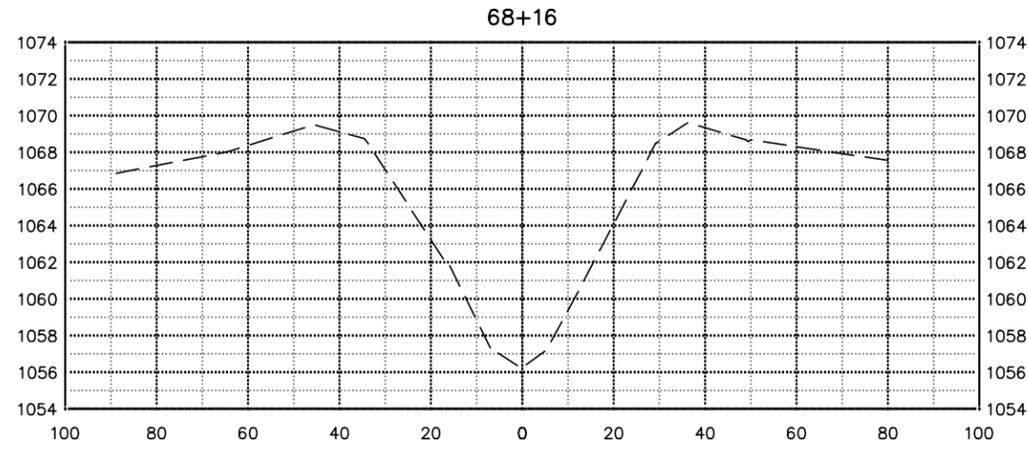
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CROSS SECTIONS - MAIN CHANNEL  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

C-805

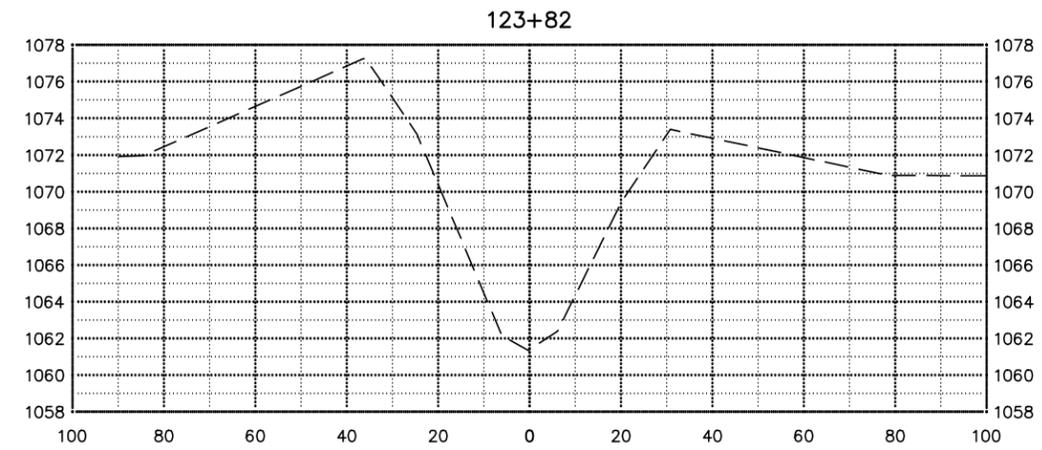
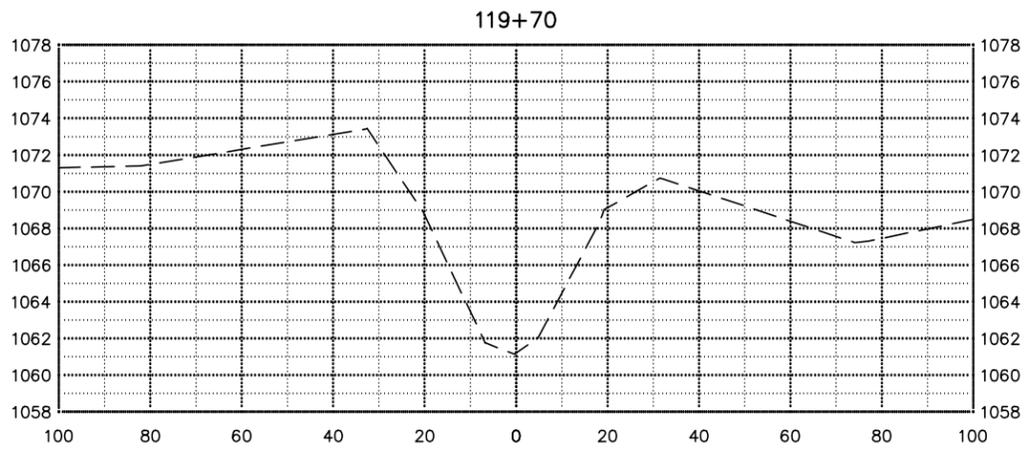
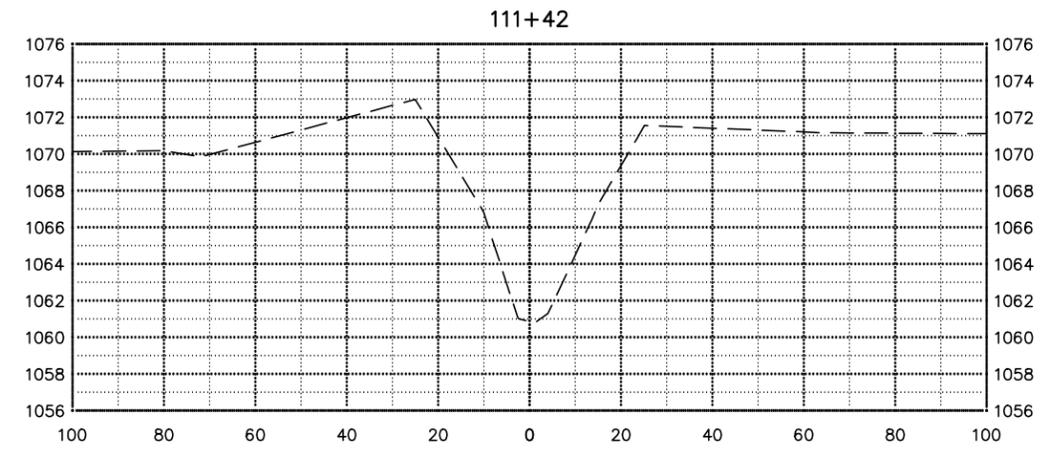
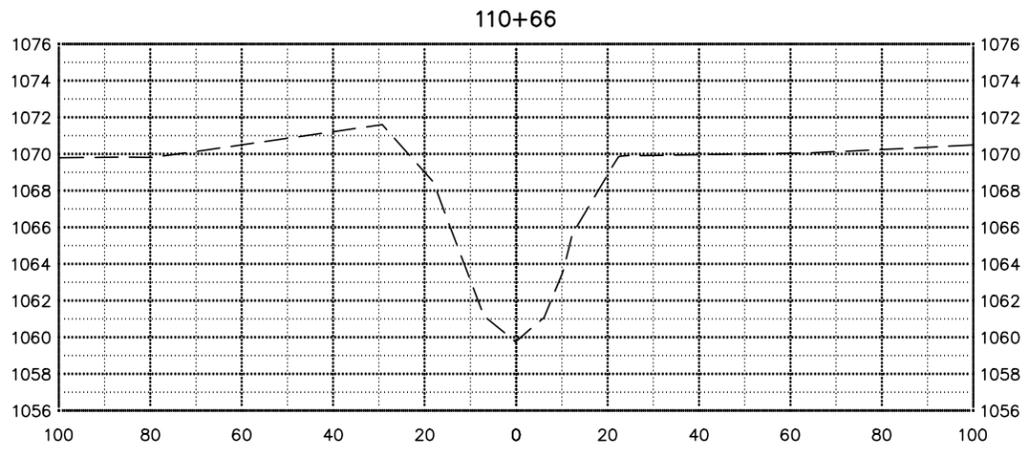
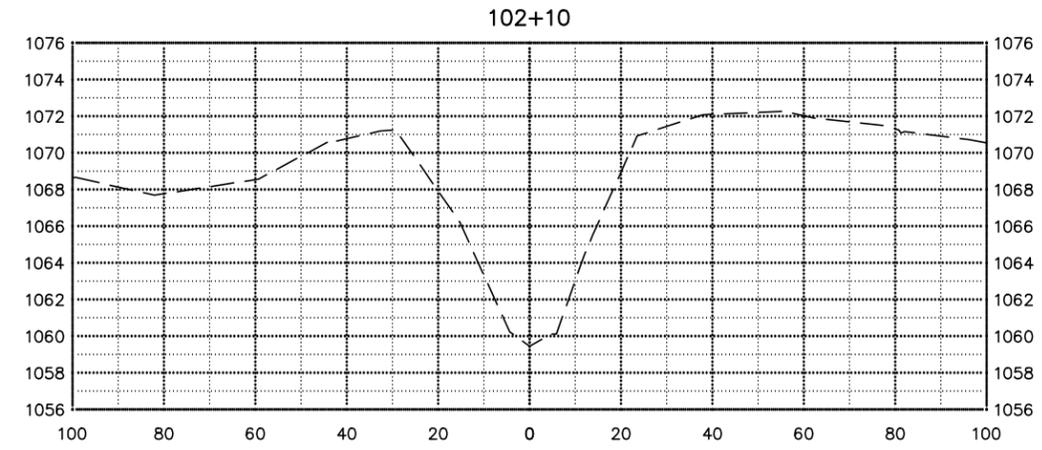
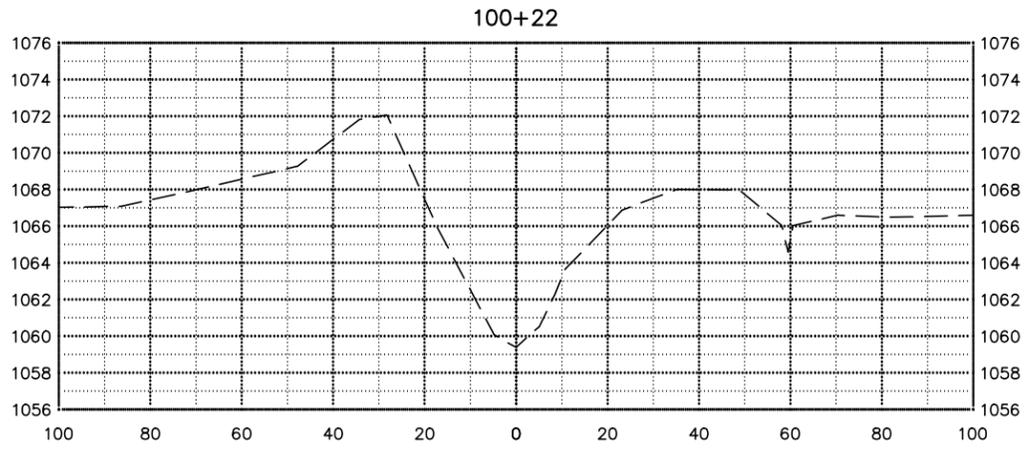
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engineering, inc.

CROSS SECTIONS - MAIN CHANNEL  
GRANT CO. DITCH #21 IMPROVEMENT  
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PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

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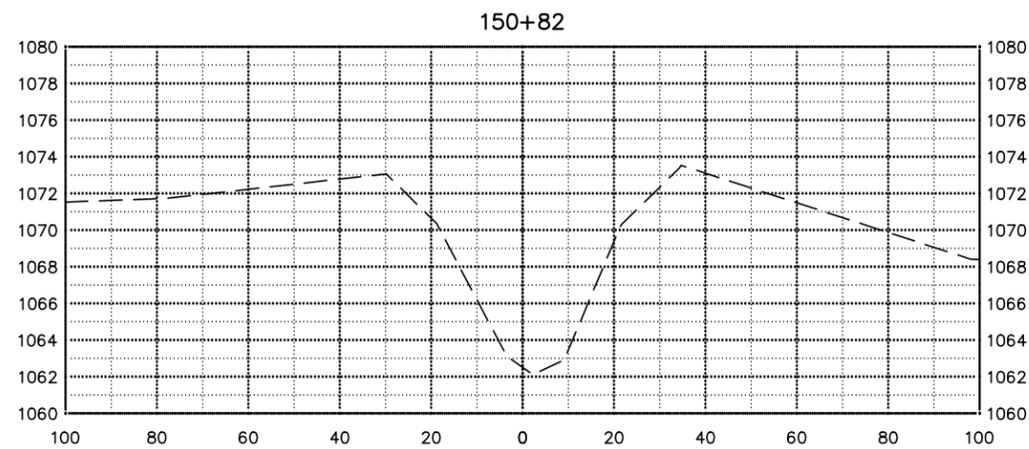
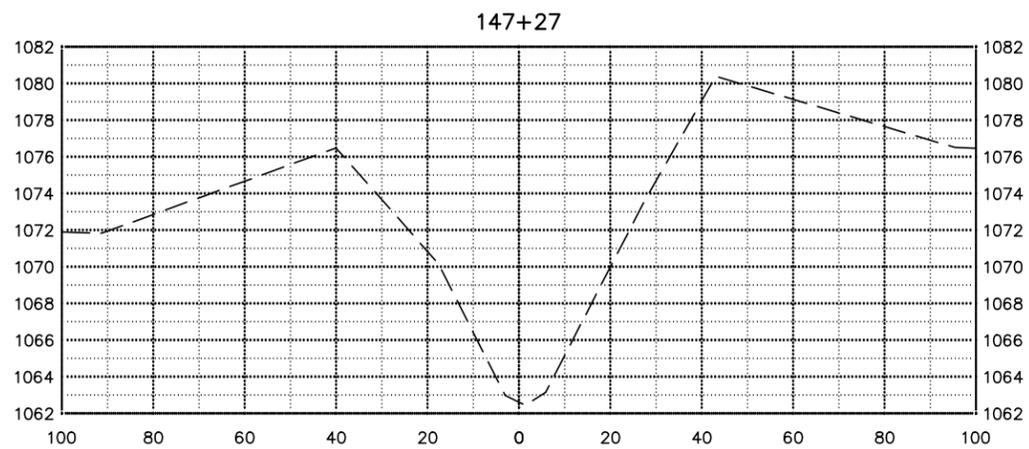
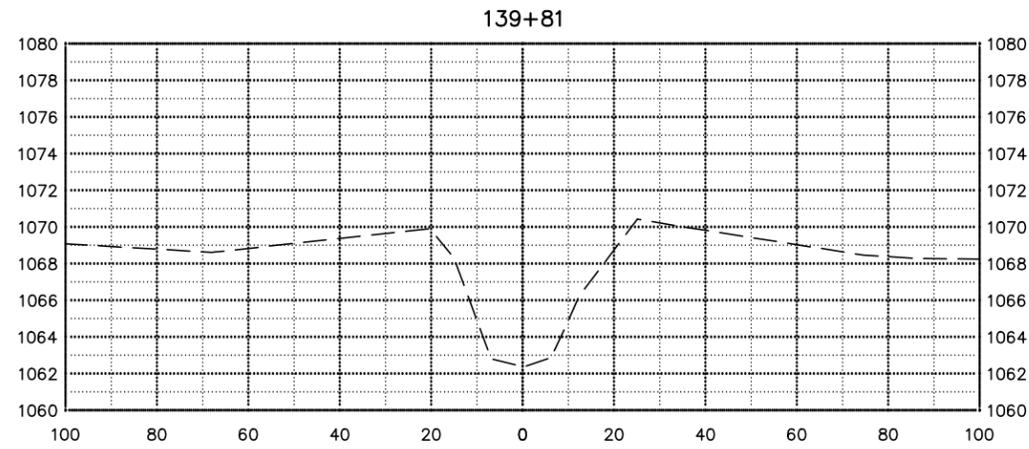
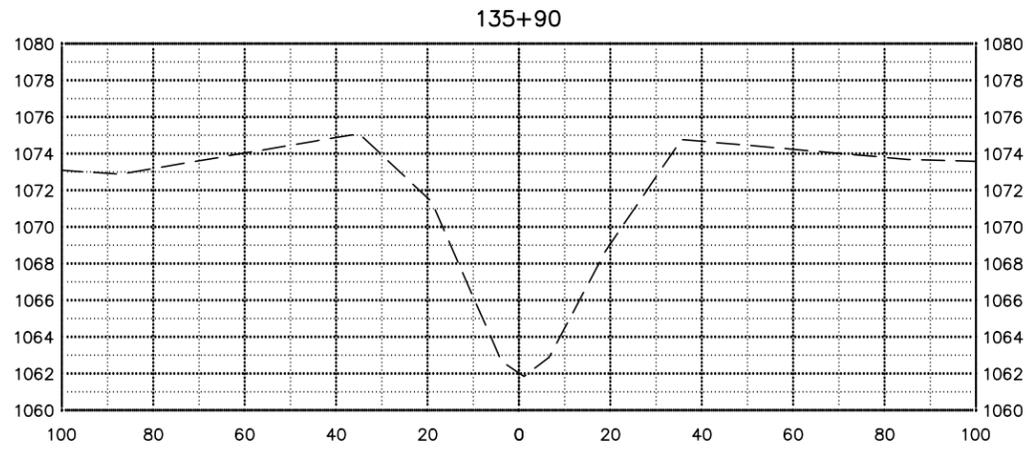
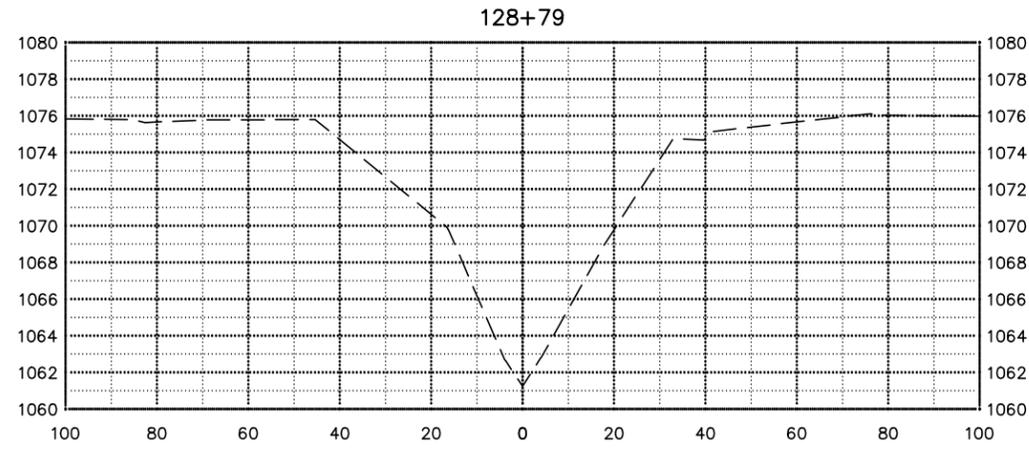
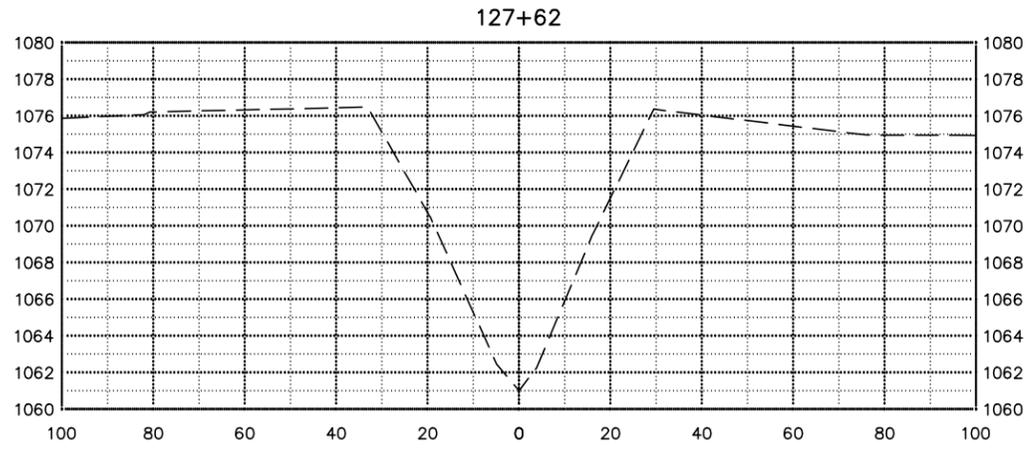
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CROSS SECTIONS - MAIN CHANNEL  
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 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

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PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

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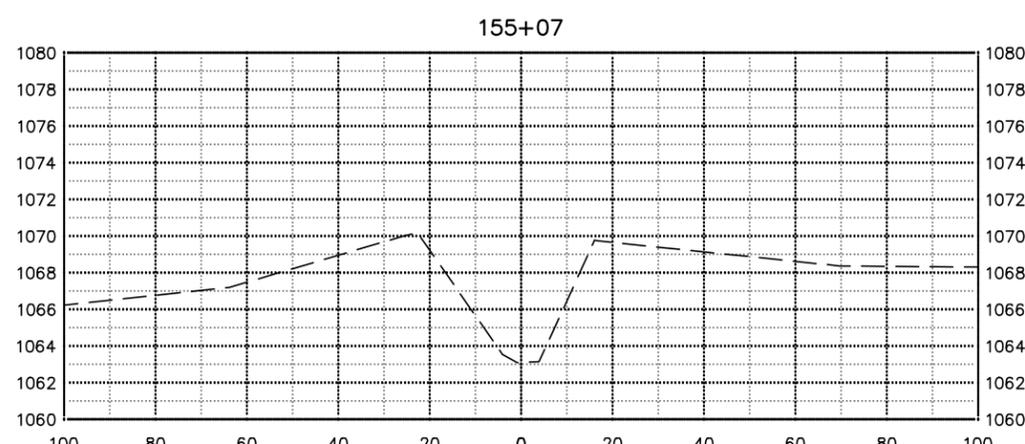
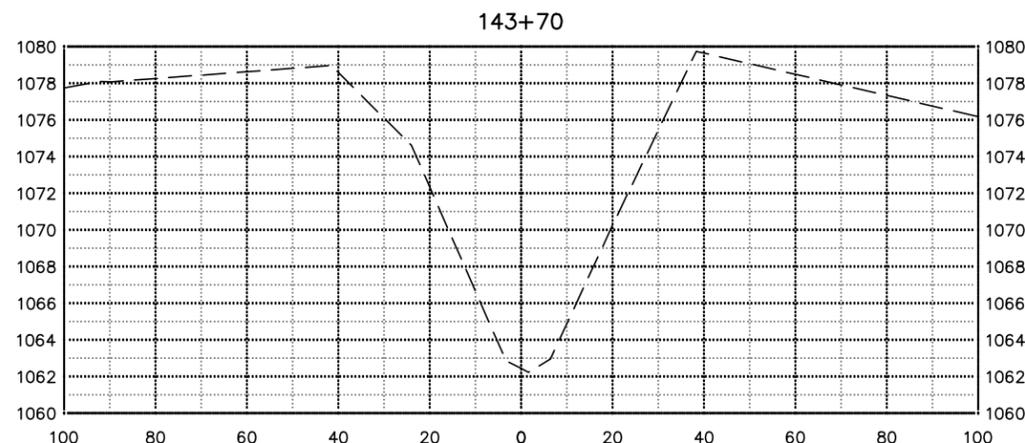
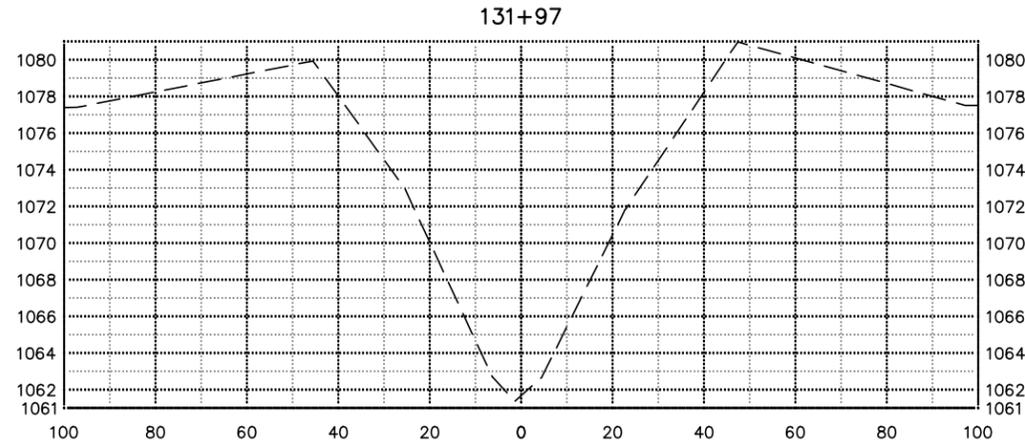
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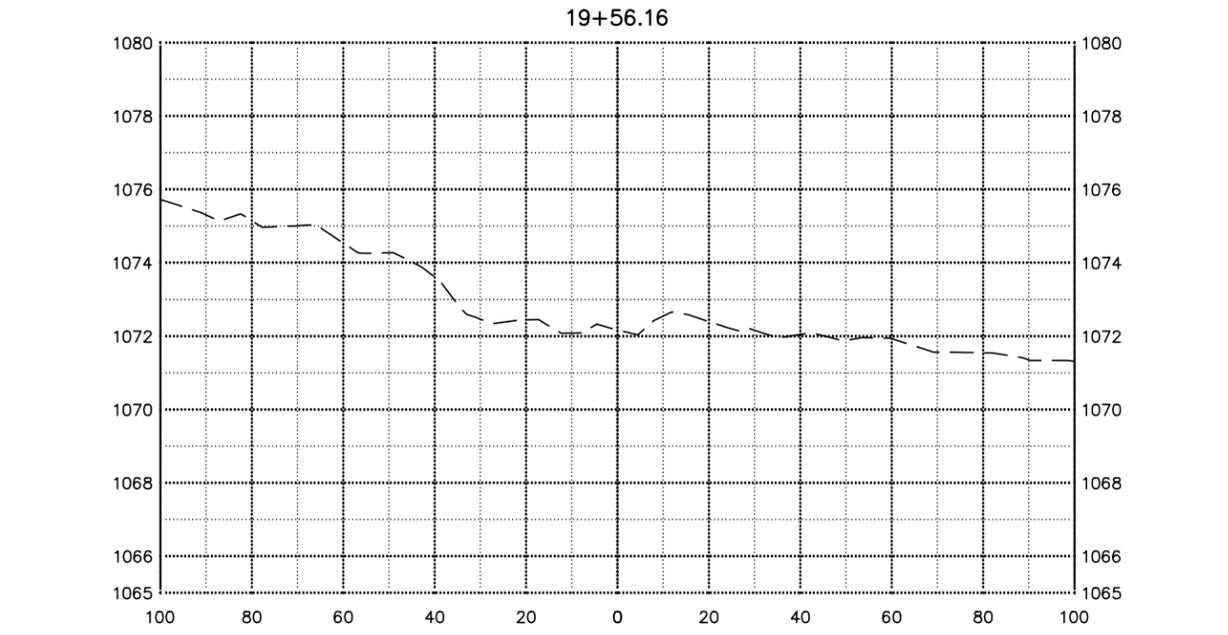
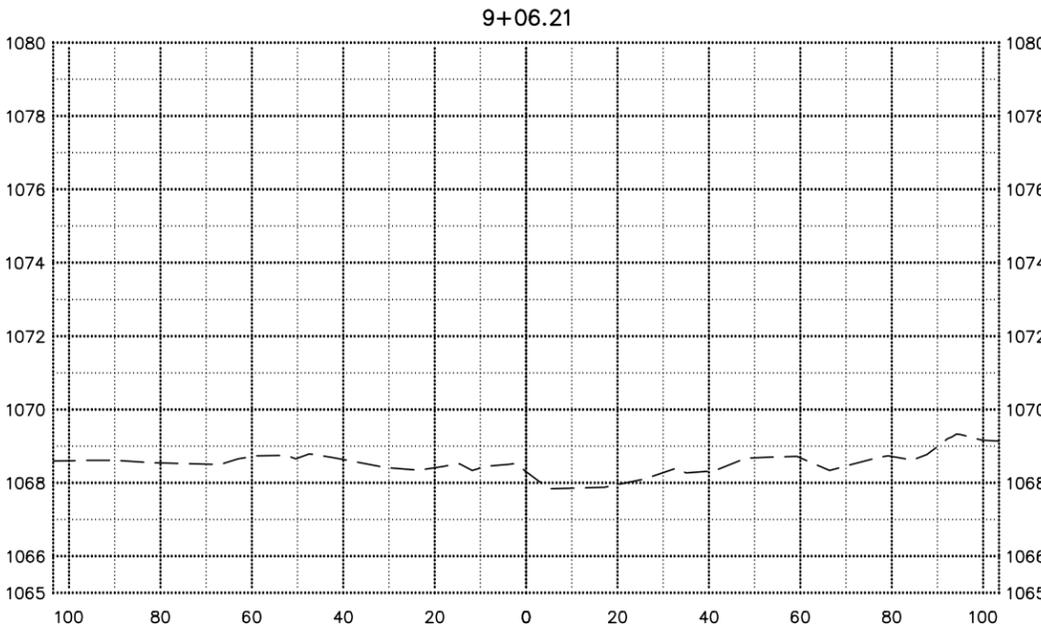
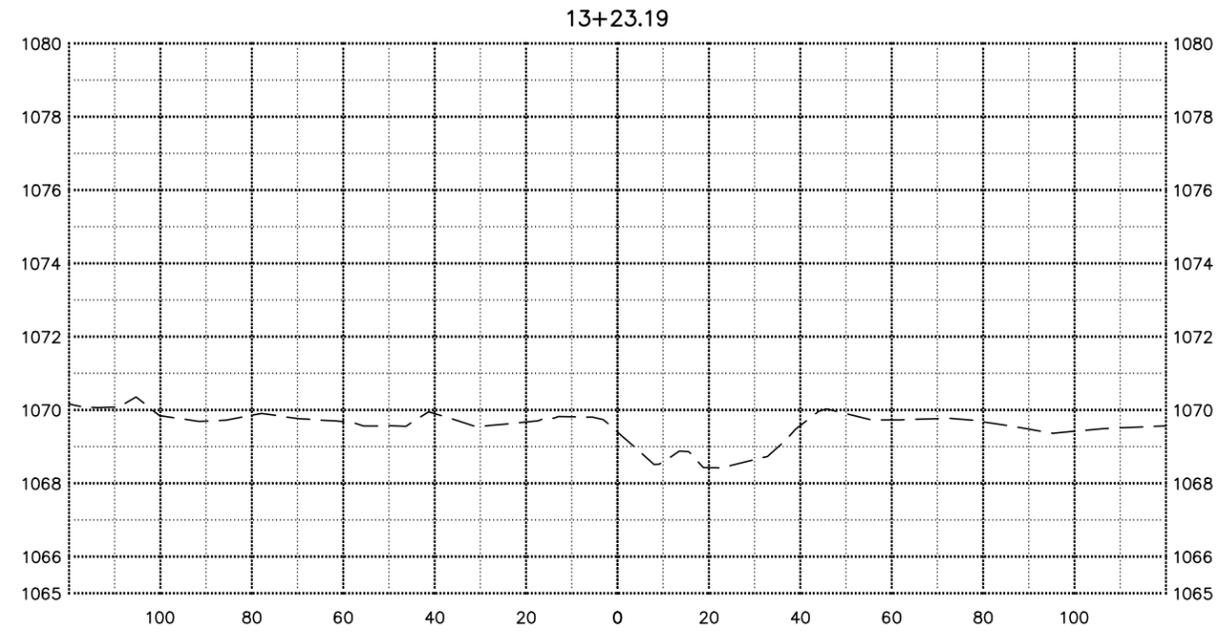
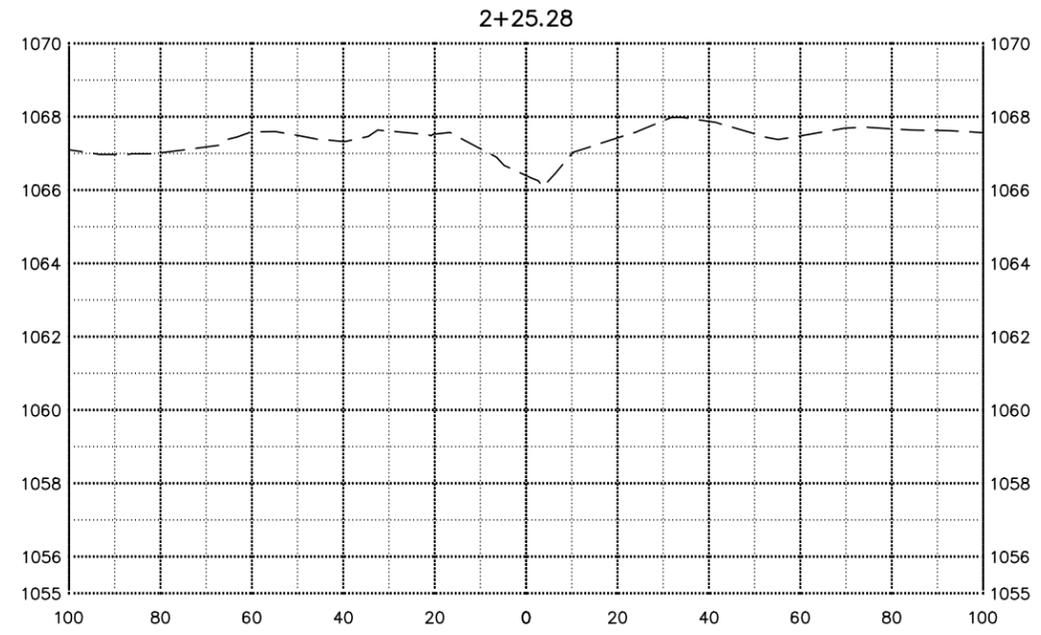


CROSS SECTIONS - BRANCH NO. 3  
GRANT CO. DITCH #21 IMPROVEMENT  
BOIS DE SIOUX WATERSHED DISTRICT  
GRANT COUNTY, MINNESOTA

DATE:	12.12.23
REVISED:	---
RECORD:	---
PROJECT No.	22549
MANAGER:	J.Guler
DESIGNER:	KLO
DRAFTER:	KLO
REVIEWER:	---

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FILE LOCATION: R:\Projects\22000\22500\22549\CIVIL\DESIGN\22549-FINAL\_20231121.dwg

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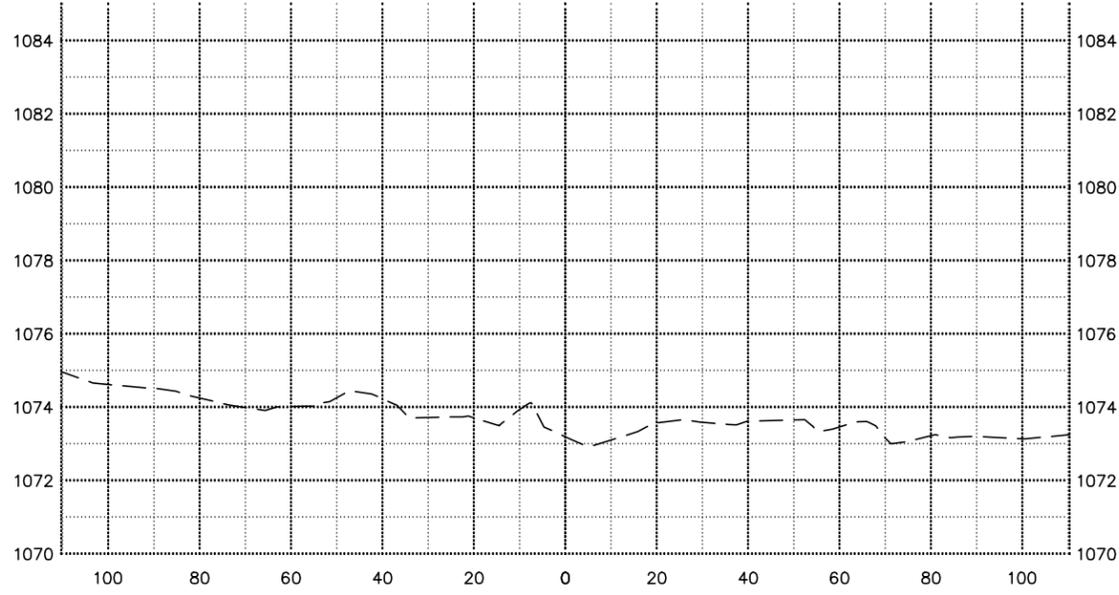


CROSS SECTIONS - BRANCH NO. 3  
 GRANT CO. DITCH #21 IMPROVEMENT  
 BOIS DE SIOUX WATERSHED DISTRICT  
 GRANT COUNTY, MINNESOTA

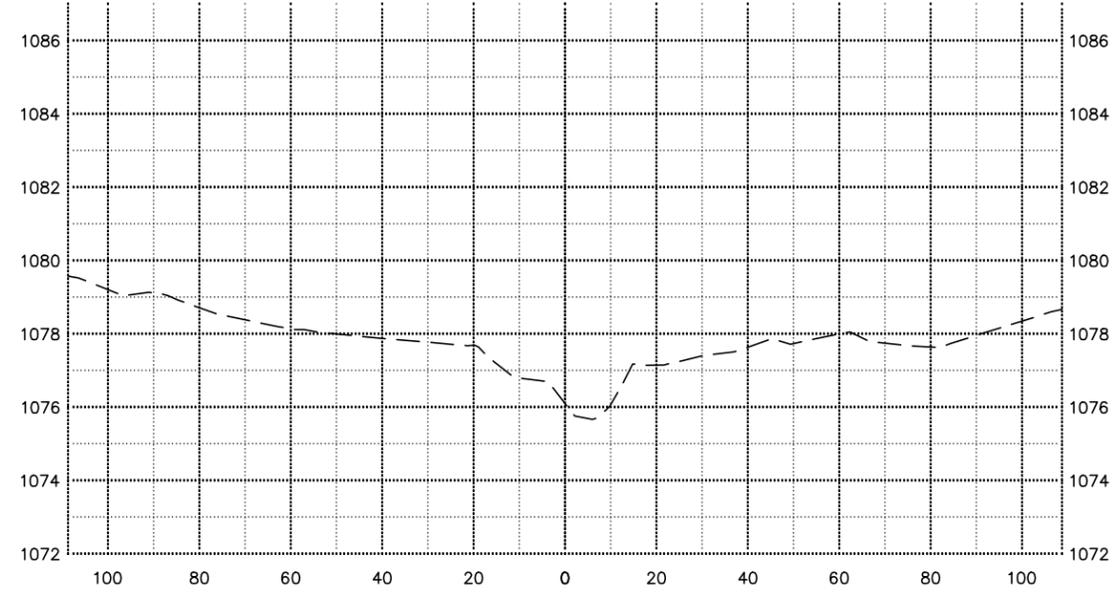
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PROJECT No.	22549
MANAGER:	J.Guler
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REVIEWER:	---

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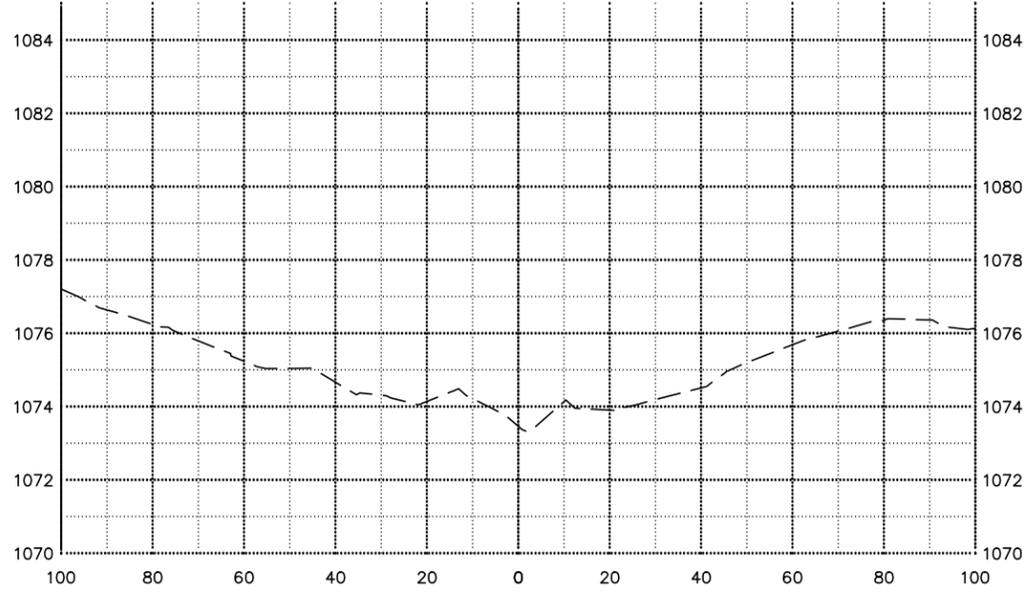
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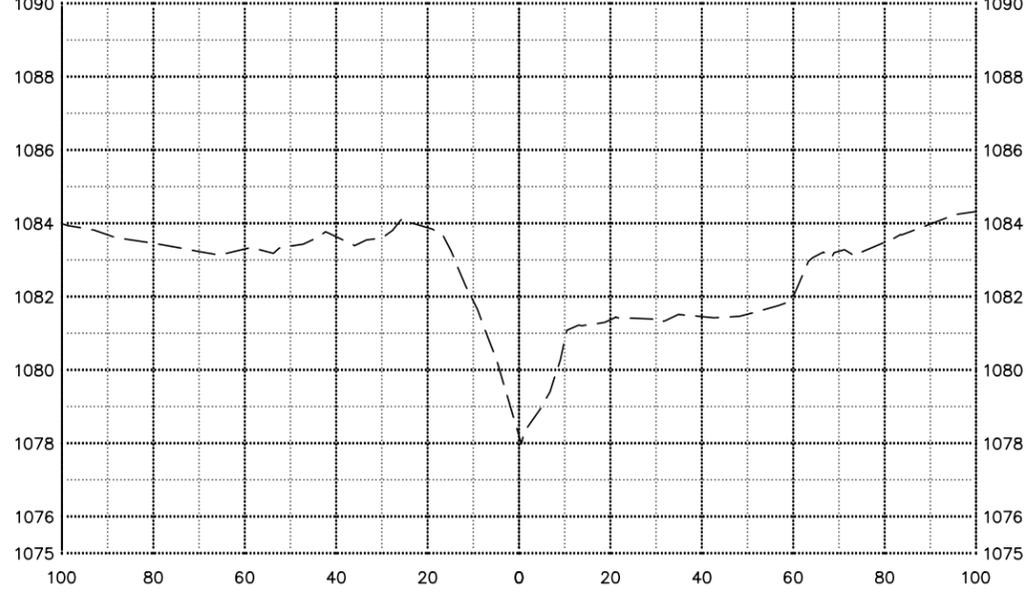
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26+17.88



32+49.24



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