Repair Report
County Ditch No. 64
Faribault County, Minnesota

Date: March 1, 2022

ISG Project No.: 17-21098

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SIGNATURE SHEET

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

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County Ditch No. 64

Faribault County, Minnesota

Engineer's Project Number: 17-21098

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EXECUTIVE SUMMARY

ISG was contacted by the Faribault County Drainage Authority to review the County Ditch No. 64 (CD 64) drainage system in regard to its erosion concerns and develop non-traditional repairs geared towards addressing the channel and bank erosion. County Ditch No. 64 drains a 2,663 acre-watershed, which consists primarily of rolling agricultural land with a relatively steep east to west gradient. The watershed drained by CD 64 is abnormal for southern Minnesota topography with some of the steepest terrain in the area.

Faribault County Ditch No. 64 was constructed in 1923 as a combination open ditch and buried tile system. The system now contains roughly 59,200 feet of buried tile and 10,800 linear feet of open ditch. Major repairs were completed in 1948, 1958, and 1963 when the open ditch was cleaned and grade stabilization methods were used in an effort to prevent the channel from further downcutting. Several other minor repairs took place during the 70s and 80s involving tree removal, spot repairs and other assorted ditch work.

Reports of initial conditions provided by the county were evaluated, and while most crossings and open ditch areas were found to have above-standard drainage, the steep nature of the watershed and specifically the open ditch are creating a highly erosive environment which is resulting in ditch failure and soil loss.

The proposed repair is non-traditional as minor cleaning is proposed with more focus on incorporating Best Management Practices (BMPs) to reduced channel downcutting and bank erosion. This will entail the modification of 2,100 linear feet of existing ditch into a two-stage ditch at the downstream end of the system. It will also introduce 8 in-line rock riffle structures, 15 grade stabilization structures along the ditch banks, and over 500 linear feet of flattening of side slopes at the outlet into County Ditch 72. This proposed project would also consist of other ditch maintenance items such as tile outlet repairs, tree removals, bank repairs, headwall repairs, and other ditch maintenance and cleaning related items.

There are two options for repairs on the CD 64 system ranging in cost from $365,365 to $423,789 depending on the level of repairs. Various grants have been obtained through Faribault County and the Soil and Water Conservation District which would alleviate portions of the BMP implementation cost from the landowners.

SYSTEM WATERSHED

Location

County Ditch No. 64's watershed is approximately 2,663 acres and is located in Sections 7-9 and 16 & 17 of Kiester Township, and Sections 1, 4-6, and 12 of Seely Township. The mainline open ditch generally runs west from its end in Section 8 in Keister Township to its outlet in Section 12 of Seely Township where it drains into Brush Creek/County Ditch 72 approximately 3 miles east of Bricelyn. This repair report is specifically looking at the open ditch, which, at its outlet drains the entirety of the watershed.

HISTORY

Original System, Repairs, and Improvements

According to materials supplied by Faribault County, Faribault County Ditch No. 64 was established in 1923 and included the main open ditch and several subsurface drainage tiles. The ditch was repaired in 1948, cleaning from the outlet to 3,500-feet upstream. The main open ditch was cleaned again in this location in 1958, totaling 2,100-feet downstream from the crossing at 550th Avenue. An additional repair was completed in 1963 which cleaned the remaining upstream portion of the open ditch that was not repaired in the past along with many tree and stump removals. Over the course of these cleanings and decades since, the grade of the ditch has been intentionally modified as well as naturally affected by downcutting. The efforts to reduce the grade of the ditch have ultimately been unsuccessful and downcutting near the outlet has led to a steep flow gradient which persists within the open ditch. Various repairs took place in 1948, 1974, 1982, and 1984. In 2021, ISG replaced an existing 84-inch corrugated metal arch culvert at STA: 64+00 with dual 48 and 98-inch corrugated metal culverts.

SYSTEM INVENTORY

This document has been prepared using the original CD 64 drawings and alignment maps provided by Faribault County, LiDAR contours, topographic drone survey, a topographic survey completed by ISG and the Minnesota Department of Natural Resources (DNR), MnDNR Watershed lines, and drone and aerial photographs. Several maps illustrating the CD 64 watershed can be found within Appendix A.

Existing System

As discussed previously in the History section of this report, the system as it currently stands exhibits ditch side slope erosion throughout the majority of the system and downcutting which is resulting in increasingly steep grades and therefore increased velocities during major flooding events. The watershed is also known to be very flashy with high peak flow rates draining through the system in a short duration of time. These issues combined with one another contribute to increased sediment and nutrient transport for downstream users, as well as failing ditch integrity which could result in major ditch failures. Some images of the current condition of the ditch can be seen in the figures added below. Figures 1 through 4 depict some of the issues seen through the length of the ditch, while this is not a cumulative inventory, it provides insight into the failures the majority of the ditch is facing. Several drone aerial videos have been submitted to the Faribault County Drainage Staff and are available for viewing.

Figure 1. Streambank Failure at Bend in Open Ditch (Section 7, Kiester Township)

Figure 2. Streambank Erosion (East Half of Section 7, Kiester Township)

Figure 3. Sediment Delta Formation and Streambank Failure (East Half of Section 7, Kiester Township)

Figure 4. Streambank Gully from Overland Flow (West of CR 21)

Capacity Analysis

The capacity of agricultural drainage infrastructure (ditch or tile) is expressed as a drainage coefficient in inches per day (in/day); the depth of water over the entire area of the upstream watershed that a ditch, tile, or culvert can drain in 24-hours. While for a ditch system like CD 64, a drainage coefficient of 1.0 in/day is recommended, the topography of the watershed supplies a much greater capacity with the steep slopes of the channel. Other design factors are considered for capacity of CD 64 which includes bank and channel stabilities, roadway overtopping.

Table 1 summarizes the maximum capacity (drainage coefficient) of the culverts throughout the watershed as if they were in new condition with no sediment accumulation or blockages. As shown, the capacity of these structures are more than sufficient for drainage standards, therefore additional capacity review analyses were performed which utilized HEC-RAS, a hydraulic modeling software to analyze flow conditions of the culverts and open channel. This analysis was used for the design of the BMP repairs.

Additionally, a HEC-RAS model was completed for the Crossings at Station 34+50 and 64+00 (550th Avenue and a field crossing respectively), neither of which overtop for their respective 100-year flooding event. The field crossing at Station 64+00 was replaced in 2021 due to the immediate need and potential failure.

Table 1: Existing Crossing Capacities

Crossing #	Station	Location	Existing Type	Existing Material	Existing Width (ft)	Existing Height (ft)	Existing Rise x Span (in)	Existing Slope (%)	Drainage Area (Acres)	Existing Drainage Coefficient (in/day)
1	8+00	Bridge	BRIDGE	Grass	-	-	Bridge	0.50%	2400	8.97
2	34+50	550th Ave	ARCH CULVERT	CMP	-	-	87 x 137	0.40%	2002	5.20
3	64+00	Field Crossing	ROUND CULVERT	CMP	-	-	48 and 96	0.50%	1972	4.70
4	96+00	CR 21/560th Ave	BOX CULVERT	RCP	8	8	-	0.26%	1755	9.75

The existing ditch crossings within the CD 64 watershed are well above the standard 1.0 in/day drainage coefficient. This assumes the crossings are clean and free of debris, which may not be the case for some of the older crossings listed. While the capacity of the actual open ditch is not specifically listed, it falls at, or in most cases greater than, the crossing capacities listed above.

The cast in place box culvert under County Road 21 is well above the adjacent upstream and downstream channel grades. This is referred to as a perched culvert that can occur by a misplacement of the structure or from channel downcutting overtime. Since this structure appears to be in place for a significant time period, it is unlikely it was incorrectly placed and the perched culvert is a result of channel downcutting. The elevation difference from the upstream side to the downstream side of the culvert is nearly 3 feet. Since there are no major drainage issues upstream of the crossing, it is recommended to leave the structure at the same elevation moving forward to prevent further channel downcutting. An image showing the drop-off after the culvert outlet can be seen below in Figure 1.

Figure 1: Perched Culvert under County Road 25 (560th Avenue)

Not discussed or tabulated within this report was the watershed's tile system. While this generally falls below the desired 0.50 in/day drainage coefficient, it is supplemented by a robust system of grassed waterways centralized within the eastern half of the watershed. Drainage concerns were not brought forward concerning the tile systems at the time this report was prepared and do not fall within the scope of this specific report. The tile system is 100-years old and tile repairs are likely in the future.

PROPOSED REPAIRS

Bank Stability Analysis

The limiting velocity method was used to determine suitable velocities with corresponding cross sections throughout the ditch. The Limiting Velocity Method determines a maximum recommended velocity based on the type of soil present. For CD 64, soil textures along the open ditch vary between clay loam, sandy clay loam, and loam from the Natural Resources Conservation Services (NRCS) Web Soil Survey (WSS). Using Table 2 the permissible velocity for the soil texture along CD 64 varies between 3.5 and 4 feet per second when fair vegetation is present. This was the design factor for the given conditions on the CD 64 open ditch. Preliminary construction plans are included in Appendix B.

Table 2: Permissible Velocities

			Permissible velocity		
Soil Texture	Bare channel rn/s (ft/s)	Retardance*	Channel Poor (fils)	Vegetation Fair	Condition Good
Sandy, silt,		B			
			0.61 (2.0)	0.91 (3.0)	1.22 4.0)
sandy loam,	0.45 (1.5)	C	0.45 (1.5)	0.76 (2.5)	1.07 (3.5)
and silty loam		D	0.45 (1.5)	0.61 (2.0)	0.91 (3.0)
Silty clay loam and	0.61 (2.0)	B	0.91 (3.0)	1.22 (4.0)	1.52 (5.0)
sandy clay loam		C	0.76 (2.5)	1.07 (3.5)	1.37 5.0)
D		D	0.61 (2.0)	0.91 (3.0)	1.22 (4.0)
		B	1.07 (3.5)	1.52 (5.0)	1.83 (6.0)
Clay	0.76 (2.5)	C	0.91 (3.0)	1.37 (4.5)	1.68 (5.5)
D			0.76 (2.5)	1.22 (4.0)	1.52 (5.0)
Coarse Gravel	1.52 (5.0)	B, C, orD	1.52 (5.0)	1.83 (6.0)	2.13 (7.0)
Cobbles and shale	1.83 (6.0)	B, C, orD	1.83 (6.0)	2.13 (7.0)	2.44(8.0)

*The choice of retardance B, C, or D will depend on the vegetation and maintenance planned for the diversion channel. Refer to the Handbook for Channel Design, SCS-TP-61, or similar information in the field office technical gUide, to select the vegetal retardance.

Figure 7. Permissible velocities for diversions

Reference: USDA, NRCS Part 354 Stream Restoration Design, National Engineering Handbook, Chapter 8, Threshold Channel Design

Outlet Side Slope Flattening

The outlet portion of the open ditch downstream of the private bridge crossing is experiencing significant bank sloughing that is causing erosion and downstream sedimentation. The existing bank slopes range between 1:1 and 1.5:1 which is very steep for open ditches. After reviewing the flow elevations and velocities with the permissible velocity method, the current channel geometry is at risk for further bank failures. In order to have a stable geometry in this stretch, the south bank side slope should have a minimum 3:1 backslope from Station 1+25 to 6+00 to achieve a 3.5 feet/second velocity. If the side slopes were flattened out to 4:1, the velocities of the channel would be 3.38 feet per second, slightly lower than a 3:1 side slope. Shown below shows a drone aerial of the outlet portion ditch while Figure 3 shows a cross section of this stretch.

Figure 2: Bank Sloughing at Open Ditch Outlet (Section 12, Seely Township)

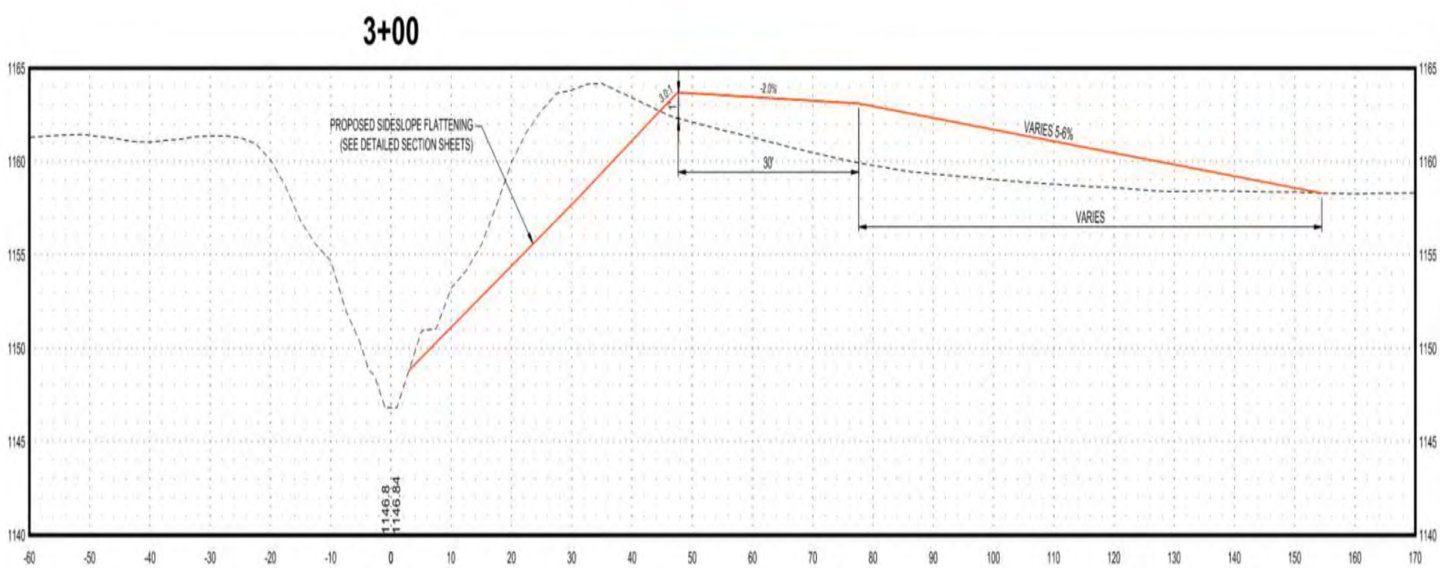


Figure 3: Sample Cross Seection of Outlet Open Ditch

This repair will include peeling back the existing sloughed material, flattening of the ditch bank, leveling of spoils adjacent to the ditch, and reseeding the bank and buffer area. Erosion control blanket is recommended for the seeding as it provides more stability for the flashy ditch system and also provides cover for the seed bed so the seeds stay in place. For this stretch, there are an estimated 0.4 acres of permanent damages for widening of the ditch easement and 1.5 acres of temporary damages for topsoil stripping and spoil placement. Since this repair area avoids the area next to the outlet and next to the bridge, the permanent easement is recommended to extend in a straight line across the entire stretch as this will make farming practices more practical.

Midway Open Ditch Along 60th Street

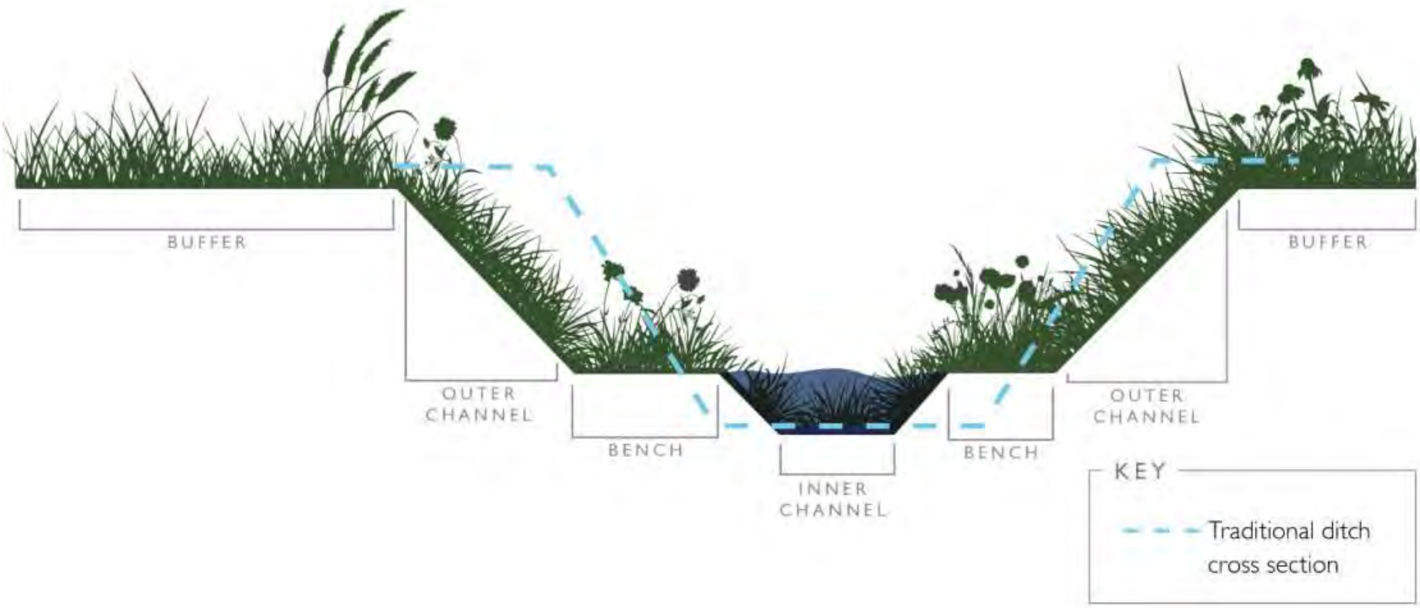
The midway open ditch along 60th Street from the private driveway to a point roughly 550 feet upstream (Figure 4) contains a deeper ditch with steep banks. Currently there are minor slough areas, however the channel itself appears to be stable, likely due to the crossing structure underneath the bridge holding the channel grade. The existing side slopes range between 1:1 and 2:1 which is steep for the channel in this area. A review of the channel velocities in this area suggests that the slope should be closer to 3.5:1 which could be achieved by flattening to 3:1 side slopes, however the immediate need for side slope flattening is not there. This area should be monitored in the future for potential side slope flattening. A cost estimate has been generated for reference to this repair.

Figure 4: Drone Aerial Along 60th Street (Section 12, Seely Township)

Two-Stage Ditch Repair

A stretch of ditch spanning from 550th Avenue downstream for 2,100 feet (Station 13+40 to 34+40) currently is starting to form a small two-stage ditch geometry. In this geometry, there is a defined inner channel with small floodplain banks inside the overall open ditch. The overall channel depth is shallow ranging in depth from 6 to 10 feet and the inner channel itself is relatively stable. In order to amplify this geometry and provide more stability to the inner channel and outer ditch banks, a two-stage expanded channel is proposed.

A two-stage ditch is designed to mimic natural fluvial processes that occur in rivers. The “two-stage” channel integrates a small inner channel within a larger outer channel that acts as the floodplain. Two-stage ditches have shown to benefit drainage systems by their ability to stabilize banks with the floodplain benches. Higher velocities are carried in the inner channel while under larger flooding events, the benches act as a floodplain and reduce the outer channel velocities. Additional riparian vegetation established in the outer channel benches which aids in sediment and nutrient reduction. Figure 5 below shows a typical two-stage ditch cross section.



In the CD 64 proposed two-stage ditch segment, only the south side is able to have an expanded bench as the north side would impede into 60th Street. This two-stage ditch will increase the width of the ditch by 30 feet for that length along the southern bank of the ditch. The implementation of the two-stage ditch will allow additional in-stream storage and velocity reduction in major storm and flooding events. Figure 6 shows a drone aerial of the existing 2,100-foot stretch of ditch while Figure 7 shows the proposed channel cross section. The two-stage ditch channel would require an additional 1.5 acres of permanent easement.

Figure 6: Drone Aerial of Two-Stage Ditch Area (Section 12, Seely Township)

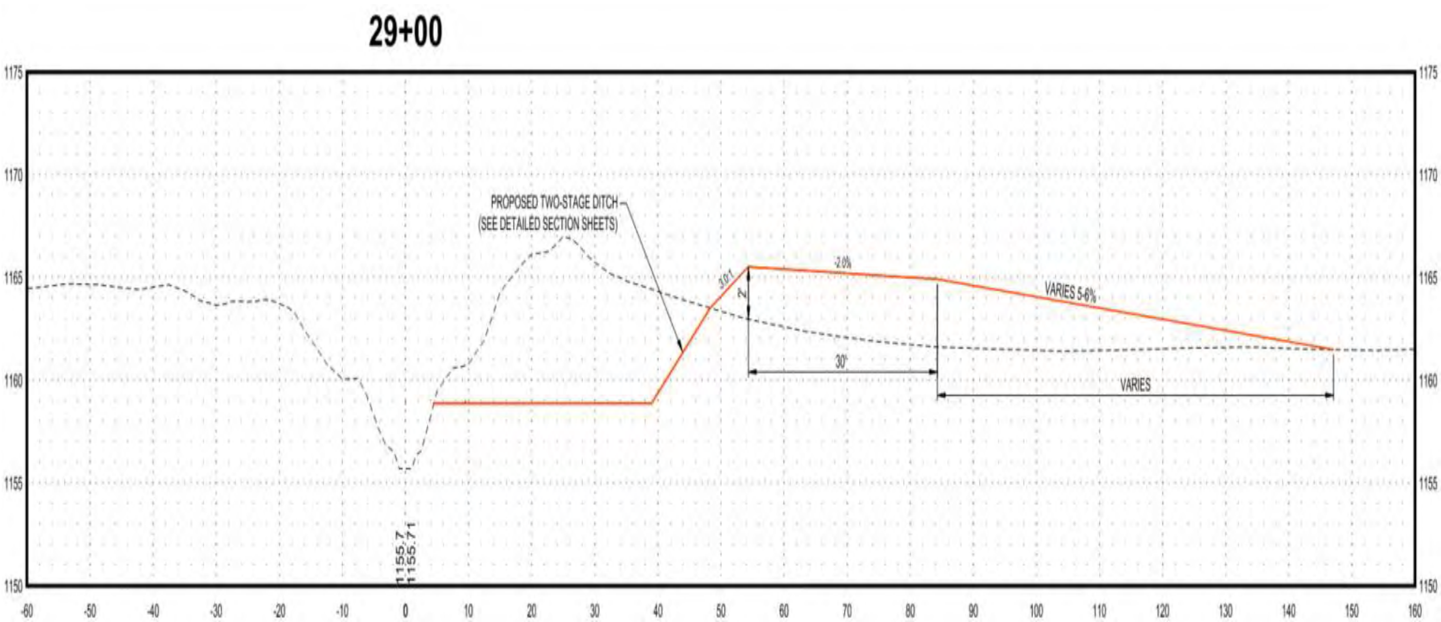


Figure 7: Proposed Two-STage Ditch Cross Section

Construction of the two-stage ditch will include stripping of topsoil areas adjacent to the open ditch, excavating the two-stage ditch bench, and placing the spoils in the stripped areas. After leveling, the topsoil will be reclaimed over the spoil areas for farming practices. The ditch banks and bench will be seeding with erosion control blanket for stability and seed bed protection. Some rip rap may be needed in areas where unstable soils may be present and also to protect tile outlets and side inlets. Overall, a total of 18,100 cubic yards (CY) of material will be excavated from the two-stage ditch bank and will require an estimated 4.6 acres in order to level. Some of the material is proposed to be utilized in other ditch repair areas, however conservatively these areas show what may be needed for overall spoil leveling as shown in Figure 8.

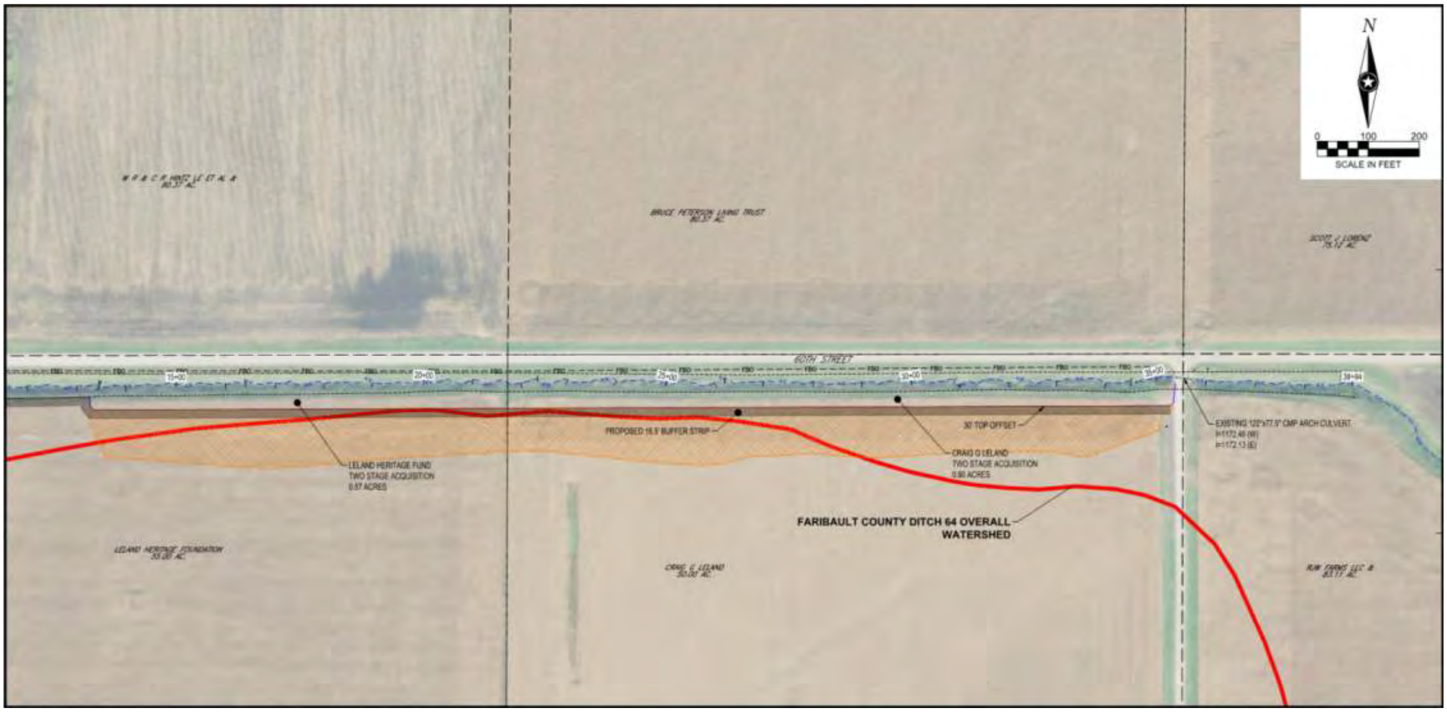


Figure 8: Overall Spoil Leveling Areas

Grade Stabilization Structures

As described previously in the report, there are multiple areas along the CD 64 open ditch with bank erosion, gully washouts, and bank failures. These areas have carved out holes and washouts through the ditch banks and have led to downstream sedimentation. Specifically, the areas located in the east half of Section 7 and the west half of Section 8 of Kiester Township are experiencing the most bank instabilities. In this portion of the watershed, the topography is rolling and steep; carrying large volumes of runoff in short durations of time.

In order to fix these bank instabilities, there are several proposed methods. While some of these can be designed based on the known existing conditions, others may need to be field adjusted depending on site conditions during construction. This section will describe the repair methods and approximate the locations and number of repairs.

Alternative Side Inlets

Locations along the ditch where there is concentrated overland flow that has caused gully erosion through the ditch bank will add an alternative side inlet (ASI). A side inlet conveys overland flow through an intake and into a pipe as it outlets into the open channel. The gulley washout will be filled in, armored with rip rap (if needed), and reseeded with erosion control blanket. A small ditch berm and basin allow surface water to temporarily pond on the backside of the ditch bank to remove sediment and prevent erosion through the ditch. The new side inlets are to be constructed entirely within the buffer strip which will keep them out of the path of equipment as much as possible. ASIs are designed to temporarily store water on the surface for 24-hours to allow for sedimentation while preventing crop loss. Figure 9 and Figure 10 shows two examples of alternative side inlets. There are 9 areas identified along the CD 64 ditch system where an ASI is proposed. Based on the existing conditions of the ditch in 2022, there are likely extra areas that may need ASI's during construction.

Figure 9: Example Alternative Side Inlet

Figure 10: Example Alternatvie Side Inlet

Grade Stabilization Fills

Many areas along the CD 64 have banks that have simply eroded away without a direct cause of gulley erosion, tile sinkholes, or other erosion causes. In these areas, it is proposed to remove the sloughed bank material, fill in the washout with compacted clay, reseed the ditch bank with erosion control blanket, and add rip rap if necessary. There are 3 areas that were preliminarily identified for a grade stabilization; however it is anticipated that more areas may surface during construction.

Select Berm Areas

An area approximately 1,000 feet downstream of County Road 25 (560th Avenue) has multiple extreme bank failures caused by surface flow from the adjacent hillside (Figure 11). Given the steep topography and surface flow, a small berm could be built up along this stretch to reduced surface flow over the ditch bank. Two alternative side inlets are proposed be added to carry the surface flow through a pipe into the open ditch as part of the grade stabilization repairs. Approximately 600 cubic yards of material would be required to build the berm up in this area and the clay could be borrowed from the two-stage ditch excavation to reduce overall earthwork costs.

Other options for this area would be to look for upland BMPs such as cover crops, WASCOBs, reduced tillage, or other buffer easements to reduces the amount of surface flow.

Figure 11: Gulley's through Ditch Bank (Downstream of CR 25, Section 7 Kiester Township)

Standard Ditch Repairs

Standard ditch repairs for CD 64 include repairing tile outlets, re-sloping sloughed areas, spot ditch cleaning, tree removals, armoring ditch banks, and reseeding ditch banks and buffers exposed during construction.

Bank Failure Repair
Ditch bank repairs will include re-establishing a stable ditch bank where erosion or sloughing is occurring. This includes flattening the side slope to a sable grade in that area and leveling the ditch bank. It will also include seeding the repaired area. In some extreme cases, rip rap will be added at the toe of the ditch to better hold the bank from sloughing again. Additional ditch bank repairs may be necessary based on the condition of the banks where construction is occurring. Figure 12 shows an example of a bank side slope repair.

Figure 12: Example Sideslope Repair

Tile Outlet Repair
Several tile outlets into the open ditch are creating erosion within the ditch bank. These will be replaced or repaired as part of a repair project. Some of the tile outlets may be in good shape and only require riprap protection on geotextile fabric. However, some tiles are damaged or are causing erosion to the ditch banks. The repair of damaged tiles will consist of replacing the damaged outlets into the ditch with a section of new tile and protecting the tile from erosion (Figure 13). Only dual wall HDPE or PVC pipe are allowed for tile outlet repairs.

Figure 13: Typical Tile Outlet Repair

Spot Ditch Repairs
As described previously, the majority of CD 64 has down cut over the years, thus the existing channel grade is at or below the legal (repairable) ditch grade. Furthermore, most of the channel is relatively stable when considering the channel grade, fluvial process, and established riffles. However, there are some areas where sediment islands have formed and are creating bank erosions. In these areas as shown in Figure 14, only the sediment island will be removed to help direct flow down the center of the channel and helping reduce erosion. Approximately 3 percent of the CD 64 open ditch contains these islands that will be removed during construction.

Figure 14: Spot Cleaning Example of Sediment Island

Tree Removals
Many areas within the east half of Section 7 and west half of Section 8 in Kiester Township have full grown trees within the ditch bank and buffer strip. These trees can cause surface erosion and block bank vegetation from establishment. As of March of 2022, these large trees are being removed on a separate contract through the drainage authority. Other tree removals along the rest of the ditch are smaller and will be removed as needed with other ditch repairs as incidentals.

Figure 15: Tree Removals along CD 64 (Section 8, Kiester Township)

Rock Riffle Structures

Existing channel grades along the entire CD 64 open ditch range between 0.15 and 0.60 percent which is very steep for a public ditch system. Most channels, streams, or creeks with this type of slope have much different fluvial processes that naturally establish riffle and pools as the channel grade drops in elevation. Riffles and pools are a way of the natural channel to create stability.

Throughout the CD 64 open channel, there are multiple riffle and pools that have naturally formed and have created stability. However there are other areas, specifically in Section 7 of Kiester Township where the channel bottom is still downcutting and not stable. One way to stabilize the channel in this area is to construct large rock riffles to help stair-step the channel bottom down in elevation.

A total of 8-rock riffles are proposed along CD 64 in Section 7. Rock riffles vary in size depending upon the cross-sectional geometry of the streambed location in question but are generally 4 to 6 feet wide on the bottom width, 30-feet wide across the top, and between 40 to 60-feet in length. Each riffle is designed to have a water elevation drop of 6-inches across the riffle. These riffle structures are central to reducing flow velocities and aim to reduce the relatively steep open channel grade. Figure 16 shows an example constructed rock riffle while the preliminary construction plans in Appendix A show full details of the proposed riffle structures.

Figure 16: Example Rock Rillfe

Headwall Repair

The existing headwall at the beginning of the open ditch in Section 8 of Kiester Township is in failing condition. Upstream of the headwall, the grassed waterway has eroded down to the existing tiles that drain into the open dich. Along the sides, there are two gulley's that have carved large holes in the ditch banks. The concrete headwall itself is deteriorated, with the bottom potion no longer fully attached and the wing walls eroded and no longer connected. The channel itself has carved a large plunge pool due to the high flows, velocities, and erosion through the years. The age of the structure is approximately 100-years which is likely over the expected lifespan. Figure 17 through Figure 19 show photos of the headwall structure.

Figure 17: Failed Headwall at Beginning of Open Ditch (Section 8, Kiester Township)

Figure 18: Headwall Failures

Figure 19: Grassed Waterway Erosion and Downcuts

The existing headwall is in need of major repairs that may be costly. There are two options to consider for repairing the headwall, adjacent waterway, and gulley erosion through the ditch bank. In both options, it is proposed to build a berm around the perimeter of the plunge pool to direct surface flow into the pool at 1 location. Also in both options, it is proposed to fill in the large gullies, add rip rap for stabilization, and add alternative side intake to take some immediately adjacent surface water into the pool. Sections of the tiles outletting inlet to plunge pool under the waterway will also need to be replaced in the waterway erosion areas. Both options would need further surveying and design moving forward depending on which option is preferred.

Option 1: Replacing Headwall

Option 1 includes replacing the concrete headwall with either a concrete structure or sheet pile weir. The weir wall would be installed just upstream of the existing structure to allow for rip rap to be placed on the downstream side to prevent future erosion and enlargement of the plunge pool. Both of the existing tiles outletting through the weir wall would be replaced with watertight tiles and connected through the new weir. Upstream of the new weir wall, additional rip rap would be added to dissipate velocities and to protect the backfill from downcutting. The grassed waterway would be repaired by filling the erosion holes and reseeded. Additional rip rap would be added on the perimeter of the plunge pool to prevent it from expanding and eroding further.

Option 2: Riprap Stilling Basin Series

In an effort to control upstream flowrates, velocities, and channel downcutting; a series of three rip rap stilling basins would be installed along the grassed waterway. These structures would include lengthy stilling basins spanning up to 500 feet upstream of the plunge pool. These basins are designed to dissipate energy from the surface flow waterways and stair step them down into the plunge pool. Basin lengths could span up to 75 feet in length along the alignment. Option 2 requires much more grading and rip rap and will also require more maintenance in the future. Figure 20 shows an example rip rap stilling basin along an open channel.

Figure 20: Example Stilling Basin

COST ESTIMATES

The following section will describe potential repair options as described in the report above. Since CD 64 does not need a full system wide cleanout like most open ditch systems in need of repair, the repairs and BMP options will be described as line items with different total options for repairs.

OTHER PROJECT RELATED COSTS

All drainage projects have indirect costs that must be accounted for in project cost estimates and used in cost benefit analyses. They include costs related to drainage authority administration, permanent and temporary damages, topographic survey, reports, plans and specifications, and construction staking and administration. These costs have been factored into the summaries. A full itemized breakdown of all costs are included in Appendix C.

REPAIR ITEM COSTS

As described throughout this report, there are many different repair types ranging from standard ditch repairs (bank stabilization, tile outlets, etc.) to non-traditional BMP repairs such as rock riffle structures, two-stage ditch cleaning, and other bank stabilization methods. Table 3 summarizes all repair items discussed in this report for CD 64.

Table 3: Repair Items Cost Estiamtes

TRADITIONAL REPAIRS	ESTIMATED COST	
STANDARD OPEN DITCH REPAIRS	$	101,301
OUTLET SIDE SLOPE FLATTENING	$	38,973
MIDWAY OPEN DITCH SIDE SLOPE FLATTENING	$	48,672
HEADWALL-REPLACE HEADWALL (OPTION 1)	$	134,268
HEADWALL-RIPRAP STILLING BASINS (OPTION 2)	$	91,092
FIELD CROSSING REPAIR	*PREVIOUSLY REPAIRED*	
TREE REMOVALS	*PREVIOUSLY REPAIRED*	
ALTERNATIVE BMPS REPAIRS	**ESTIMATED COST**	
TWO-STAGE DITCH	$	178,746
RIPRAP RIFFLES	$	113,677
560TH AVE WEST BERM AREA	$	15,247
PRIORITY BMPS/GRADE STABILIZATION	$	90,077
GRANT FUNDING	*$*	*248,500*

MINIMUM REPAIRS

Based on the condition of the ditch and potential repair options; at a minimum the ditch should be repaired to fix bank erosion areas, complete standard ditch repairs, and fix the headwall structure at the beginning of the open ditch. By utilizing the non-tradition BMPs as part of repairs, the CD 64 system may be less costly to repair in the future. There is also outside funding that was obtained by Faribault County for these BMPs to help pay for a portion of these costs. Table 4 summarizes the minimum repairs required for CD 64. This option includes the less expensive riprap stilling basins repair for headwall repair.

Table 4: Minimum Repair Items Cost Estimate

MINIMUM REPAIRS SUMMARY		
TRADITIONAL REPAIRS	ESTIMATED COST	
STANDARD OPEN DITCH REPAIRS	$	101,301
OUTLET SIDE SLOPE FLATTENING	$	38,973
HEADWALL-RIPRAP STILLING BASINS (OPTION 2)	$	91,092
FIELD CROSSING REPAIR	*PREVIOUSLY REPAIRED*	
TREE REMOVALS	*PREVIOUSLY REPAIRED*	
ALTERNATIVE BMPS REPAIRS	ESTIMATED COST	
TWO-STAGE DITCH	$	178,746
RIPRAP RIFFLES	$	113,677
PRIORITY BMPS/GRADE STABILIZATION	$	90,077
GRANT FUNDING	*$*	*248,500*
TRADITIONAL REPAIRS SUBTOTAL	**$**	**231,365**
ALTERNATIVE BMPS REPAIRS SUBTOTAL	**$**	**134,000**
MINIMUM REPAIRS TOTAL COST ESTIMATE	$	365,365

RECOMMENDED REPAIRS

After further review of the system including a site visit in March of 2022, there are other areas of the ditch that need further repairs such as the berming along the field west of 560th Avenue, other larger slough areas, and replacing the headwall structure. The current headwall structure has failed and is in need of repair. While the riprap stilling basins will provide adequate repairs, they will require more long-term maintenance such as cleaning of the basins, extra riprap, and reshaping areas of the waterway and basins. A permanent weir replacement structure is a better long-term solution with less routine maintenance and likely a longer life expectancy. Given the large repair area and deep plunge pool, a steel sheet pile weir is recommended over a concrete weir; however it may be bid as an alternative to compare costs. For a weir of this size, it is anticipated that a concrete weir will be more expensive. Table 5 summarizes the recommended repair item cost estimate. Since some of the repairs include earthwork, there are savings be repurposing the excavated ditch material for fill areas throughout the open ditch.

Table 5: Recommended Repairs Cost Estimate

RECOMMENDED REPAIRS SUMMARY		
TRADITIONAL REPAIRS	ESTIMATED COST	
STANDARD OPEN DITCH REPAIRS	$	101,301
OUTLET SIDE SLOPE FLATTENING	$	38,973
HEADWALL-REPLACE HEADWALL (OPTION 1)	$	134,268
FIELD CROSSING REPAIR	*PREVIOUSLY REPAIRED*	
TREE REMOVALS	*PREVIOUSLY REPAIRED*	
ALTERNATIVE BMPS REPAIRS	ESTIMATED COST	
TWO-STAGE DITCH	$	178,746
RIPRAP RIFFLES	$	113,677
560TH AVE WEST BERM AREA	$	15,247
PRIORITY BMPS/GRADE STABILIZATION	$	90,077
GRANT FUNDING	*$*	*248,500*
TRADITIONAL REPAIRS SUBTOTAL	**$**	**274,542**
ALTERNATIVE BMPS REPAIRS SUBTOTAL	**$**	**149,247**
MINIMUM REPAIRS TOTAL COST ESTIMATE	$	423,789

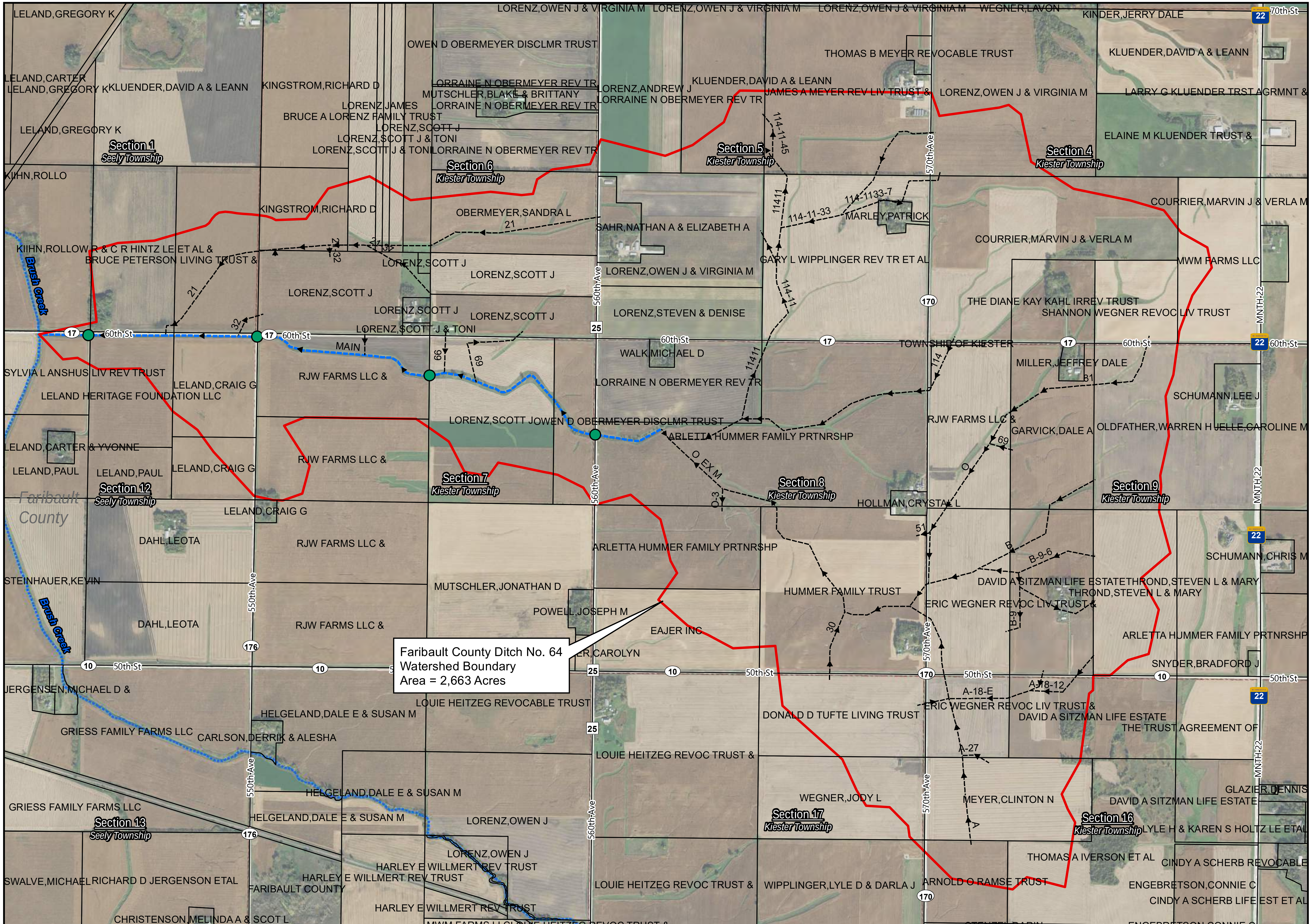
SUMMARY OF FINDINGS, CONCLUSIONS, + RECOMMENDATIONS

After review, the existing Faribault County CD 64 open ditch displays signs of downcutting and erosion to the channel banks. The open ditch portion of this system has been cleaned and regraded multiple times over the course of its life in an effort to reduce erosion maintain flow. As it sits, there are many areas of the ditch system that are out of repair, even though there are no major areas in need of ditch cleaning at this time.

The proposed BMP options are designed to reduce flow velocities, downcutting within the open ditch, as well as bank and surface erosion. These measures were found to be of necessity due to the erosive qualities of the soil as well as the relatively steep nature of the watershed as a whole. Combined with the repair efforts that would address the immediate issues seen within the open ditch, this project would create a longer lasting system for its users, and contribute less sediment, nutrients, and turbidity to downstream users.

Based on the findings presented throughout this report, the proposed repair and BMP implementation options presented for the Main Open Ditch are recommended for the CD 64 system. Two options have been present based on current conditions, ISG, and Faribault County Staff review. There may be other alternatives, areas in need of repair, or additional locations for the identified BMPs. The engineer recommends discussing this report and repair alternatives with landowners at the repair hearing to develop an approach to developing construction plans.

Appendix A: Maps



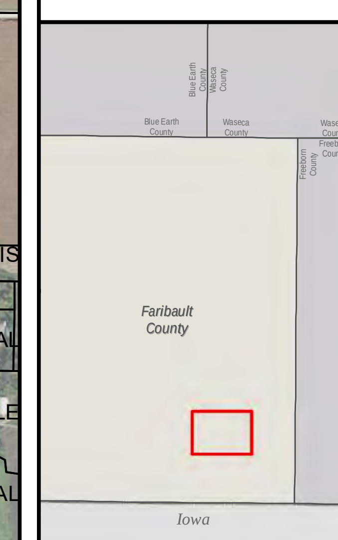
Existing Watershed Map
County Ditch No 64
Faribault County, Minnesota
March 1, 2022

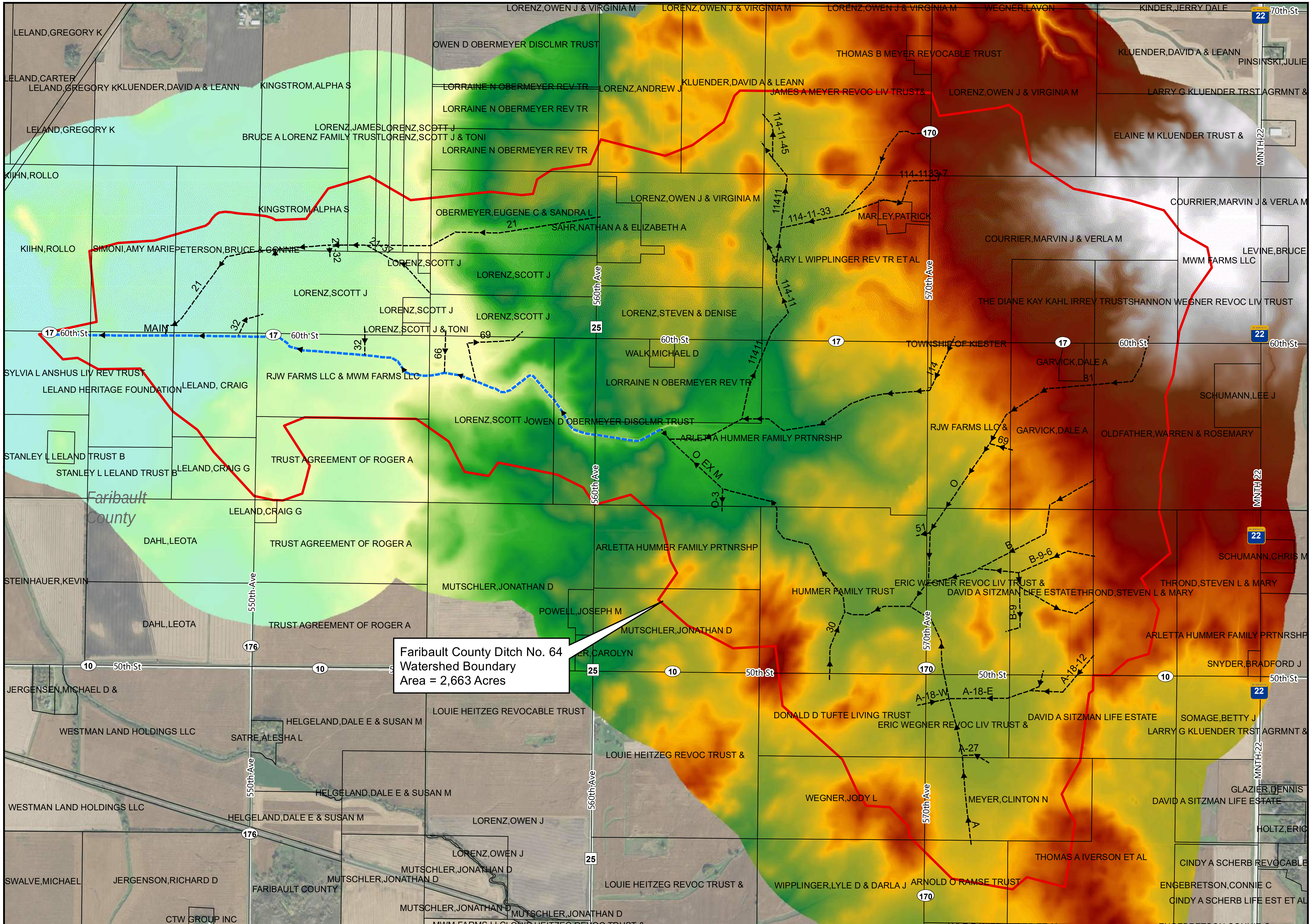
Legend
- Bridges and Culverts
- Parcels
- Watershed
- OPEN CHANNEL
- TILE

0 500 1,000 2,000 Feet

PN: 17-21098

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





ISG

Existing Elevation Map

County Ditch No 64

Faribault County, Minnesota

March 1, 2022

Legend

- Parcels
- Watershed
- OPEN CHANNEL
- TILE

Elevation

Feet

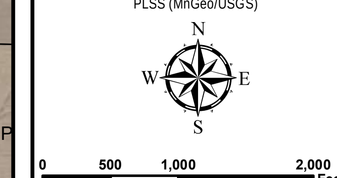
High : 1402.966

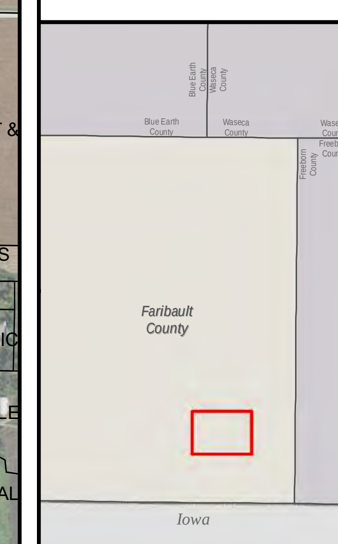
Low : 1145.387

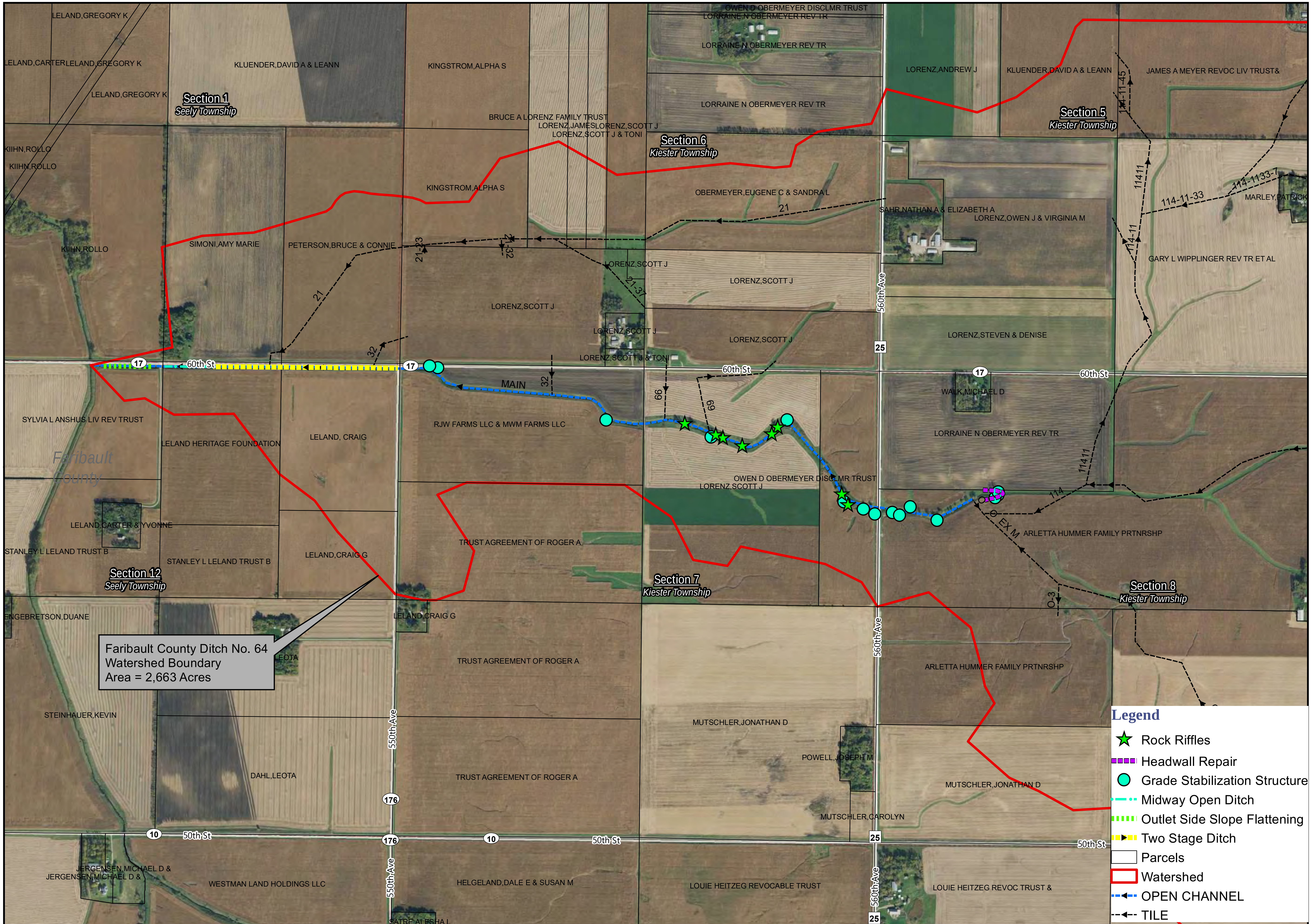
PN: 17-21098

Source:

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







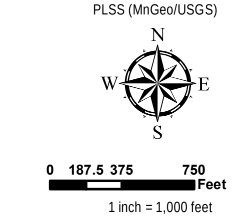
ISG

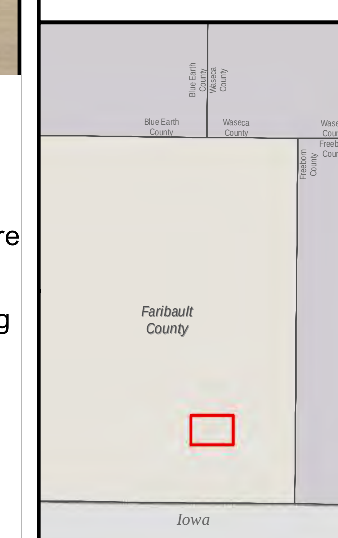
Repair Map
County Ditch No 64
Faribault County, Minnesota
March 1, 2022

PN: 17-21098

Source:

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





Appendix B: Preliminary Construction Plans

FARIBAULT COUNTY
FARIBAULT CD 64 REPAIRS

FARIBAULT COUNTY, MINNESOTA **PRELIMINARY CONSTRUCTION PLANS** **ISG PROJECT # 18-21098**

ISG

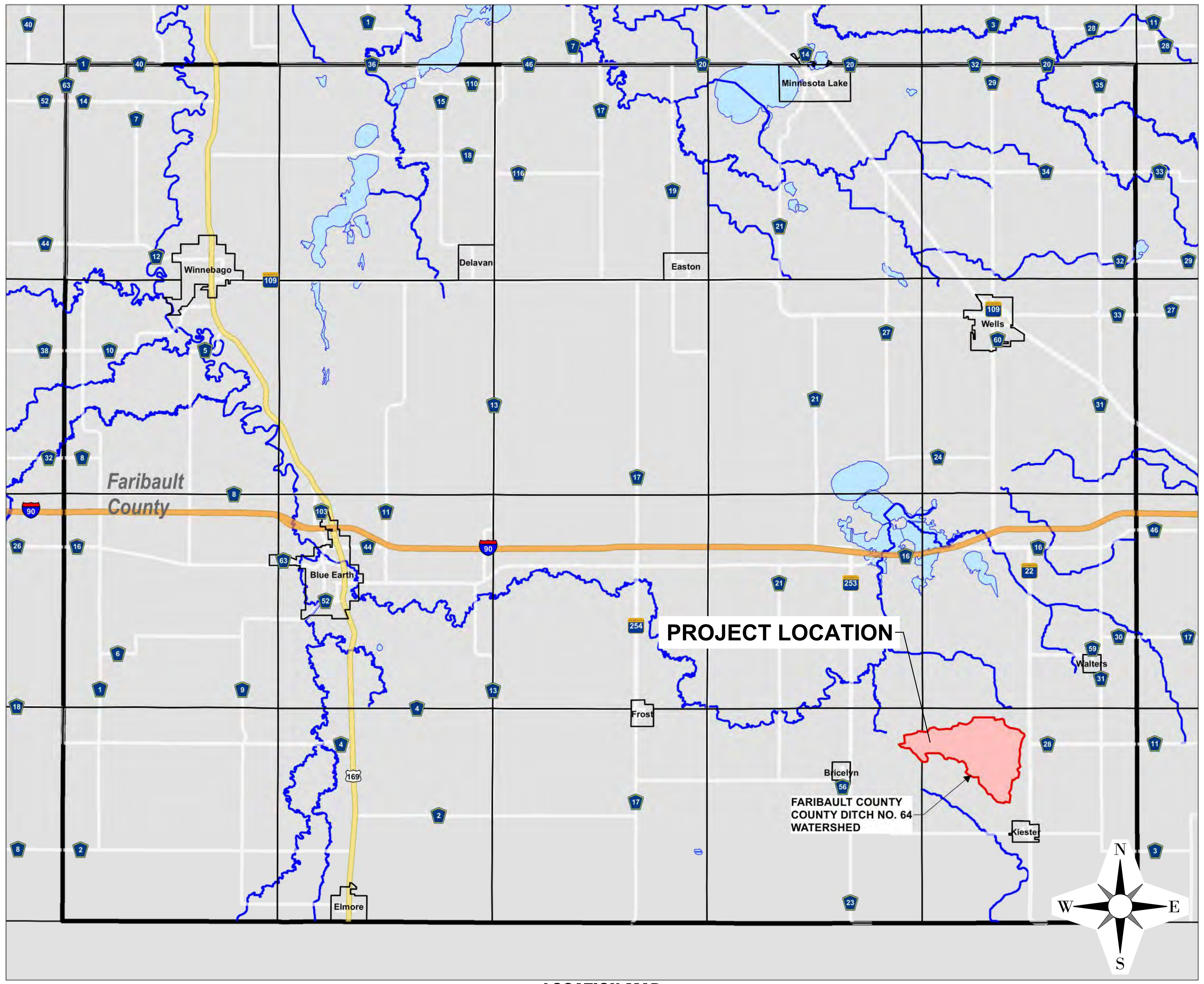
LEGEND

EXISTING

- WATERSHED BOUNDARY
- CITY LIMITS
- SECTION LINE
- QUARTER SECTION LINE
- RIGHT OF WAY LINE
- PROPERTY / LOTLINE
- EASEMENT LINE
- ACCESS CONTROL
- WATER EDGE
- WETLAND BOUNDARY
- FENCE LINE
- EXISTING OPEN DITCH
- CULVERT
- TILE
- PRIVATE TILE
- WATER
- GAS
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- UNDERGROUND TV
- OVERHEAD UTILITY
- UNDERGROUND UTILITY
- UNDERGROUND FIBER OPTIC
- CONTOUR (MAJOR)
- CONTOUR (MINOR)
- DECIDUOUS TREE
- CONIFEROUS TREE
- TREE LINE
- DROP INTAKE
- HYDRANT
- POWER POLE

PROPOSED

- EASEMENT
- PROPOSED OPEN DITCH
- OPEN DITCH REPAIR
- CULVERT (RCP)
- CULVERT (CMP)
- CULVERT (HDPE)
- TILE
- TILE (PIPE WIDTH)
- PRIVATE TILE
- WATER
- GAS
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TV
- CONTOUR (MAJOR)
- CONTOUR (MINOR)
- DROP INTAKE
- SLOUGH REPAIR
- SPOIL PLACEMENT
- TREE CLEARING
- REMOVE TREE
- BUFFER



LOCATION MAP

SHEET INDEX

GIS DISCLAIMER:

INFORMATION FOR THE BOUNDARY / LOT LINES, AND UNDERGROUND UTILITIES SHOWN WAS DERIVED FROM DIGITAL DATABASES AND IS FOR INFORMATIONAL PURPOSES ONLY. DATA MAY NOT HAVE BEEN PREPARED FOR, OR BE SUITABLE FOR: LEGAL, ENGINEERING, OR SURVEYING PURPOSES.

PROJECT GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE CONTRACT DOCUMENTS, WHICH INCLUDE, BUT ARE NOT LIMITED TO, THE OWNER - CONTRACTOR AGREEMENT, THE PROJECT MANUAL (WHICH INCLUDES GENERAL SUPPLEMENTARY CONDITIONS AND SPECIFICATIONS), DRAWINGS OF ALL DISCIPLINES AND ALL ADDENDA, MODIFICATIONS AND CLARIFICATIONS ISSUED BY THE ARCHITECT/ENGINEER.
2. CONTRACT DOCUMENTS SHALL BE ISSUED TO ALL SUBCONTRACTORS BY THE GENERAL CONTRACTOR IN COMPLETE SETS IN ORDER TO ACHIEVE THE FULL EXTENT AND COMPLETE COORDINATION OF ALL WORK.
3. WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES OR CONDITIONS REQUIRING INFORMATION OR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
4. FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES OR CONDITIONS REQUIRING INFORMATION OR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
5. DETAILS SHOWN ARE INTENDED TO BE INDICATIVE OF THE PROFILES AND TYPE OF DETAILING REQUIRED THROUGHOUT THE WORK. DETAILS NOT SHOWN ARE SIMILAR IN CHARACTER TO DETAILS SHOWN. WHERE SPECIFIC DIMENSIONS, DETAILS OR DESIGN INTENT CANNOT BE DETERMINED, NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
6. ALL MANUFACTURED ARTICLES, MATERIALS AND EQUIPMENT SHALL BE APPLIED, INSTALLED, CONNECTED, ERECTED, CLEANED AND CONDITIONED ACCORDING TO MANUFACTURERS' INSTRUCTIONS. IN CASE OF DISCREPANCIES BETWEEN MANUFACTURERS' INSTRUCTIONS AND THE CONTRACT DOCUMENTS, NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
7. ALL DISSIMILAR METALS SHALL BE EFFECTIVELY ISOLATED FROM EACH OTHER TO AVOID GALVANIC CORROSION.
8. THE LOCATION AND TYPE OF ALL INPLACE UTILITIES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY AND ARE ACCURATE AND COMPLETE TO THE BEST OF THE KNOWLEDGE OF I & S GROUP, INC. (ISG). NO WARRANTY OR GUARANTEE IS IMPLIED. THE CONTRACTOR SHALL VERIFY THE SIZES, LOCATIONS AND ELEVATIONS OF ALL INPLACE UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM PLAN.
9. THE CONTRACTOR IS TO CONTACT "GOPHER STATE ONE CALL" FOR UTILITY LOCATIONS, MINIMUM 2 BUSINESS DAYS PRIOR TO ANY EXCAVATION / CONSTRUCTION (1-800-252-1166).

PROJECT INDEX:

OWNER:

FARIBAULT COUNTY DRAINAGE AUTHORITY
415 SOUTH GROVE STREET
BLUE EARTH, MN, 56013

PH: 507-304-4253

PROJECT ADDRESS / LOCATION:

SEELY TOWNSHIP, SECTIONS:
1, 4, 5, 6, 12

KEISTER TOWNSHIP, SECTIONS:
7, 8, 9, 16, 17

MANAGING OFFICE:

ISG

MANKATO OFFICE
115 EAST HICKORY STREET
SUITE 300
MANKATO, MN 56001
PHONE: 507.387.6651

PROJECT MANAGER: MARK ORIGER
EMAIL: MARK.ORIGER@ISGINC.COM

SPECIFICATIONS REFERENCE

ALL CONSTRUCTION SHALL COMPLY WITH THE COUNTY OF FARIBAULT REQUIREMENTS AND MnDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2020 EDITION, AND THE STANDARD SPECIFICATIONS FOR SANITARY SEWER, STORM DRAIN AND WATERMAIN AS PROPOSED BY THE CITY ENGINEERS ASSOCIATION OF MINNESOTA 2018, UNLESS DIRECTED OTHERWISE.

PROJECT DATUM

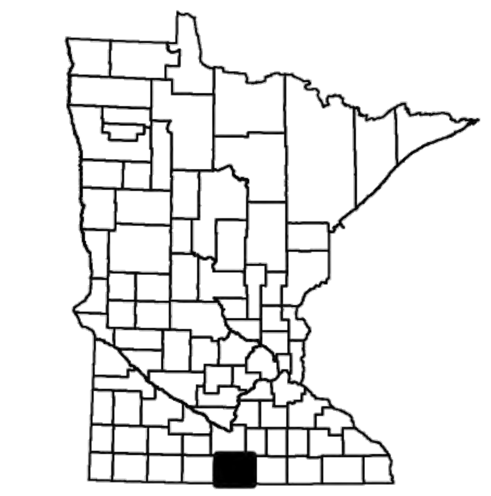
HORIZONTAL COORDINATES HAVE BEEN REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), 1996 ADJUSTMENT (NAD83(1996)) ON THE FARIBAULT COUNTY COORDINATE SYSTEM, IN U.S. SURVEY FEET.
ELEVATIONS HAVE BEEN REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
RTK GPS METHODS WERE USED TO ESTABLISH HORIZONTAL AND VERTICAL COORDINATES FOR THIS PROJECT.

B.M. ELEVATION=1174.67

METAL ROD 41.9 FT SOUTH OF THE INTERSECTION OF 5TH ST & TRUNK HWY 253, WEST SIDE OF TRUNK HWY 253, 1.5 FT SOUTH OF WITNESS POST

TOPOGRAPHIC SURVEY

THIS PROJECT'S TOPOGRAPHIC SURVEY CONSISTS OF DATA COLLECTED IN MAY OF 2018 BY ISG.



NOTE:
THE CLARITY OF THESE PLANS DEPEND UPON COLOR COPIES. IF THIS TEXT DOES NOT APPEAR IN COLOR, THIS IS NOT AN ORIGINAL PLAN SET AND MAY RESULT IN MISINTERPRETATION.

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

PRELIMINARY
NOT FOR CONSTRUCTION

MARK ORIGER

DATE XX/XX/XX LIC. NO. 54863

PROJECT

FARIBAULT COUNTY DITCH No. 64 REPAIRS

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	18-21098
FILE NAME	21098 TITLE
DRAWN BY	JJM
DESIGNED BY	MAO
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

TITLE

TITLE

SHEET

ISG

NOTE:
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PRELIMINARY
NOT FOR CONSTRUCTION

MARK ORIGER

DATE XX/XX/XX LIC. NO. 54863

PROJECT

FARIBAULT COUNTY DITCH No. 64 REPAIRS

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	18-21098
FILE NAME	21098 WATERSHEDMAPS
DRAWN BY	-
DESIGNED BY	-
REVIEWED BY	-
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

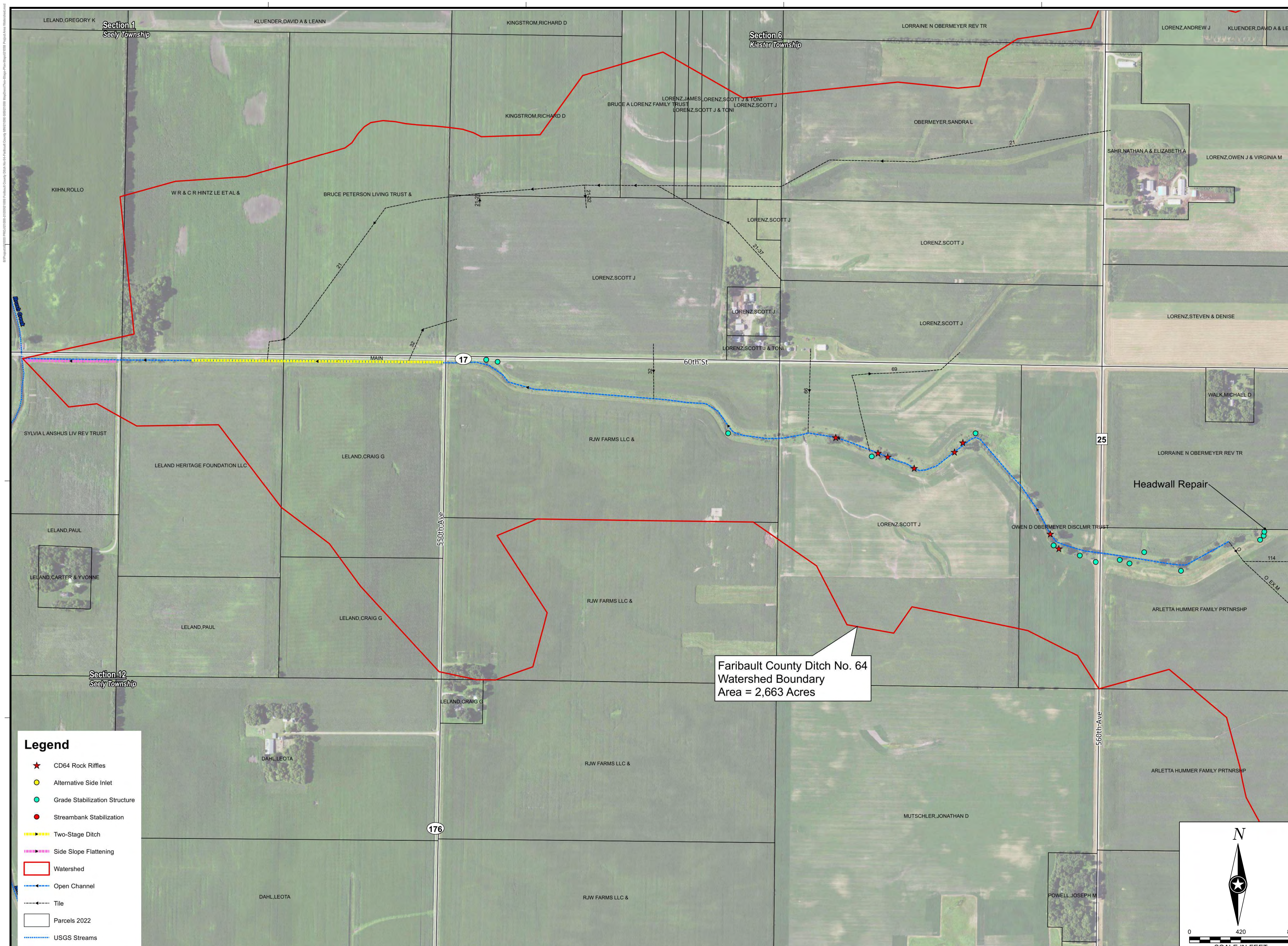
TITLE

OVERALL WATERSHED MAP

SHEET

2

OF 21



ISG

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PRELIMINARY NOT FOR CONSTRUCTION

MARK KRIGER

DATE XX/XX/XX LIC. NO. 54863

PROJECT

FARIBAULT COUNTY DITCH No. 64 REPAIRS

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	18-21098
FILE NAME	21098 WATERSHEDMAPS
DRAWN BY	-
DESIGNED BY	-
REVIEWED BY	-
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

TITLE

REPAIR OVERVIEW

SHEET

3

OF 21

GENERAL PROJECT NOTES:

1. DURING CONSTRUCTION, CONTRACTOR SHALL MAINTAIN A DRAINAGE OUTLET FOR THE ENTIRE CD 64 PROJECT AREA.
2. ALL PIPE DIMENSIONS REFERENCED IN THE PLANS REFER TO THE INSIDE DIAMETER.
3. RODENT GUARDS SHALL BE INSTALLED ON ALL OUTLETS 18" AND SMALLER. (INCIDENTAL TO RESPECTIVE BID ITEMS).
4. ALL ROAD SIGNAGE, COORDINATION, AND TRAFFIC CONTROL SIGNAGE SHALL BE INCIDENTAL TO ROAD RESTORATIONS AND SHALL CONFORM TO LOCAL ROAD AUTHORITY PERMITS AND REGULATIONS.
5. THE CONTRACTOR SHALL SUBMIT A WINTER CONSTRUCTION PLAN FOR SITE STABILIZATION, EROSION PREVENTION, AND SEDIMENT CONTROL IF THE PROJECT IS NOT COMPLETED BY OCTOBER 15 OF THE GIVEN CONSTRUCTION SEASON, UNLESS APPROVED BY THE ENGINEER. THE PLAN SHALL BE DEVELOPED TO SPECIFICALLY ADDRESS SHUTDOWN PROCEDURES OR ACTIVE CONSTRUCTION PLANS.
6. ALL DEWATERING FOR THE PROJECT IS INCIDENTAL.
7. PRODUCT MATERIAL SHALL BE AS SPECIFIED IN THE PLANS. IF NO SPECIFIC MATERIAL IS CALLED OUT, MATERIAL SHALL CONFORM TO THE APPROVED PRODUCT LIST IN THE APPROPRIATE SPECIFICATION.
8. ALL EFFORTS SHALL BE MADE DURING CONSTRUCTION TO SEPARATE SOIL TYPES. BACKFILL SHALL BE COMPACTED PRIOR TO PLACEMENT OF TOPSOIL, EXCEPT THE TOP TWO (2) FEET, FOR WHICH COMPACTION SHALL BE MINIMIZED TO THE EXTENT POSSIBLE. TOPSOIL SHALL BE PLACED TO A MINIMUM DEPTH OF 18", OR UNIFORM TO THE TOPSOIL DEPTH OF THE SURROUNDING AREA UNLESS SPECIFIED ELSEWHERE IN THE PLANS. EXCAVATED SPOILS SHALL BE SPREAD EVENLY IN CONSTRUCTION AREA AS TO NOT IMPEDE DRAINAGE. ALL EFFORTS SHALL BE MADE TO KEEP TOPSOIL ON TOP AND SEPARATED. NO TOPSOIL SHALL BE PLACED IN THE TRENCH BELOW 2' FROM EXISTING GROUND UNLESS APPROVED BY THE ENGINEER.
9. ALL SPOIL LEVELING, GRADING, AND RESTORATION OF DISTURBED AREAS SHALL BE IN ACCORDANCE TO THE CONTRACT DOCUMENTS AND SHALL BE INCIDENTAL TO THE WORK UNLESS OTHERWISE SPECIFIED.
10. HEAVY VEGETATIVE CLEARING WITH TREE REMOVAL SHALL ONLY BE COMPLETED AS NECESSARY FOR SAFE CONSTRUCTION PRACTICES AND WITHIN THE ALLOWED CONSTRUCTION EASEMENT, UNLESS APPROVED BY THE ENGINEER. TREE REMOVAL AND GRUBBING SHALL BE INCIDENTAL TO HEAVY VEGETATIVE CLEARING WITH TREE REMOVAL BID ITEM.
11. TREES CALLED OUT AS "REMOVE TREE" SHALL BE PAID FOR BY EACH OCCURRENCE. IF TREES ARE NOT CALLED OUT IN THE CONSTRUCTION DOCUMENTS AS REMOVE TREE, THEN THE REMOVAL SHALL BE PAID FOR BY THE ACRE AS HEAVY VEGETATIVE CLEARING WITH TREE REMOVAL.
12. AGGREGATE SURFACE SHALL BE INCIDENTAL TO CROSSING OR ROAD RESTORATION.
13. RIPRAP QUANTITIES ARE ESTIMATED. ADDITIONAL QUANTITY MAY BE REQUIRED BY THE ENGINEER. ALL RIPRAP QUANTITIES SHALL BE PAID BY THE CUBIC YARD INSTALLED, UNLESS RIPRAP IS INCIDENTAL TO A SEPARATE PAY ITEM. ALL EXCAVATION AND GEOTEXTILE FABRIC SHALL BE INCIDENTAL TO RESPECTIVE BID ITEM.
14. ALL WORK SHALL BE DONE IN 2,500 LF SECTIONS, UNLESS APPROVED OF BY THE ENGINEER. PRIOR TO COMMENCING ON A NEW SECTION, ALL WORK IN THE PREVIOUS SECTION MUST BE COMPLETED IN ADHERENCE WITH THE CONTRACT DOCUMENTS. THE ENGINEER RESERVES THE RIGHT TO CEASE OPERATIONS AND/OR WITHHOLD PAYMENT UNTIL COMPLIANCE HAS BEEN ACHIEVED.
15. EXISTING TILES THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED AT NO COST TO THE PROJECT, UNLESS OTHERWISE SPECIFIED.
16. ALL SIGNS AND MARKERS SHALL BE PROTECTED OR REMOVED AND REINSTALLED AT NO ADDITIONAL COST TO THE PROJECT, UNLESS OTHERWISE SPECIFIED. THE ENGINEER SHALL BE NOTIFIED OF ANY SIGNS OR MARKERS IN POOR CONDITION PRIOR TO REMOVAL.
17. THE DRAINAGE AUTHORITY TAKES NO AUTHORITY OVER OR RESPONSIBILITY FOR ANY AND ALL PRIVATE TILE SHOWN ON THESE PLANS. PRIVATE TILE LOCATIONS HAVE BEEN SUPPLIED BY LANDOWNERS FOR USE BY THE CONTRACTOR.
18. THE CONTRACTOR SHALL PAY ALL DAMAGES OUTSIDE OF THE AGREED UPON EASEMENT IN AN AMOUNT OF $1,200 PER ACRE OF DISTURBANCE, AS MEASURED BY THE ENGINEER.

UTILITY NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY LEVEL D. THE UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED: STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA.

NOTE TO BE ADDED TO TILE NOTES IF MAJOR UTILITY CROSSING:

1. MAJOR UTILITY CROSSING IS ONLY APPLICABLE TO RURAL WATER LINES, WINDMILL TRANSMISSION LINES, GAS LINES, INSERT OR REMOVE UTILITIES AS NECESSARY UNLESS OTHERWISE APPROVED BY THE ENGINEER PRIOR TO CROSSING. ALL OTHER UTILITY CROSSINGS ARE INCIDENTAL TO TILE INSTALLATION.

GENERAL OPEN DITCH NOTES:

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

GENERAL CULVERT NOTES:

1. ALL CULVERTS SHALL BE CONSTRUCTED WITH CLASS III RCP ONLY, UNLESS OTHERWISE SPECIFIED ON PLANS OR APPROVED BY THE ENGINEER.
2. ALL PIPE SECTIONS SHALL BE TIED TOGETHER, WATERTIGHT, GASKETED, AND TONGUE AND GROOVE DESIGN CONFORMING TO MnDOT 3006G. ALL JOINTS SHALL BE WRAPPED IN GEOTEXTILE FABRIC.
3. WHEN A CULVERT SECTION IS TO BE REINSTALLED, THE CONTRACTOR MUST NOTIFY THE ENGINEER OF ANY CULVERT SECTIONS DEEMED NOT SALVAGEABLE PRIOR TO REMOVAL AND SHALL BE ADDRESSED BEFORE CULVERT WORK IS DONE.
4. THE CONTRACTOR SHALL VERIFY PROPER POSITIONING OF THE CULVERT PRIOR TO COMMENCEMENT OF CONSTRUCTION. IF THE CULVERT POSITIONING IS NOT COMPATIBLE WITH THE FLOW OF THE DITCH WHEN STAKING IS COMPLETED, THE ENGINEER SHALL BE NOTIFIED.

ABBREVIATIONS

AC	ACRE
ADD	ADDENDUM
AGG	AGGREGATE
APPROX	APPROXIMATE
BIT	BITUMINOUS
CAD	COMPUTER-AIDED DESIGN
CFS	CUBIC FEET PER SECOND
CF	CUBIC FOOT
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CR	COUNTY ROAD
CSAH	COUNTY STATE AID HIGHWAY
CY	CUBIC YARD
DI	DROP INTAKE
DIA	DIAMETER
DIM	DIMENSION
EA	EACH
ELEC	ELECTRICAL
ELEV	ELEVATION
EOF	EMERGENCY OVERFLOW
EQ	EQUAL
EX	EXISTING
FDN	FOUNDATION
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FOOT, FEET

GA	GAUGE
GAL	GALLON
GPM	GALLONS PER MINUTE
HDPE	HIGH DENSITY POLYETHYLENE
HORIZ	HORIZONTAL
HR	HOUR
HWL	HIGH WATER LEVEL
HWY	HIGHWAY
HYD	HYDRANT
I	INVERT
ID	INSIDE DIAMETER
IN	INCH
INV	INVERT
LF	LINEAR FEET
LIN	LINEAR
LS	LUMP SUM
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
NO	NUMBER
NTS	NOT TO SCALE
NWL	NORMAL WATER LEVEL
OC	ON CENTER
OCEW	ON CENTER EACH WAY
OH	OVERHEAD
OHWL	ORDINARY HIGH WATER
OZ	OUNCE
PERF	PERFORATED
PL	PROPERTY LINE

PP	POLYPROPYLENE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
QTY	QUANTITY
RCP	REINFORCED CONCRETE PIPE
REBAR	REINFORCING BAR
REM	REMOVE
ROW	RIGHT OF WAY
R/W	RIGHT OF WAY
SCH	SCHEDULE
SF	SQUARE FOOT
SPEC	SPECIFICATION
SQ	SQUARE
STA	STATION
SY	SQUARE YARD
TEMP	TEMPORARY
THRU	THROUGH
TRANS	TRANSFORMER
TV	TELEVISION
TYP	TYPICAL
UT	UTILITY, UNDERGROUND TELEPHONE
VCP	VITRIFIED CLAY PIPE
W/O	WITHOUT
W/	WITH
YD	YARD
YR	YEAR

ISG

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MARK ORIGER

PRELIMINARY
NOT FOR CONSTRUCTION

DATE XX/XX/XX LIC. NO. 54863

PROJECT

FARIBAULT COUNTY DITCH No. 64 REPAIRS

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

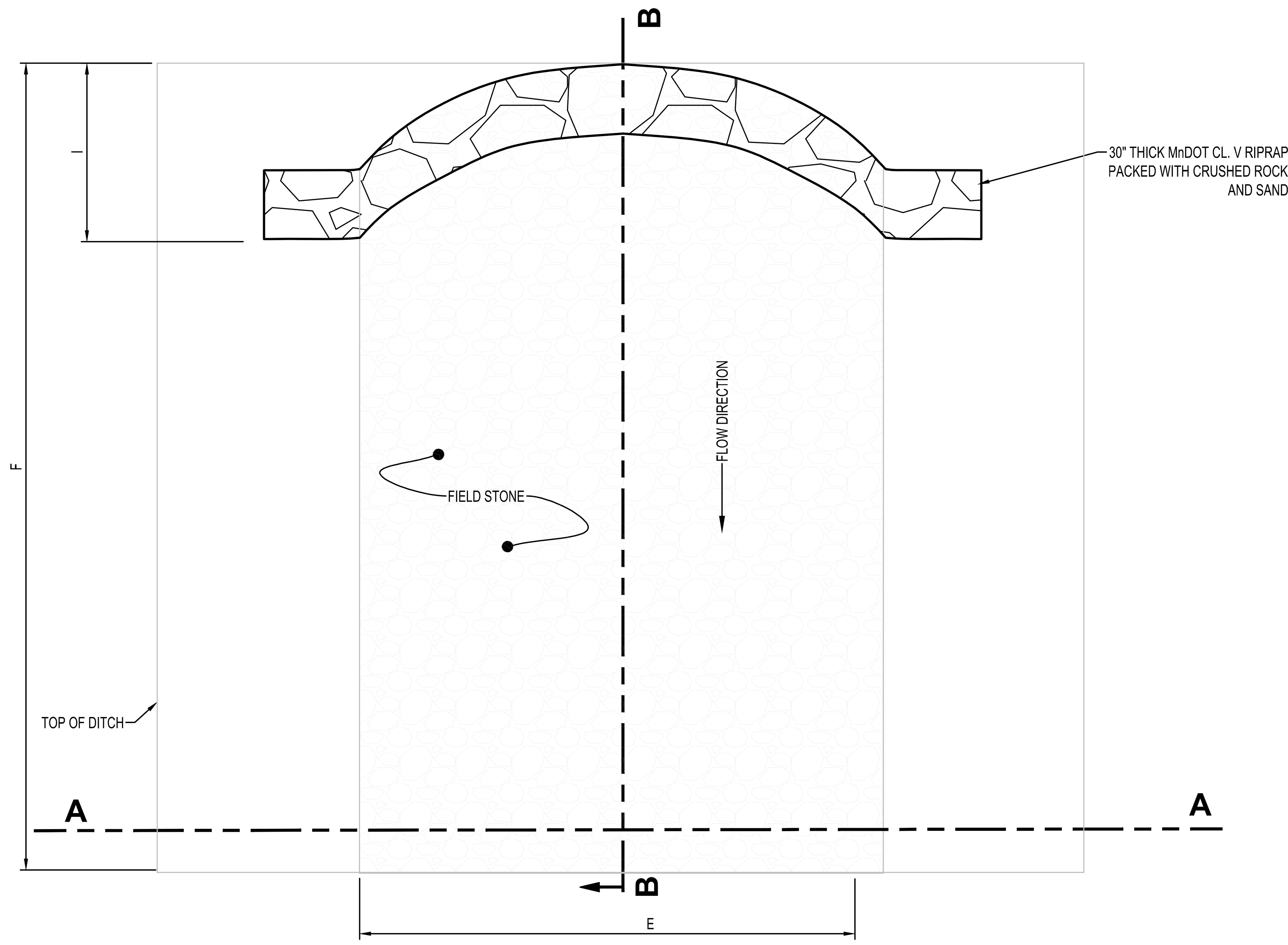
DATE	DESCRIPTION	BY

PROJECT NO.	18-21098
FILE NAME	21098 QUANTDETNOTES
DRAWN BY	JJM
DESIGNED BY	MAO
REVIEWED BY	MAO
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

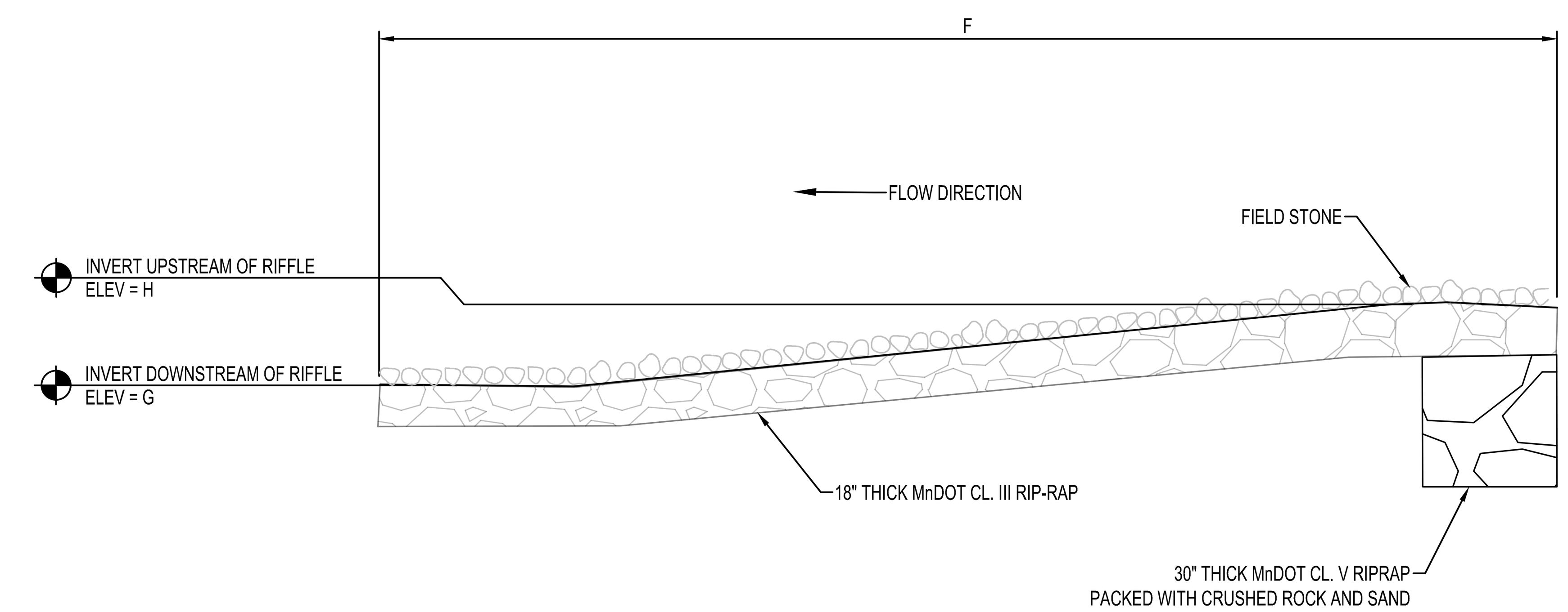
TITLE

NOTES & QUANTITIES

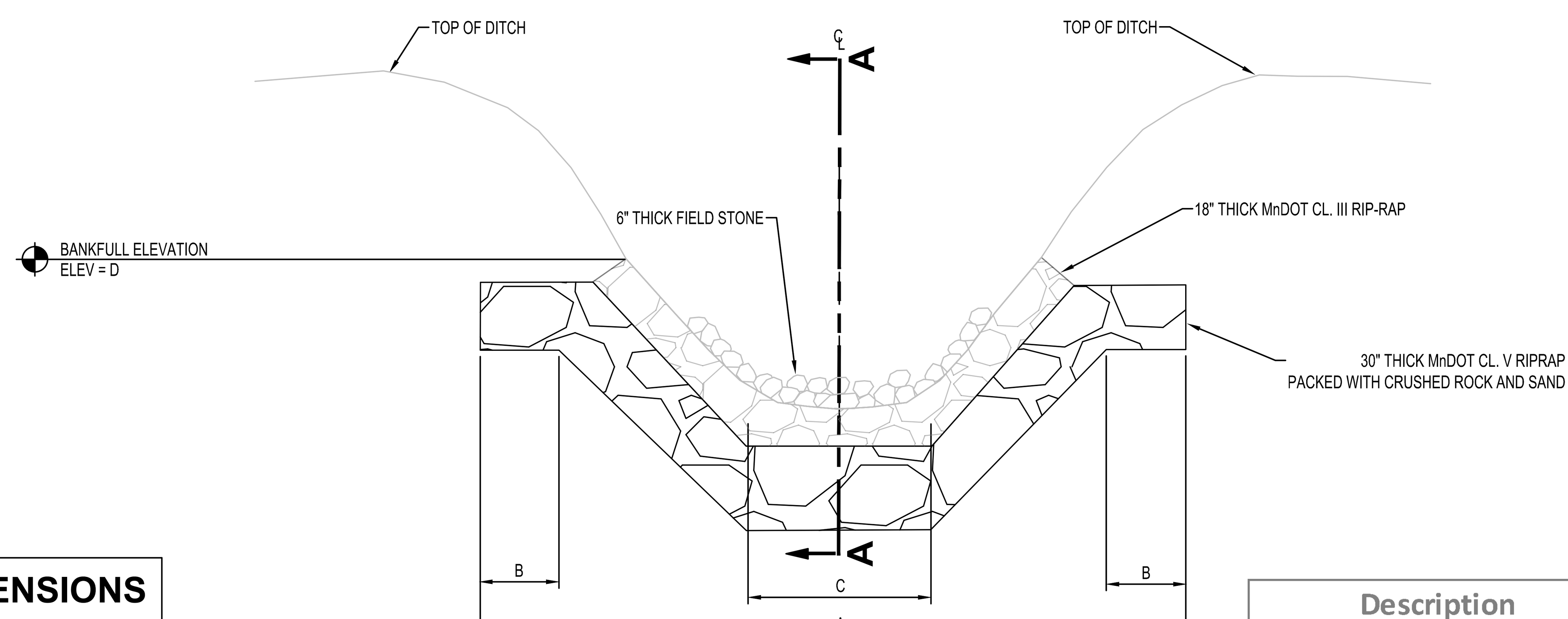
SHEET



PLAN



SECTION B-B



TYPICAL CROSS SECTION

DIMENSIONS

DIMENSION	LENGTH
A	A
B	B
C	C
D	D
E	E
F	F
G	G
H	H
I	I

NOTE:

ALL MnDOT CLASS V RIPRAP IS TO BE PACKED WITH CRUSHED ROCK AND SAND.

RIPRAP RIFFLE

NTS AG700

Description			Upstream					Downstream			Riprap		
ID	BRANCH (LOCATION)	STATION	A Riffle Width (ft)	B Key-In Width (ft)	C Channel Bottom Width (ft)	D Bankfull Elevation (MSL)	E Bankfull Width (ft)	F Riffle Length (ft)	G Downstream Elevation (MSL)	H Upstream Elevation (MSL)	Field Stone (CY)	Class III Riprap (CY)	Class V Riprap (CY)
1	Main	69+20	27	5	7	1178.00	17	43	1174.00	1174.50	20	59	24
2	Main	72+97	26	5	10	1179.80	16	40	1175.80	1176.30	21	62	26
3	Main	74+17	27	5	7	1180.40	17	43	1176.40	1176.90	20	59	24
4	Main	75+83	29	5	10	1182.00	19	48	1178.00	1178.50	25	74	26
5	Main	80+60	30	5	8	1184.10	20	50	1180.10	1180.60	24	72	25
6	Main	81+80	34	5	8	1184.70	24	60	1180.70	1182.20	29	87	25
7	Main	91+00	26	5	5	1190.30	16	40	1186.30	1186.80	17	51	22
8	Main	93+10	28	5	5	1191.00	18	45	1187.00	1187.50	19	58	22

ISG

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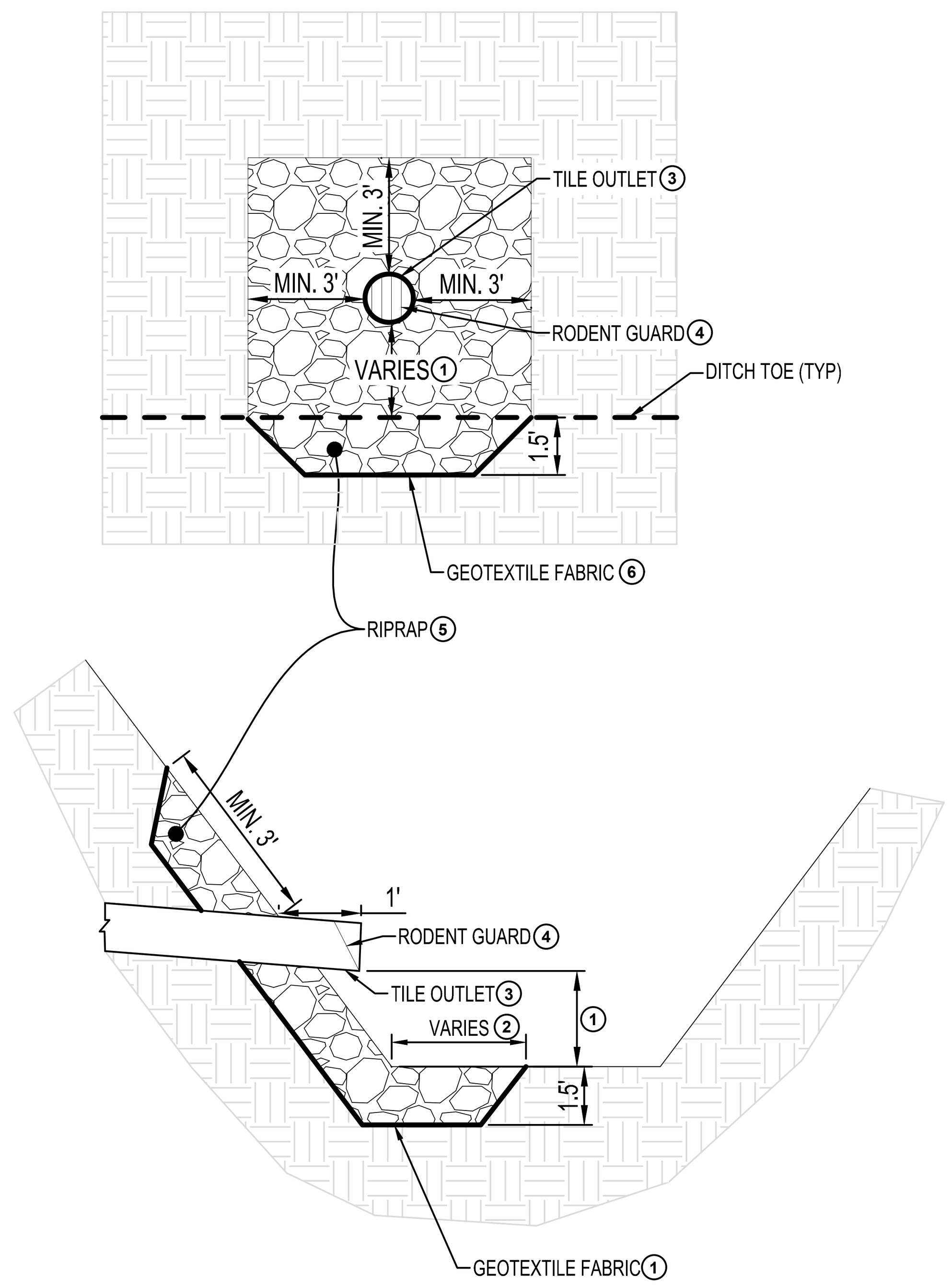
DETAILS

SHEET

5 OF 21



DIMENSIONS

NOMINAL PIPE DIA	RIPRAP⑤
UNDER 12"	8 CY
12"-15"	8.5 CY
18" TO 36"	9 CY
42" TO 60"	10 CY
ABOVE 60"	12 CY

NOTES:

1. DISTANCE VARIES. REFER TO PLANS AND DETAILS.
2. DISTACE VARIES. 4' OR 1/2 OF DITCH BOTTOM, WHICHEVER IS GREATER.
3. SIZE AND TYPE VARIES. REFER TO PLANS AND SCHEDULES.
4. RODENT GUARDS SHALL BE INSTALLED ON ALL OUTLETS 18" AND SMALLER. (INCIDENTAL TO RESPECTIVE BID ITEMS).
5. RIPRAP SHALL BE MnDOT CLASS III, UNLESS OTHERWISE SPECIFIED. THE CUBIC YARD LISTED IN THE TABLE SHALL BE INCIDENTAL TO THE RESPECTIVE BID ITEM. ADDITIONAL RIPRAP SHALL BE PAID FOR BY THE CUBIC YARD INSTALLED.
6. GEOTEXTILE FABRIC SHALL BE MnDOT TYPE IV. (INCIDENTAL TO RESPECTIVE BID ITEM)

RIPRAP DIMENSIONS SHOWN ARE TYPICAL AND MAY BE MODIFIED ON A SITUATIONAL BASIS, IF APPROVED BY THE ENGINEER.

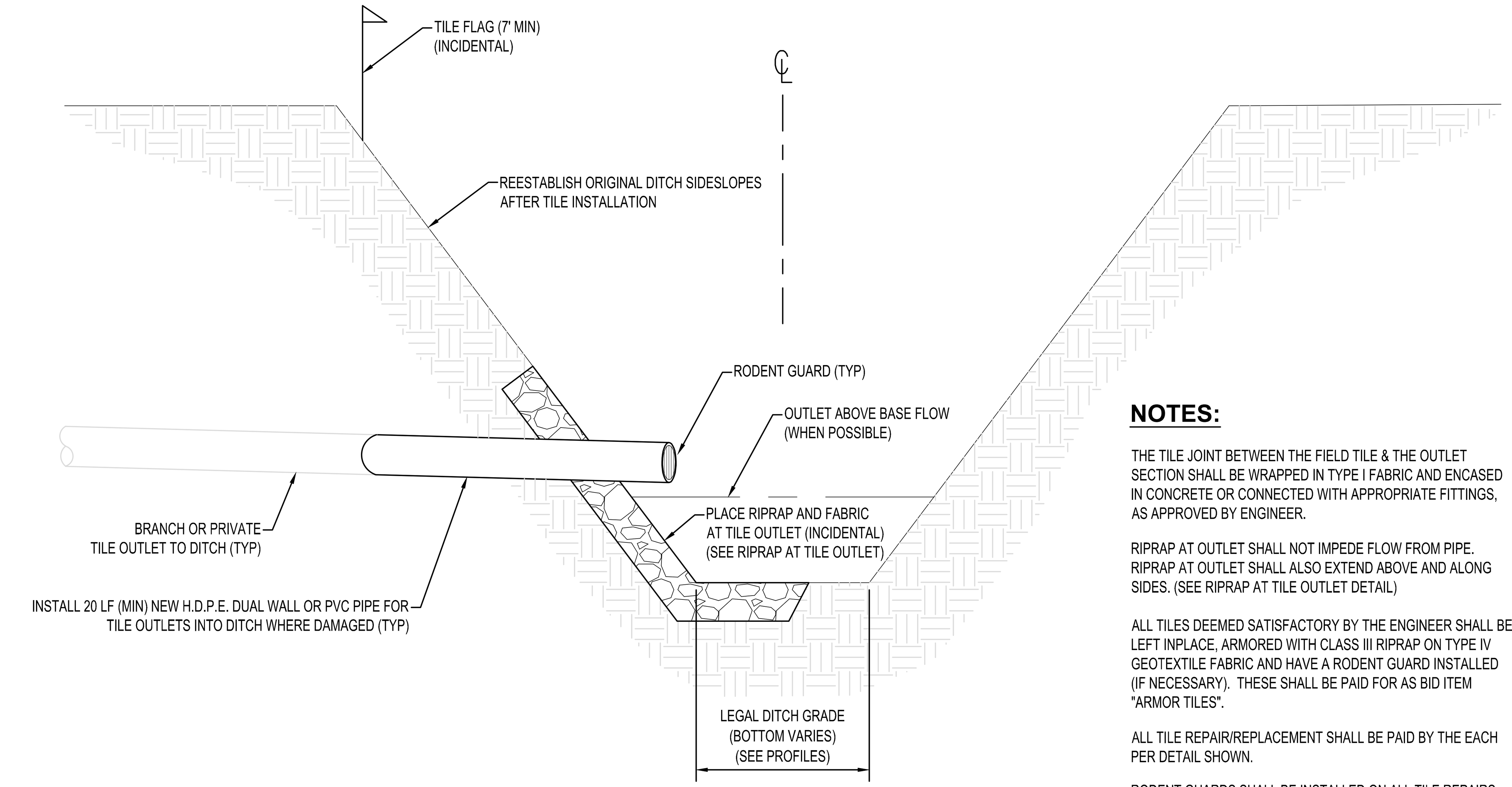
RIPRAP SHALL NOT IMPEDE FLOW FROM THE TILE OUTLET OR THE RECEIVING BODY.

RIPRAP OF THE OPPOSITE BANK MAY BE REQUIRED BY THE ENGINEER IN THE FIELD OR AS CALLED OUT IN THE PLANS. PAID FOR BY THE CUBIC YARD INSTALLED.

RIPRAP AT TILE OUTLET

NTS AG640

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



TYPICAL TILE OUTLET REPAIR

NTS AG630

NOTES:

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

RIPRAP AT OUTLET SHALL NOT IMPEDE FLOW FROM PIPE. RIPRAP AT OUTLET SHALL ALSO EXTEND ABOVE AND ALONG SIDES. (SEE RIPRAP AT TILE OUTLET DETAIL)

ALL TILES DEEMED SATISFACTORY BY THE ENGINEER SHALL BE LEFT INPLACE, ARMORED WITH CLASS III RIPRAP ON TYPE IV GEOTEXTILE FABRIC AND HAVE A RODENT GUARD INSTALLED (IF NECESSARY). THESE SHALL BE PAID FOR AS BID ITEM "ARMOR TILES".

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

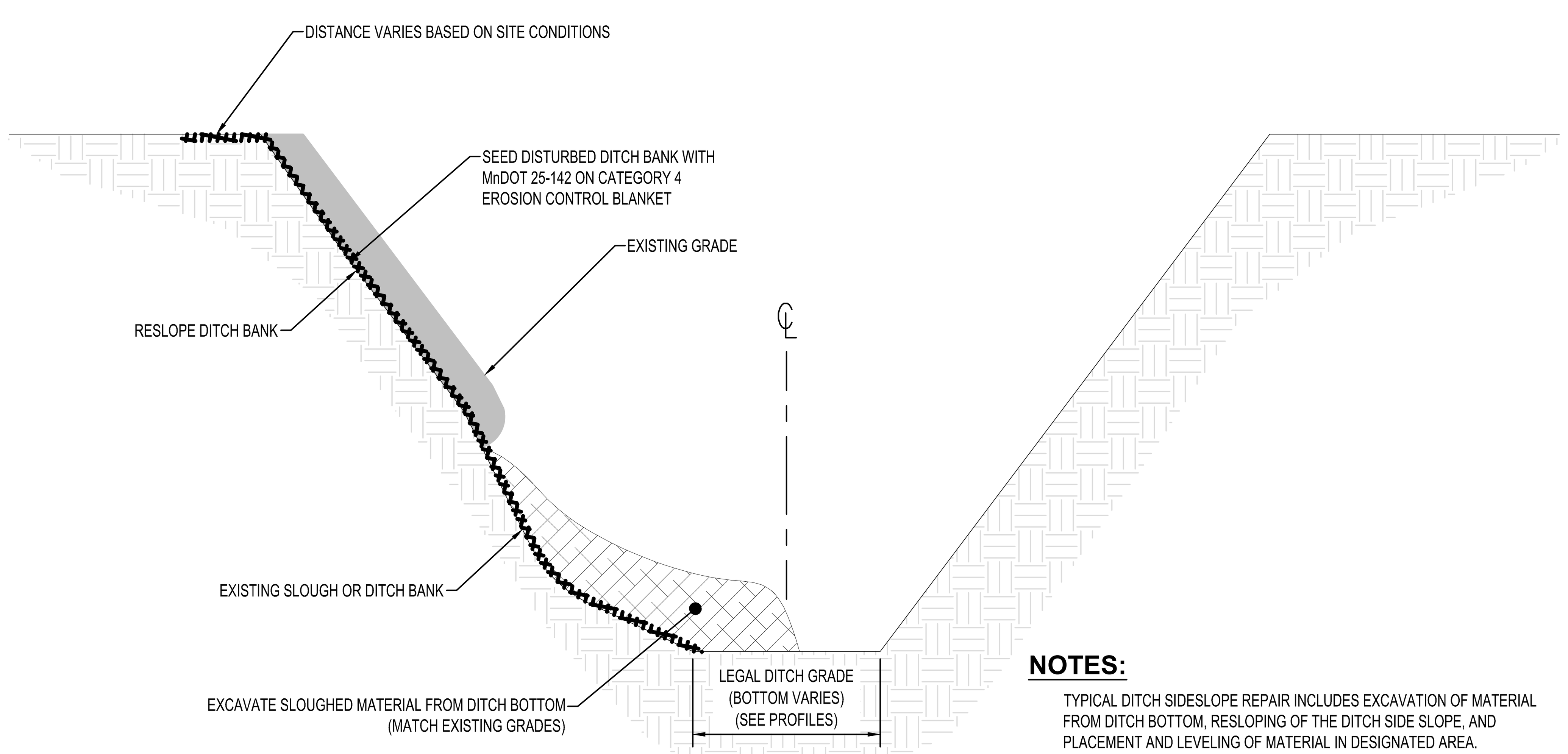
RODENT GUARDS SHALL BE INSTALLED ON ALL TILE REPAIRS 18" AND SMALLER, AND ARE INCIDENTAL TO THE PAY ITEM.

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

FENCE POST WITH 8' LONG PIECE OF PVC SLIPPED OVER IT MAY BE SUBSTITUTED FOR THE TILE FLAG.

REFER TO OPEN DITCH NOTES FOR ACCEPTABLE OUTLET MATERIAL TYPES.

SEEDING MUST OCCUR WITHIN 2 DAYS OF CONSTRUCTION.



NOTES:

TYPICAL DITCH SIDESLOPE REPAIR INCLUDES EXCAVATION OF MATERIAL FROM DITCH BOTTOM, RESLOPING OF THE DITCH SIDE SLOPE, AND PLACEMENT AND LEVELING OF MATERIAL IN DESIGNATED AREA.

DITCH SIDESLOPE REPAIR SHALL BE PAID FOR BY THE LINEAR FOOT MEASURED ALONG THE DITCH CENTERLINE.

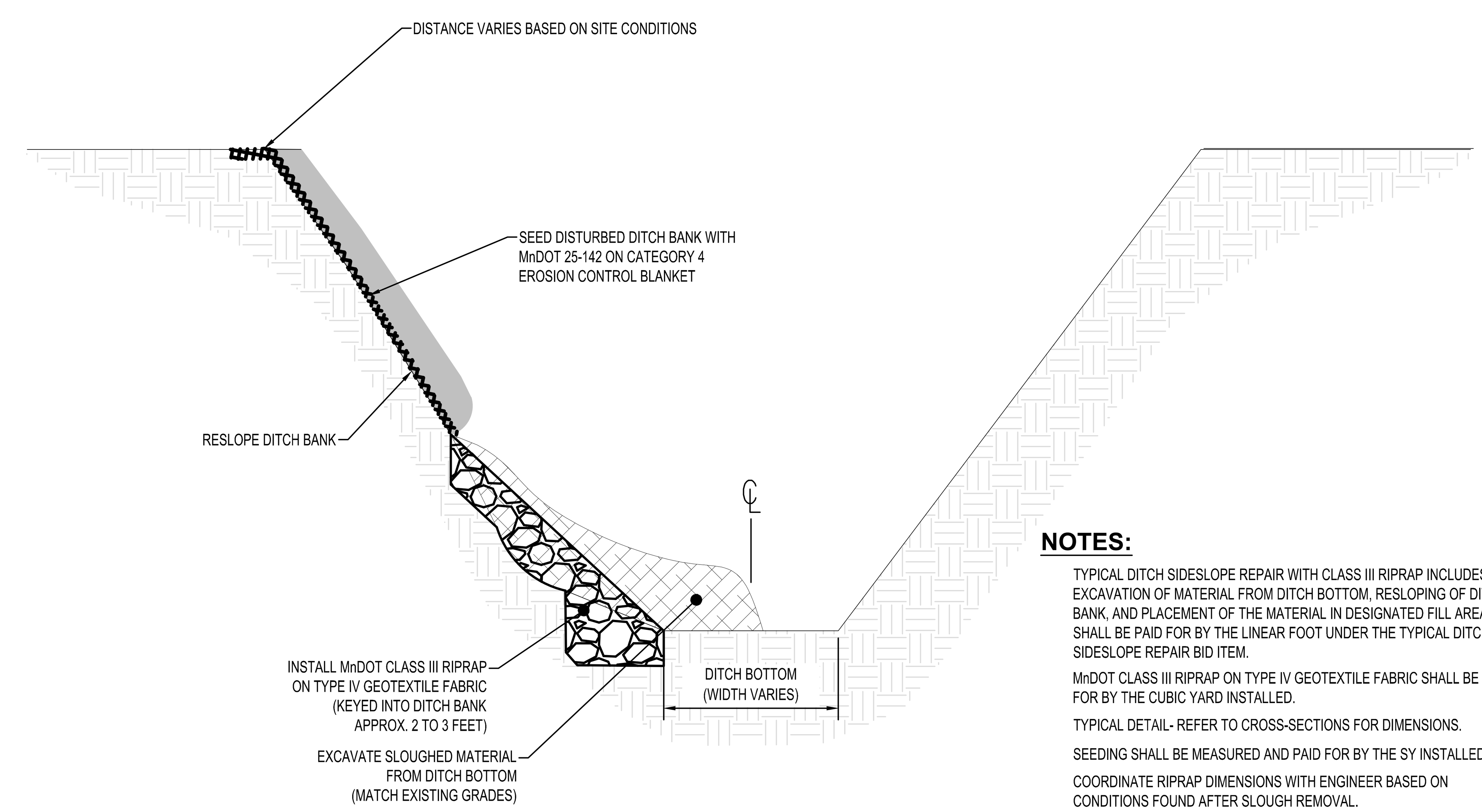
TYPICAL DETAIL- REFER TO CROSS-SECTIONS FOR DIMENSIONS.

SEEDING SHALL BE MEASURED AND PAID FOR BY THE SY INSTALLED.

DITCH BANK SEEDING MUST OCCUR WITHIN 2 DAYS OF CONSTRUCTION.

TYPICAL DITCH SIDESLOPE REPAIR

NTS AG460



NOTES:

TYPICAL DITCH SIDESLOPE REPAIR WITH CLASS III RIPRAP INCLUDES EXCAVATION OF MATERIAL FROM DITCH BOTTOM, RESLOPING OF DITCH BANK, AND PLACEMENT OF THE MATERIAL IN DESIGNATED FILL AREA AND SHALL BE PAID FOR BY THE LINEAR FOOT UNDER THE TYPICAL DITCH SIDESLOPE REPAIR BID ITEM.

MnDOT CLASS III RIPRAP ON TYPE IV GEOTEXTILE FABRIC SHALL BE PAID FOR BY THE CUBIC YARD INSTALLED.

TYPICAL DETAIL- REFER TO CROSS-SECTIONS FOR DIMENSIONS.

SEEDING SHALL BE MEASURED AND PAID FOR BY THE SY INSTALLED.

COORDINATE RIPRAP DIMENSIONS WITH ENGINEER BASED ON CONDITIONS FOUND AFTER SLOUGH REMOVAL.

DITCH BANK SEEDING MUST OCCUR WITHIN 2 DAYS OF CONSTRUCTION.

TYPICAL DITCH SIDESLOPE REPAIR
WITH CLASS III RIPRAP

NTS AG470

ISG

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MARK ORGER

DATE XX/XX/XX LIC. NO. 54863

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FARIBAULT COUNTY DITCH No. 64 REPAIRS

FARIBAULT COUNTY MINNESOTA

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TITLE

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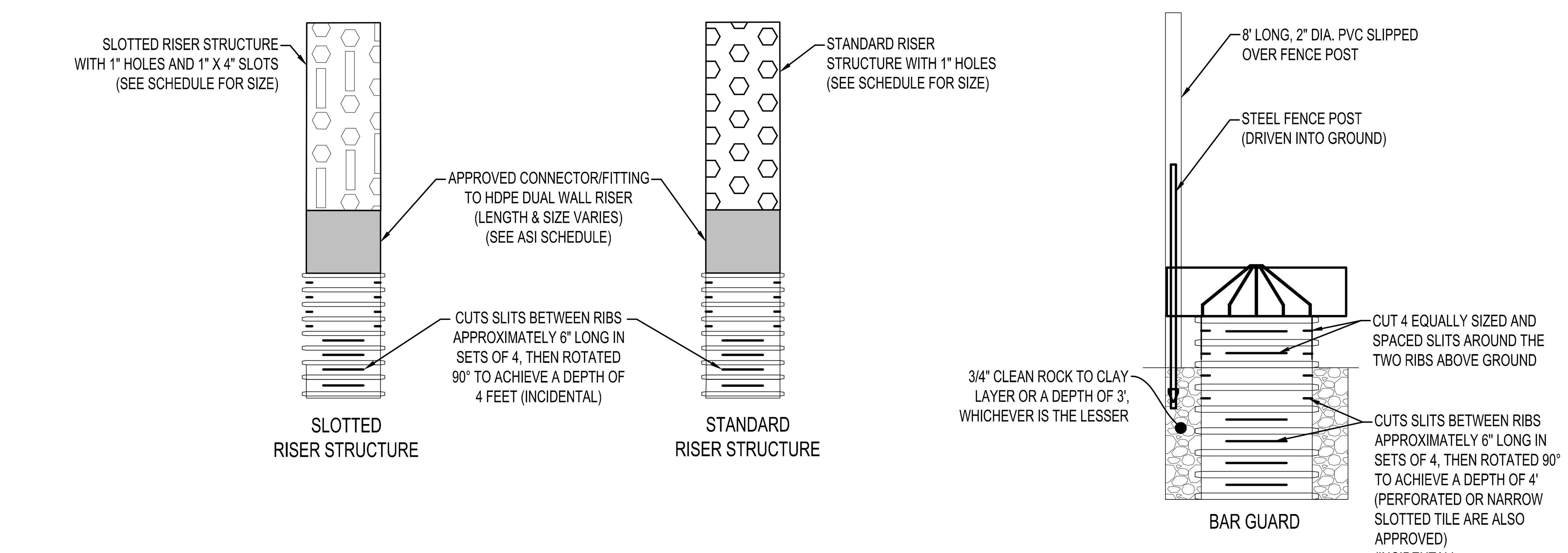
6 OF 21



DETAIL A

NOTES:

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

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

ALL DISTURBED AREAS WITHIN BUFFER EASEMENT SHALL BE SEEDED WITH BUFFER BLEND SEED MIX ON CATEGORY 4 EROSION CONTROL BLANKET. (INCIDENTAL)

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

ALL INTAKES SHALL BE WRAPPED WITH MnDOT TYPE 1 GEOTEXTILE FABRIC. (INCIDENTAL TO RISER ASSEMBLY)

ALL SLITS CUT INTO RISER ARE INCIDENTAL TO RISER ASSEMBLY.

ALL 3/4" CLEAN ROCK AND GRANULAR FOUNDATION MATERIAL IS INCIDENTAL TO RISER ASSEMBLY.

ALL OUTLET RIPRAP IS INCIDENTAL TO OUTLET ASSEMBLY.

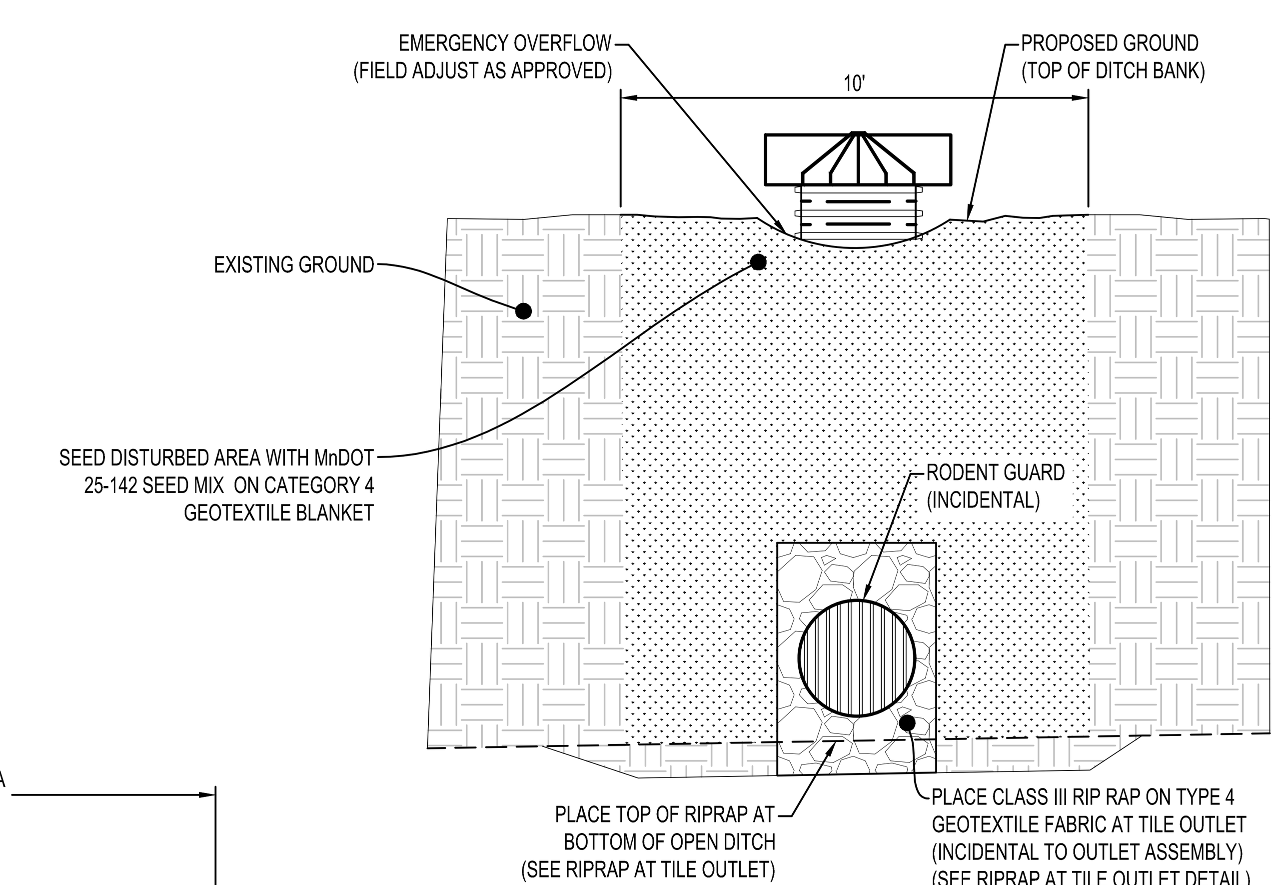
INTAKES SHALL BE FIELD ADJUSTED BASED ON ACTUAL LOCATION OF LOW AREAS, AS DETERMINED BY THE ENGINEER.

TILE OUTLET ASSEMBLY SHALL CONFORM TO STANDARD TILE INSTALLATION.

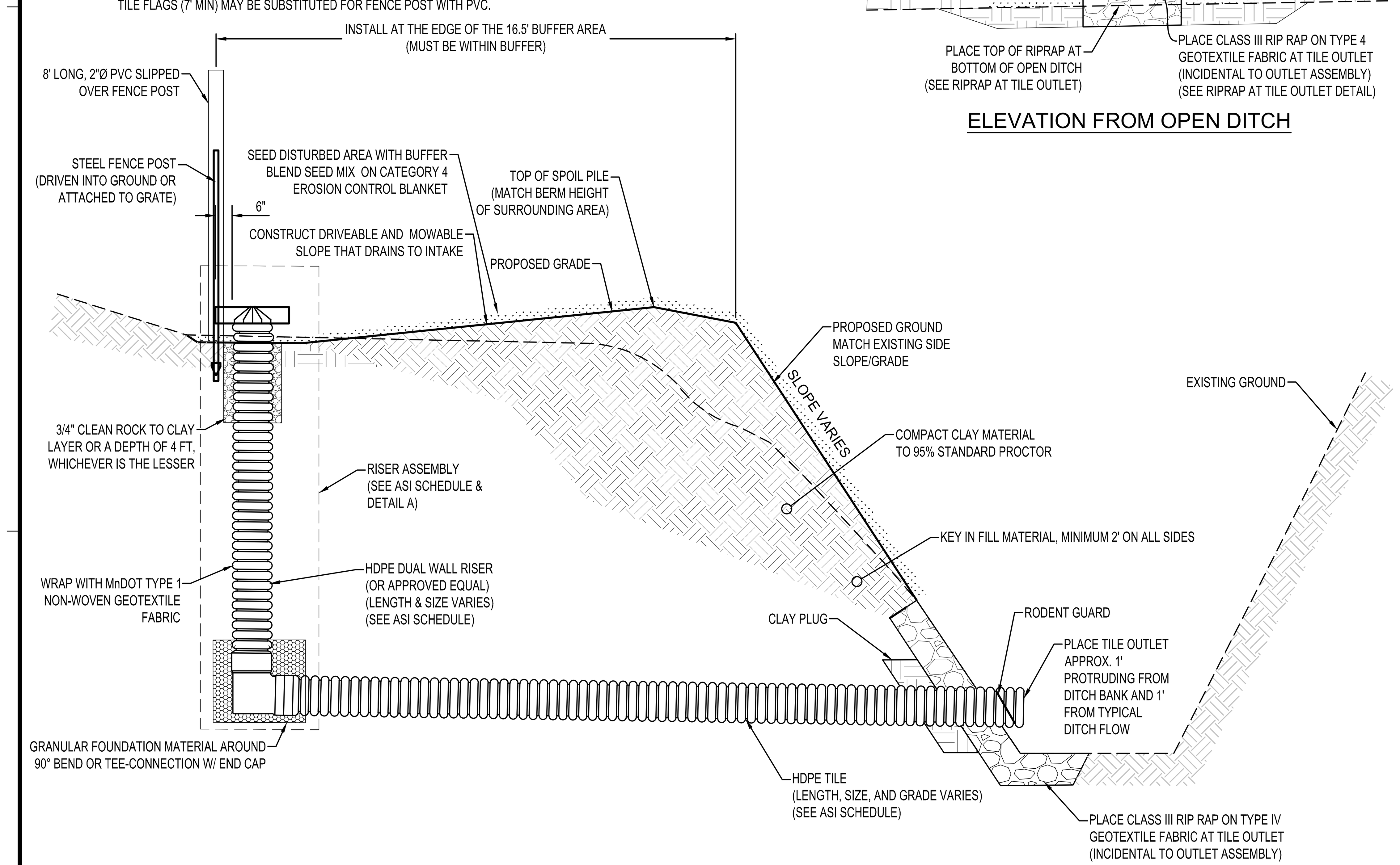
SHAPING OF LOW AREA TO GRADE TO DROP INTAKE SHALL BE INCIDENTAL TO PAY ITEM.

TRASH GRATE, ANTI-VORTEX PLATE, AND FENCE POST WITH PVC SHALL BE INCIDENTAL.

TILE FLAGS (7' MIN) MAY BE SUBSTITUTED FOR FENCE POST WITH PVC.

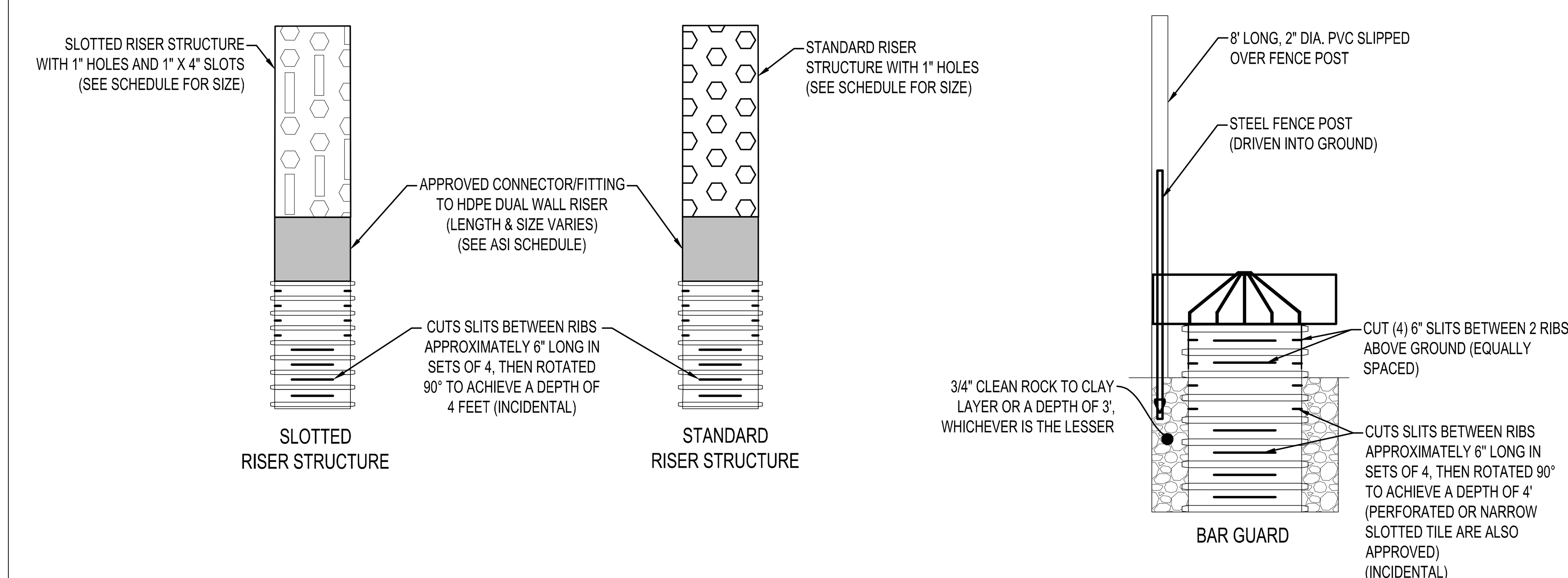


ELEVATION FROM OPEN DITCH



ALTERNATIVE SIDE INLET (ASI)

NTS AG600



DETAIL A

NOTES:

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

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

ALL DISTURBED AREAS WITHIN BUFFER EASEMENT SHALL BE SEEDED WITH BUFFER BLEND SEED MIX ON CATEGORY 4 EROSION CONTROL BLANKET. (INCIDENTAL)

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

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ALL SLITS CUT INTO RISER ARE INCIDENTAL TO RISER ASSEMBLY.

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ALL OUTLET RIPRAP IS INCIDENTAL TO OUTLET ASSEMBLY

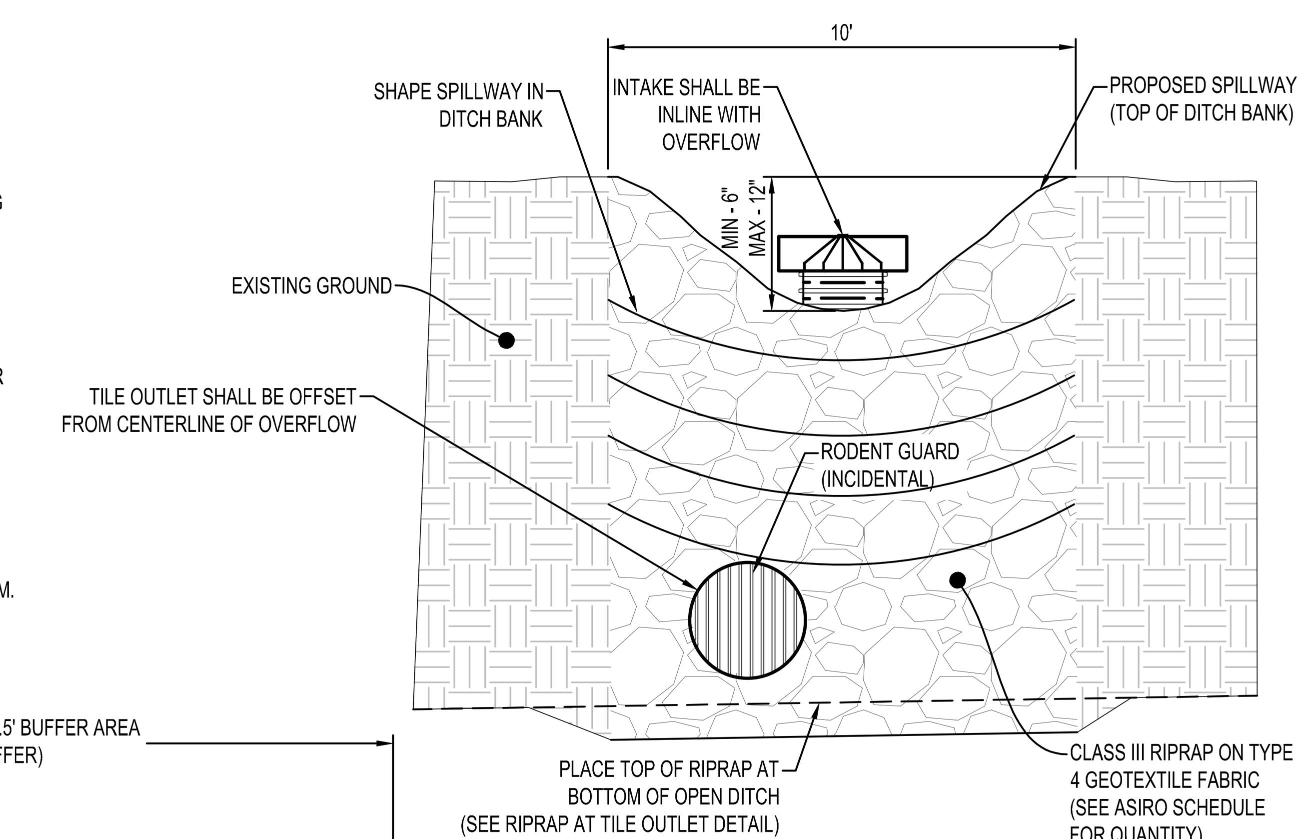
INTAKES SHALL BE FIELD ADJUSTED BASED ON ACTUAL LOCATION OF LOW AREAS, AS DETERMINED BY THE ENGINEER.

TILE OUTLET ASSEMBLY SHALL CONFORM TO STANDARD TILE INSTALLATION.

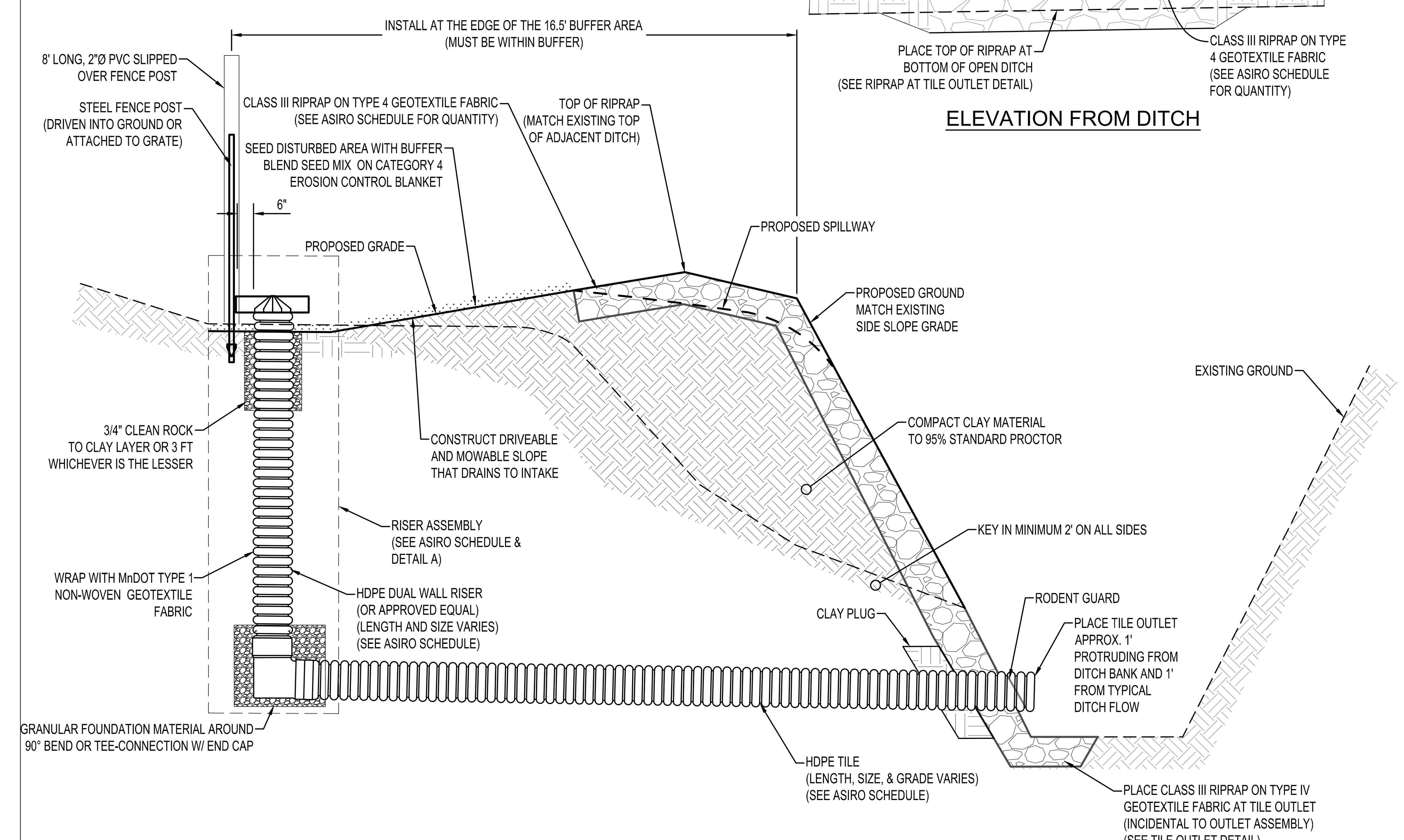
SHAPING OF LOW AREA TO GRADE TO DROP INTAKE SHALL BE INCIDENTAL TO PAY ITEM.

TRASH GRATE, ANTI-VORTEX PLAT, AND FENCE POST WITH PVC SHALL BE INCIDENTAL.

TILE FLAGS (7' MIN) MAY BE SUBSTITUTED FOR FENCE POST WITH PVC.



ELEVATION FROM DITCH



ALTERNATIVE SIDE INLET WITH RIPRAP OVERFLOW (ASIRO)

NTS AG610

ISG

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MARC ... RIGER

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PROJECT

FARIBAULT COUNTY DITCH No. 64 REPAIRS

FARIBAULT COUNTY MINNESOTA

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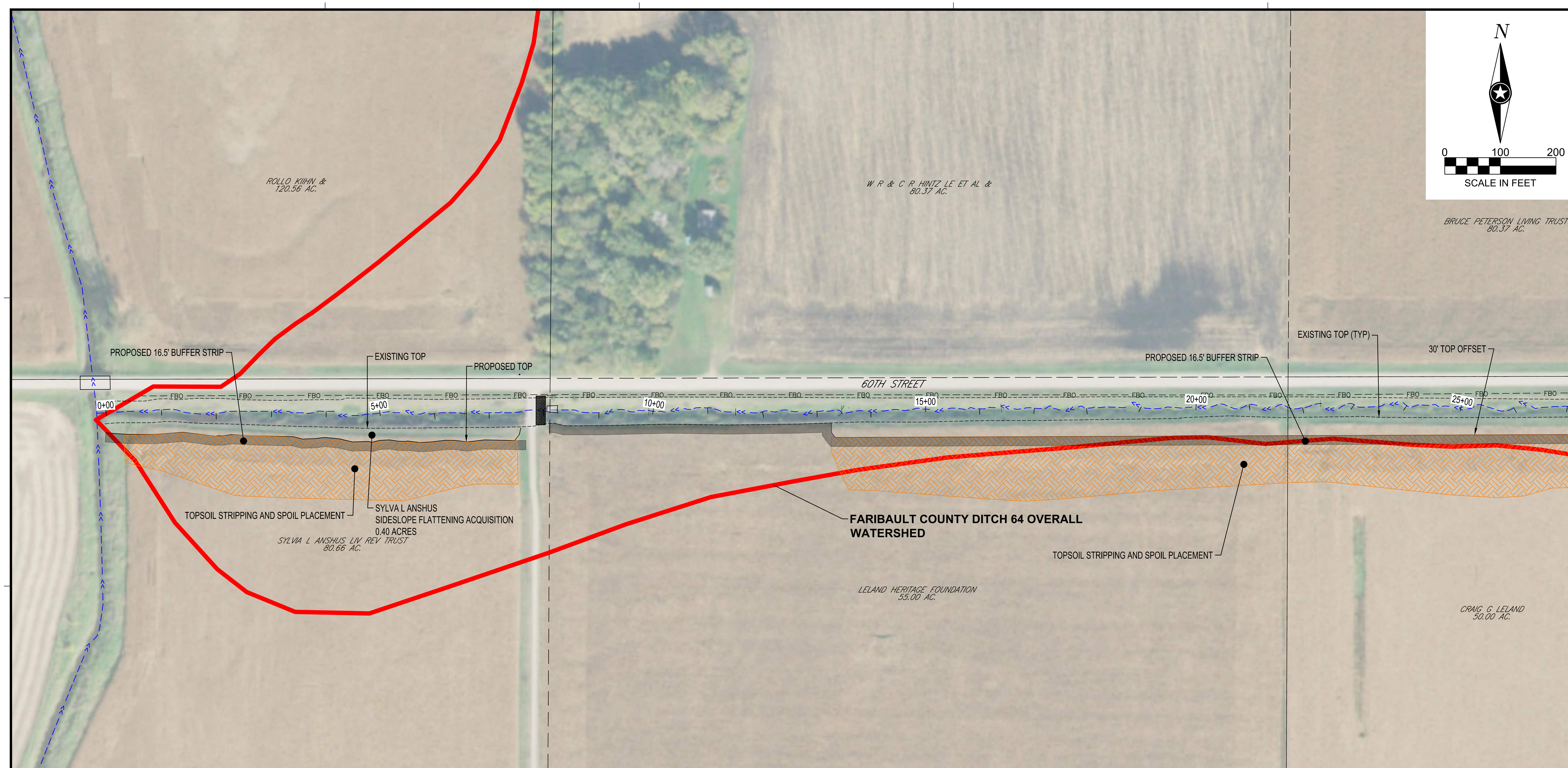

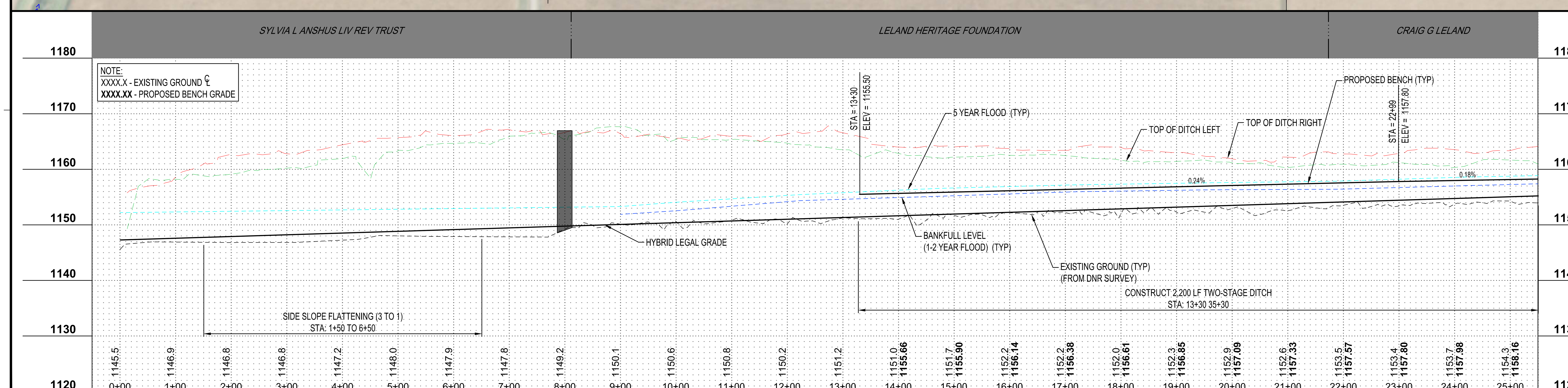

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FARIBAULT COUNTY DITCH No. 64 REPAIRS

REVISION SCHEDULE

DATE	DESCRIPTION	BY

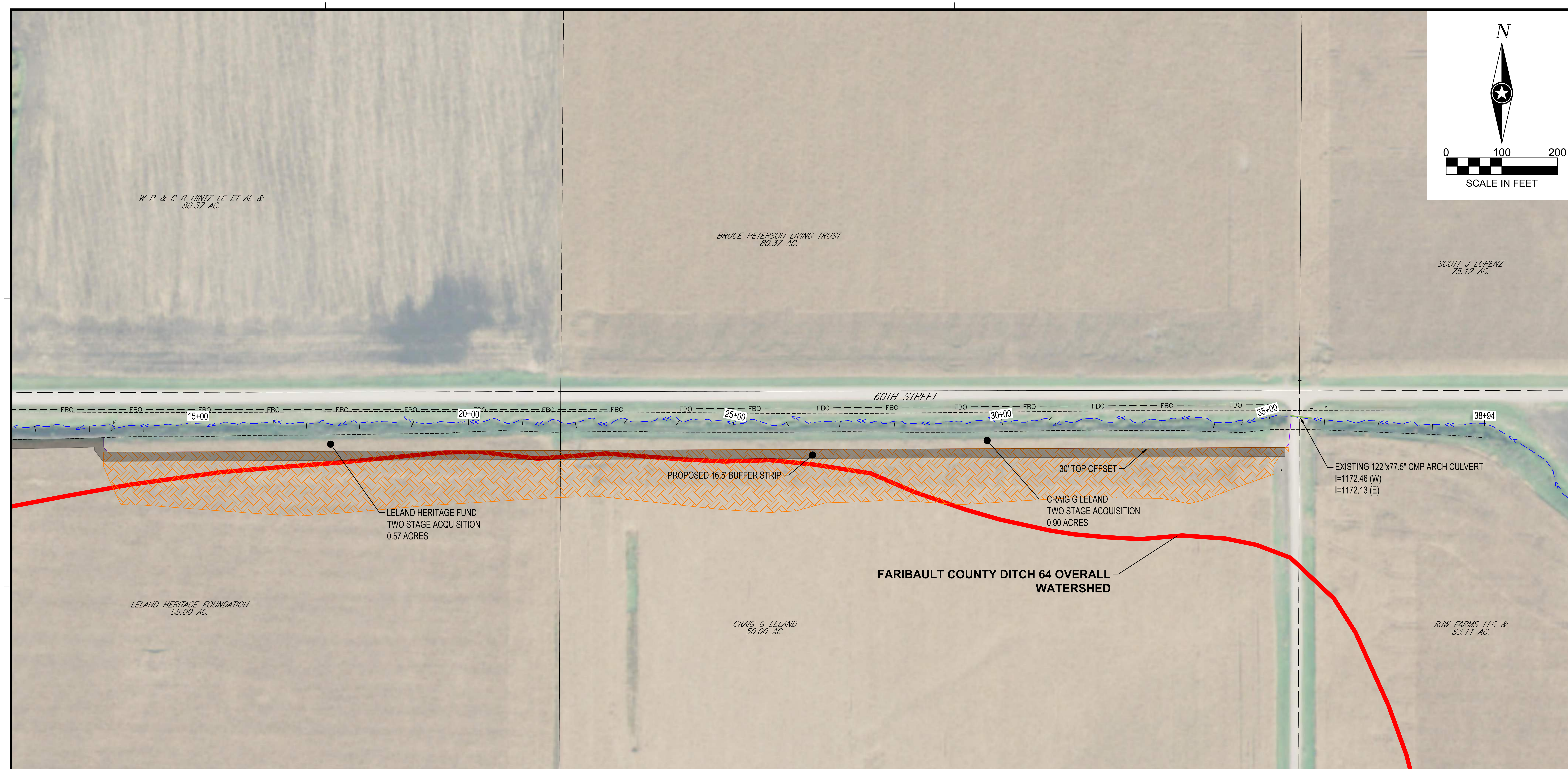
PROJECT NO.	18-21098
FILE NAME	21098 2-STAGE PLN-PROF
DRAWN BY	-
DESIGNED BY	-
REVIEWED BY	-
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

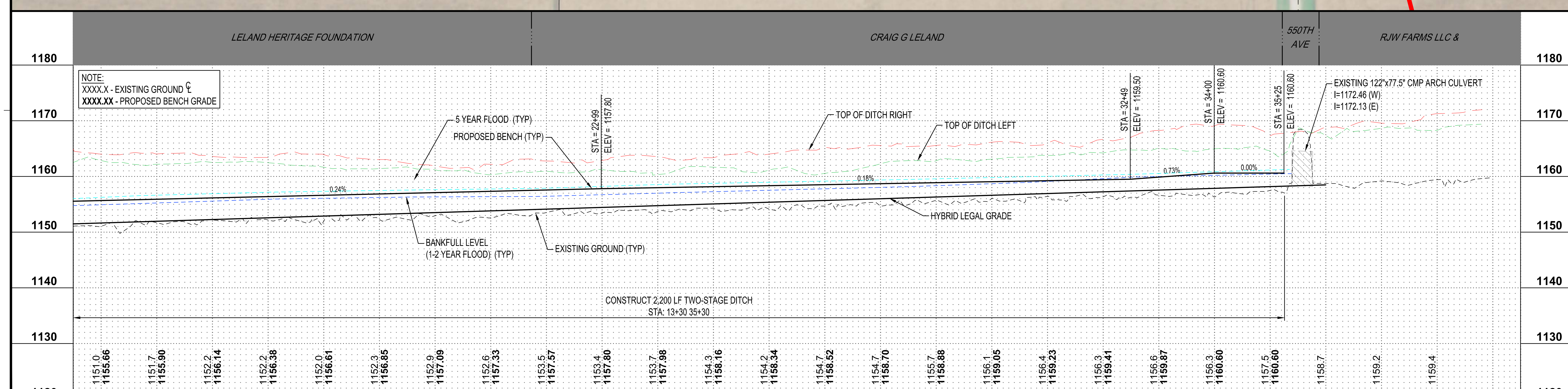
TITLE

PLAN-PROFILE (MAINLINE)

SHEET

8 OF 9





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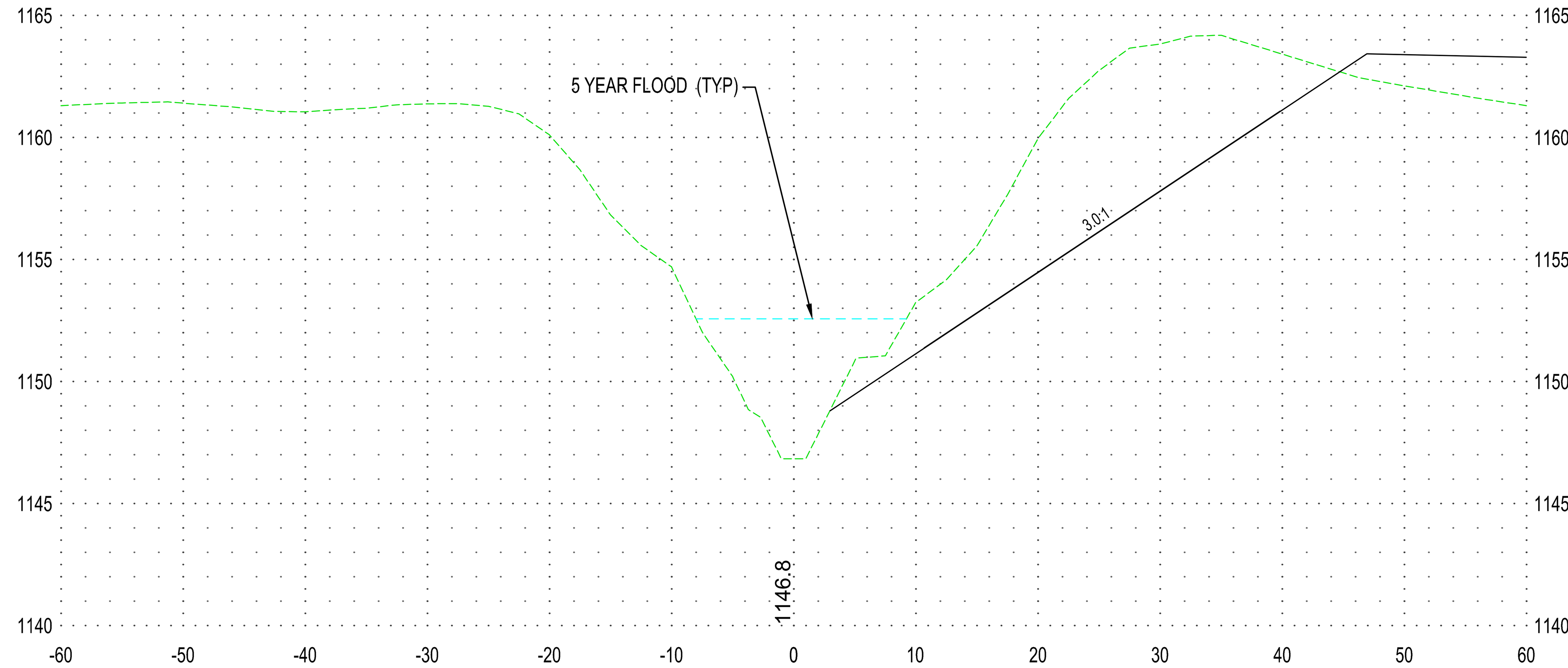
PLAN-PROFILE (MAINLINE)

SHEET

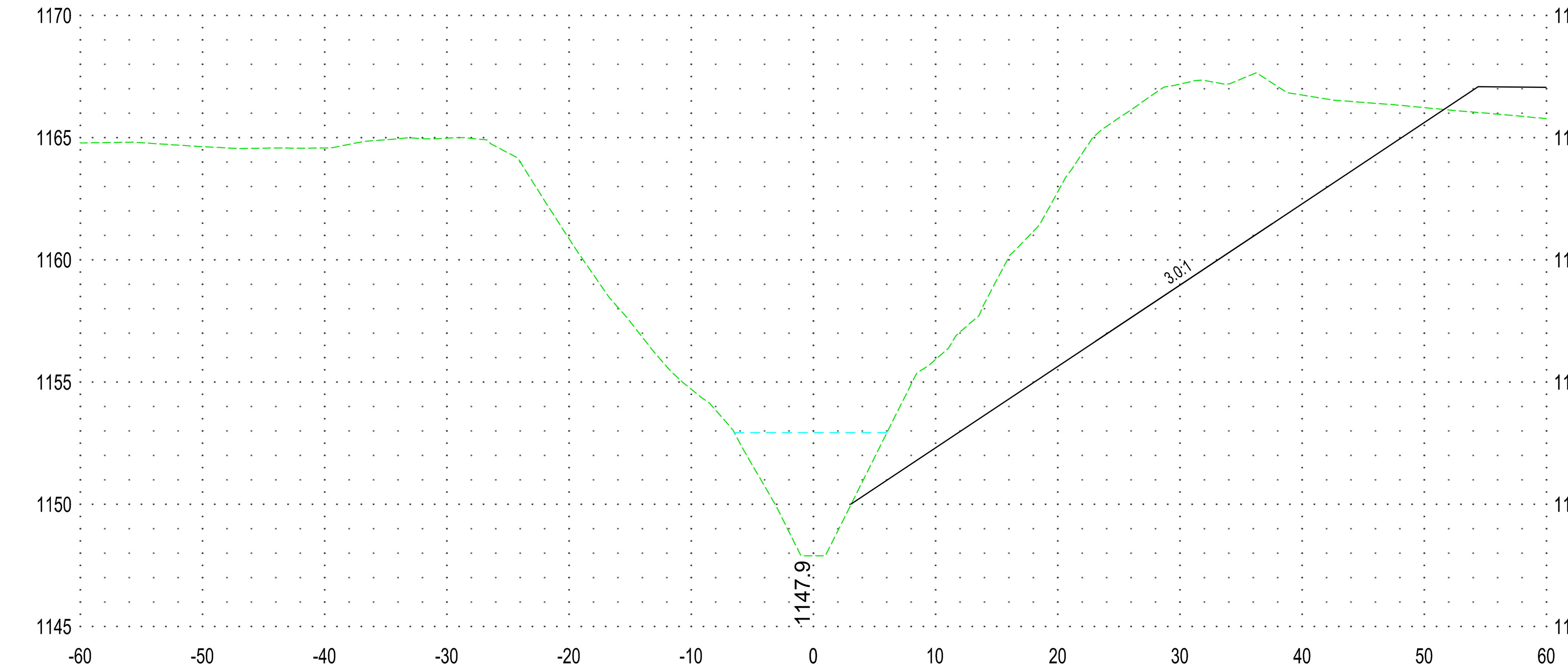
NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATION

0 10 20
SCALE IN FEET

3+00



6+00



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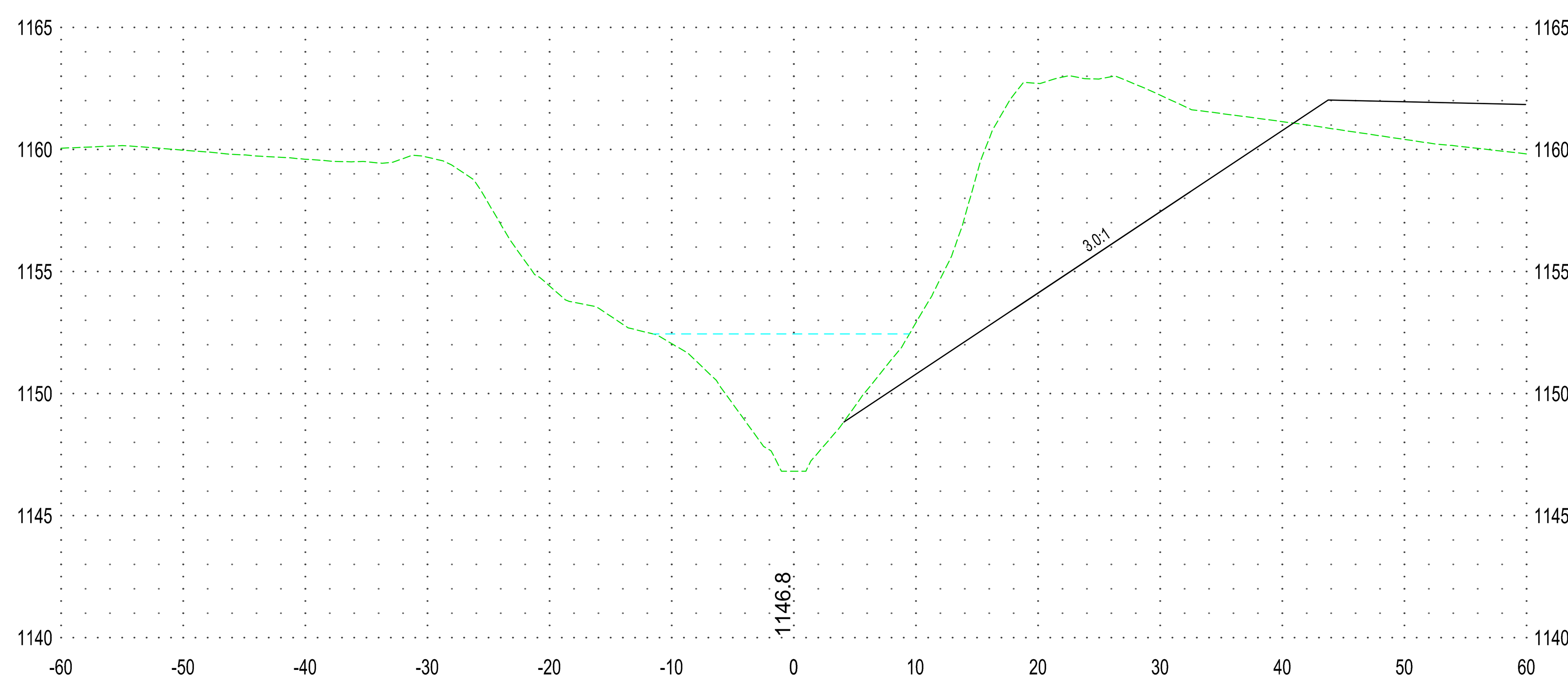

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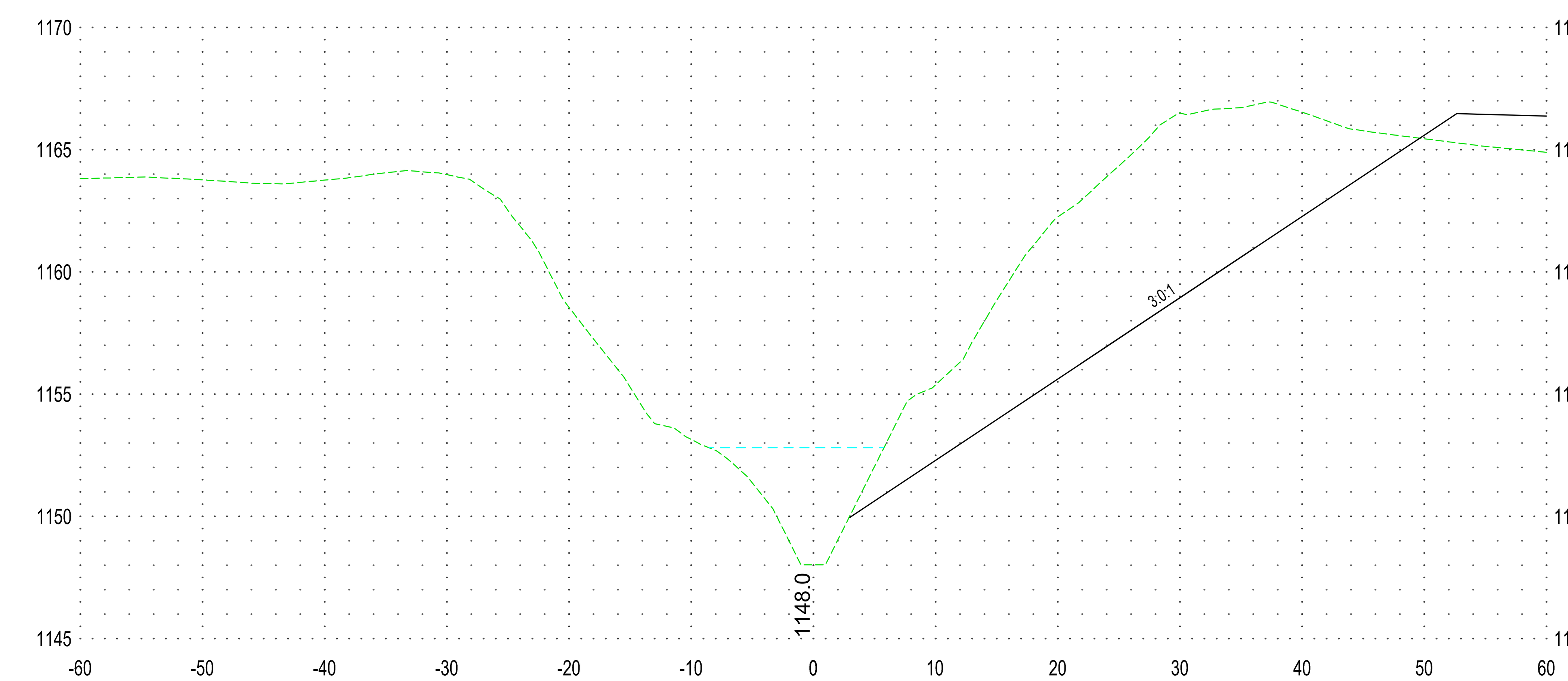

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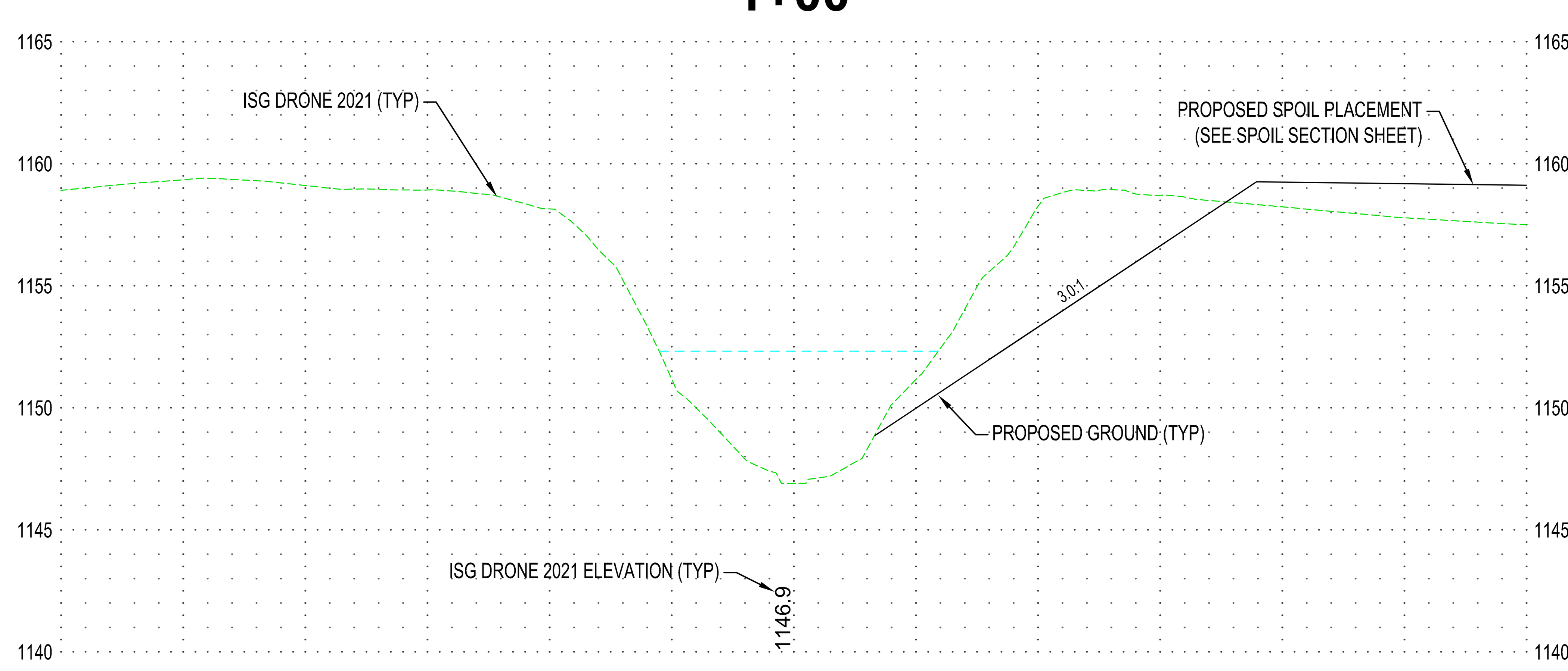

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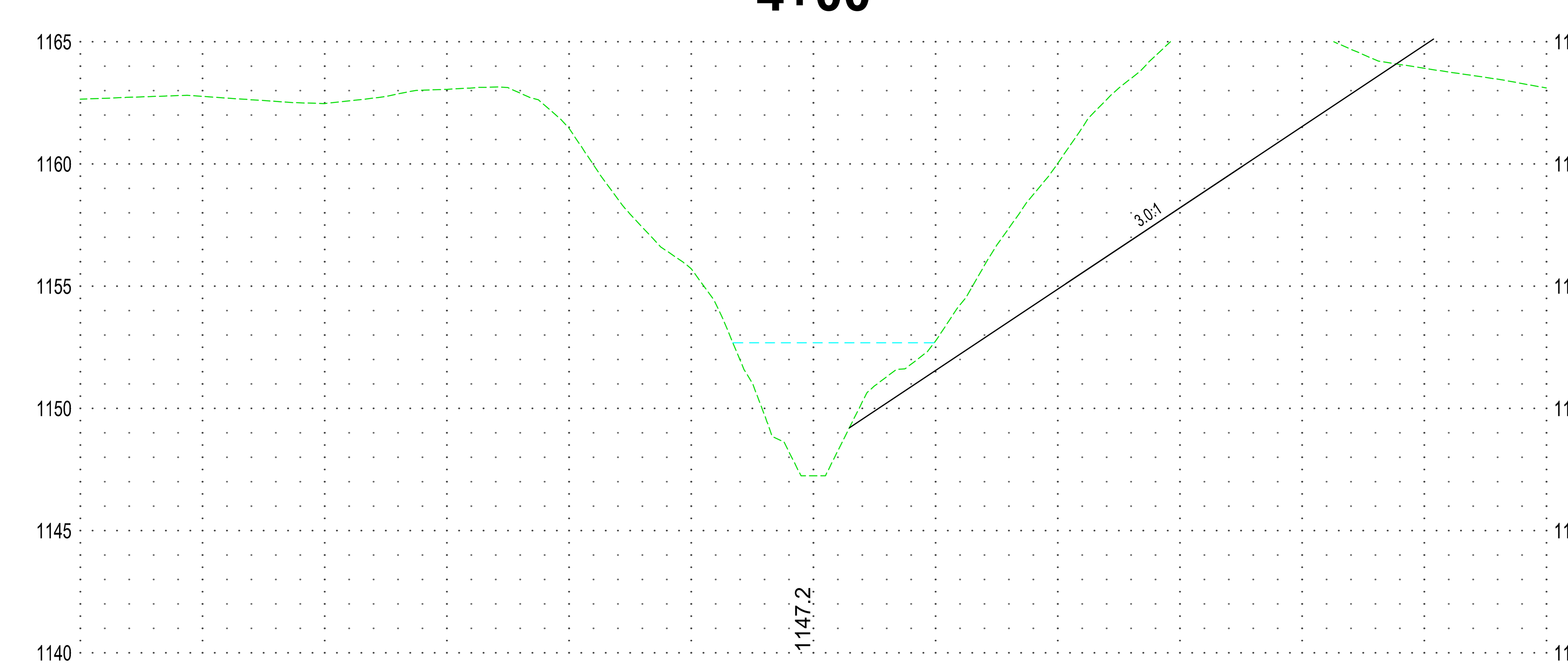

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PROJECT NO.	18-21098
FILE NAME	21098 2-STAGE SECTIONS
DRAWN BY	-
DESIGNED BY	-
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CLIENT PROJECT NO.	-

TITLE

CROSS SECTIONS (MAINLINE)

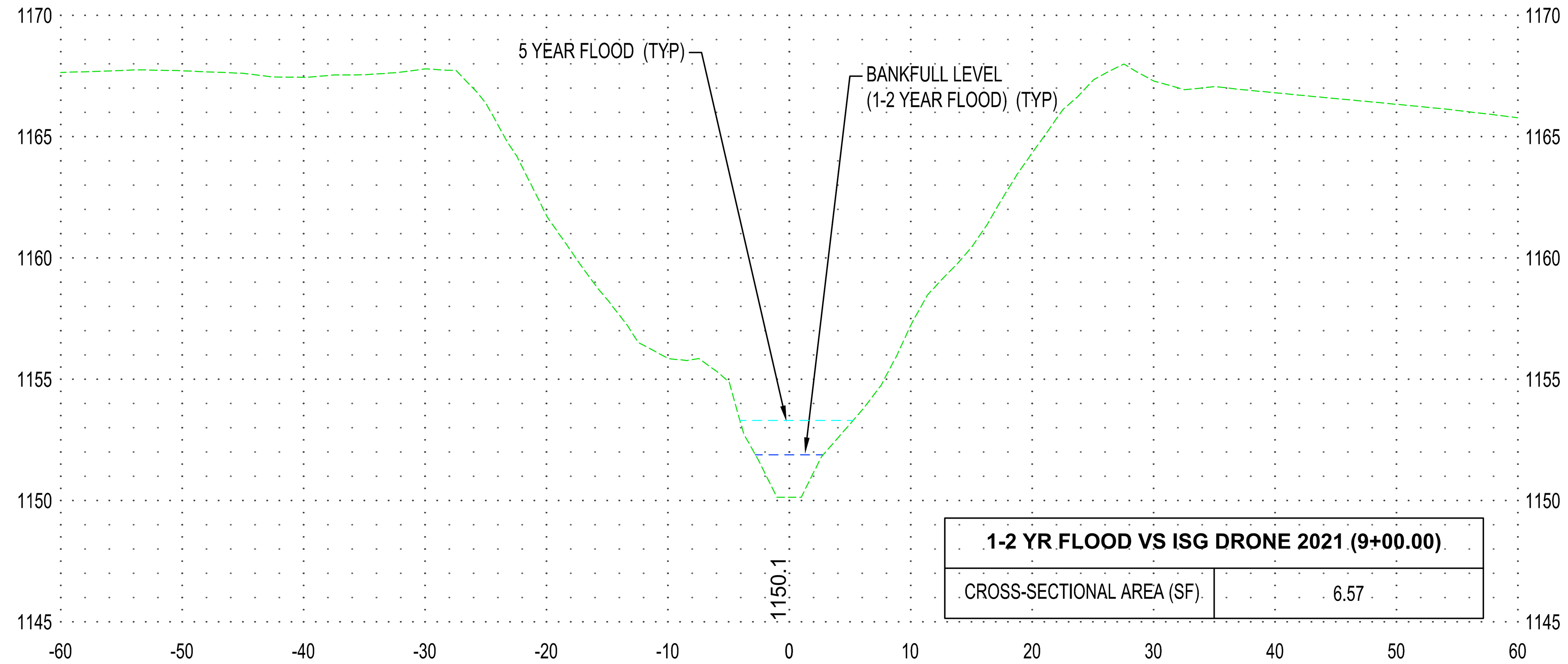
SHEET

10 OF 9

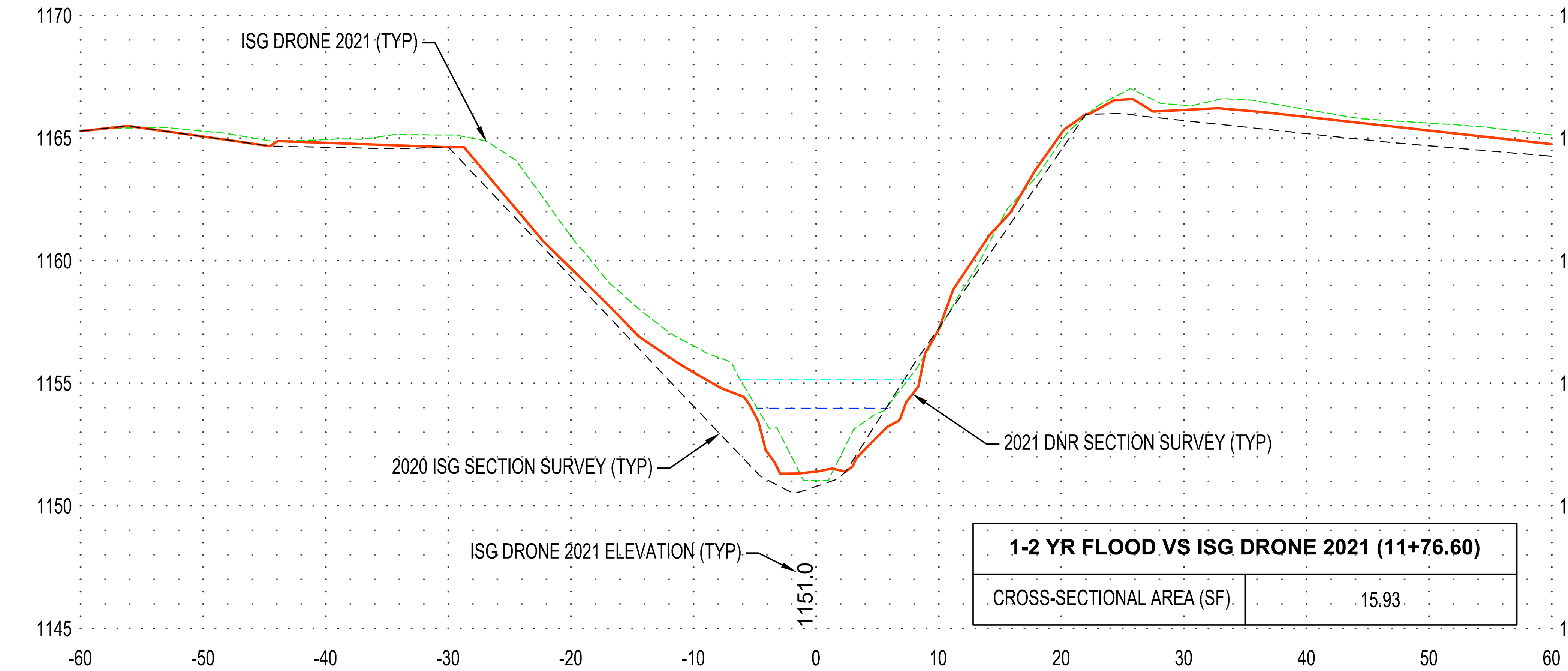
NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATION

0 10 20
SCALE IN FEET

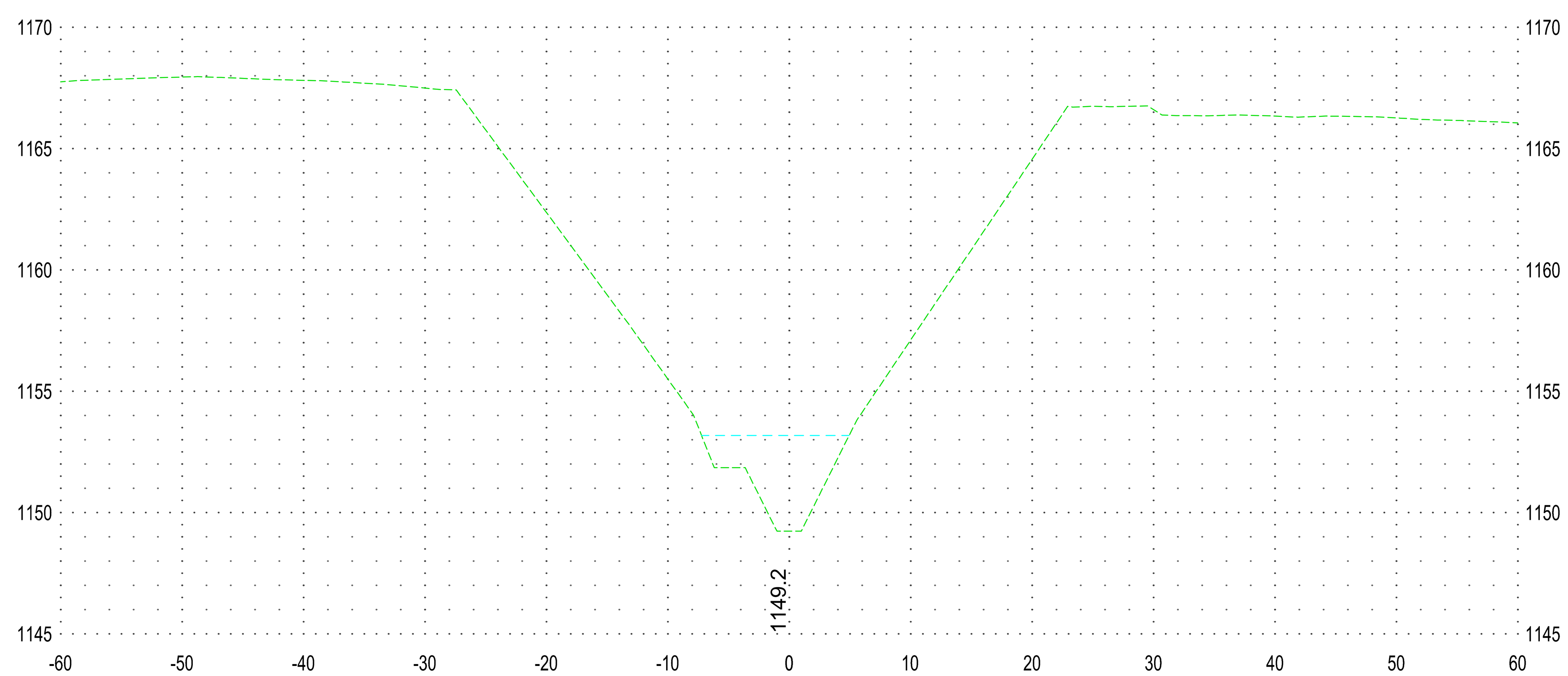
9+00



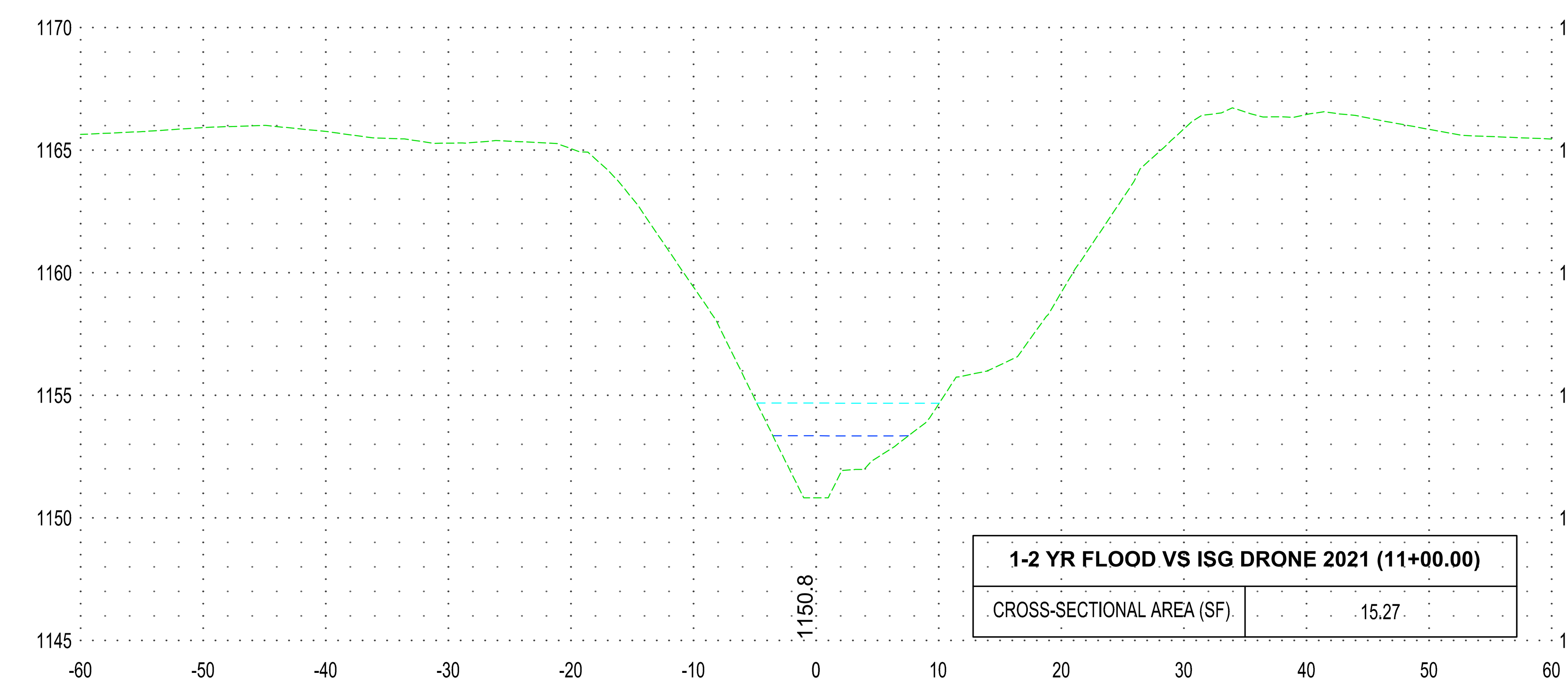
11+77



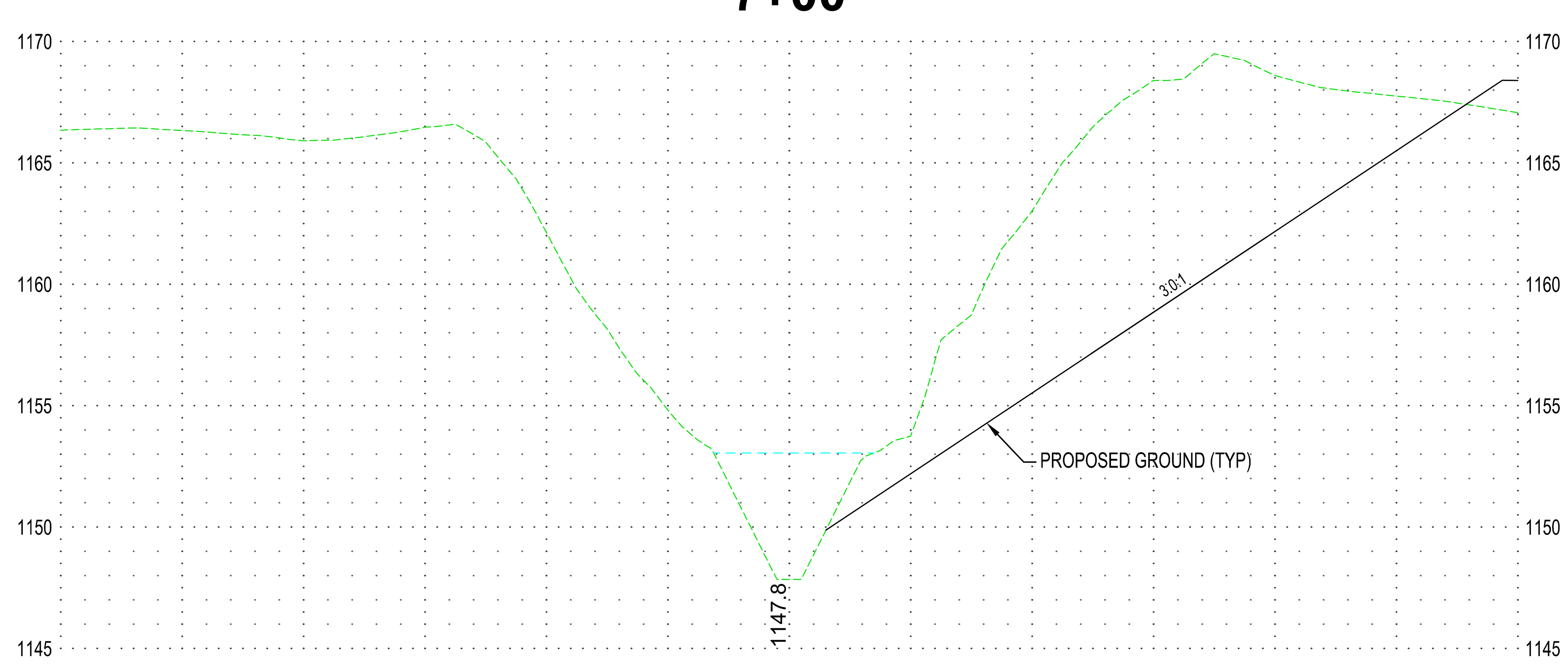
8+00



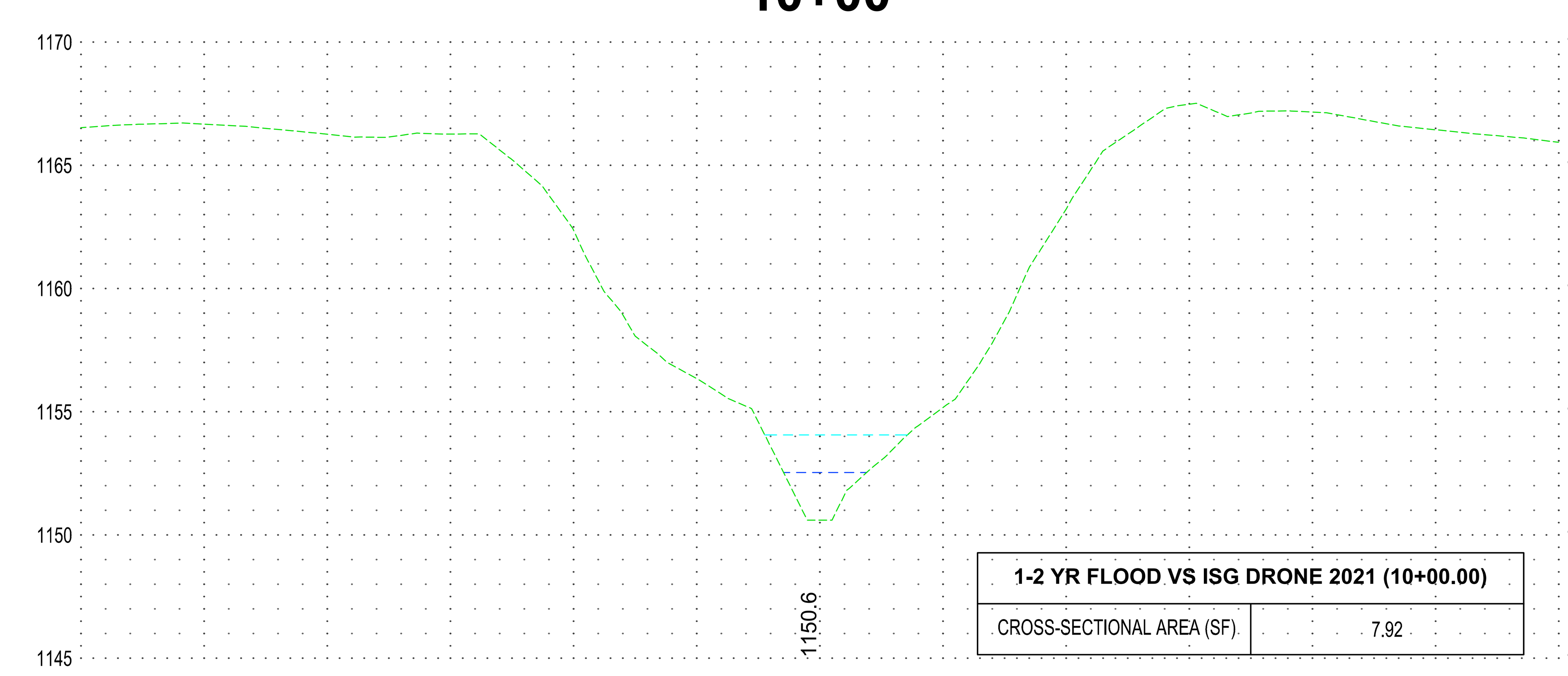
11+00



7+00



10+00



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MARK ORIGER

DATE XX/XX/XX LIC. NO. 54863

PROJECT

FARIBAULT COUNTY DITCH No. 64 REPAIRS

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	18-21098
FILE NAME	21098 2-STAGE SECTIONS
DRAWN BY	-
DESIGNED BY	-
REVIEWED BY	-
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

TITLE

CROSS SECTIONS (MAINLINE)

SHEET

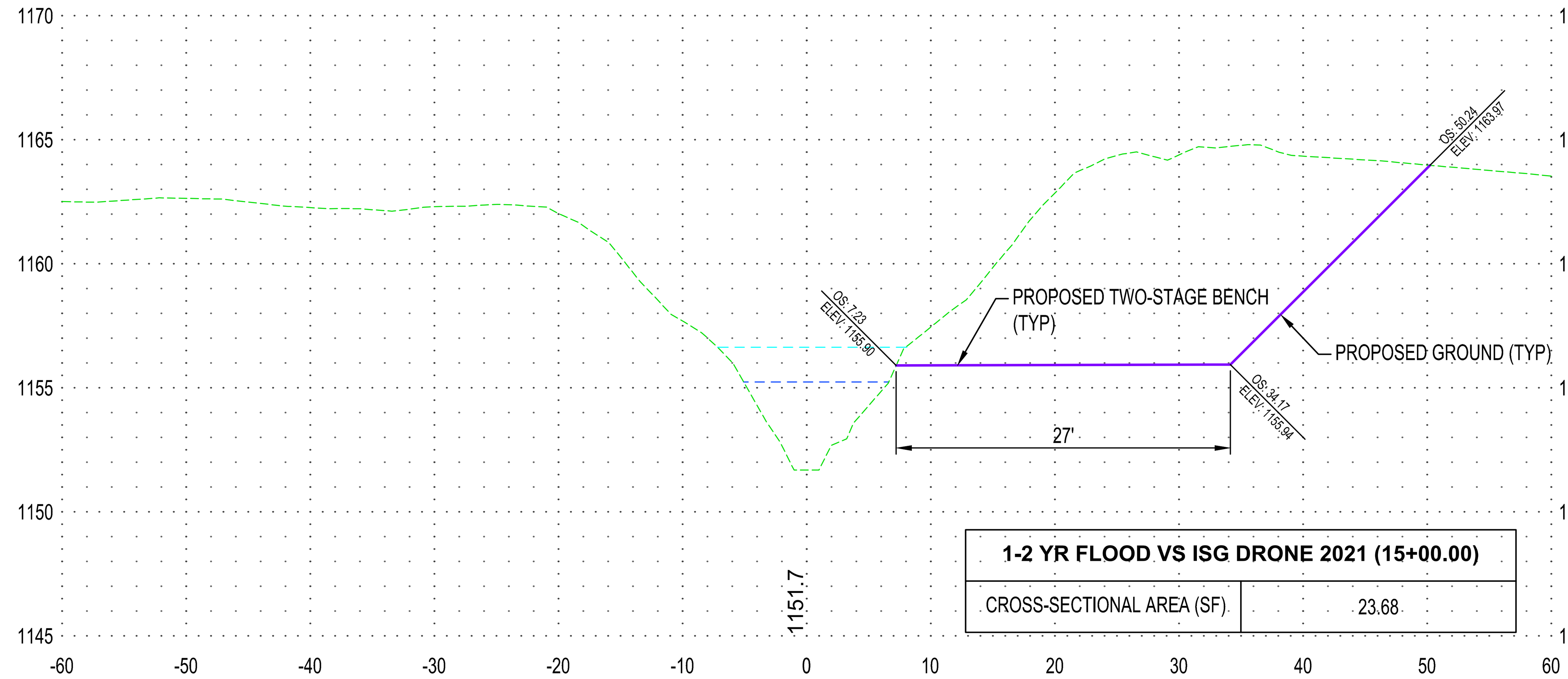
11

OF 9

NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATION

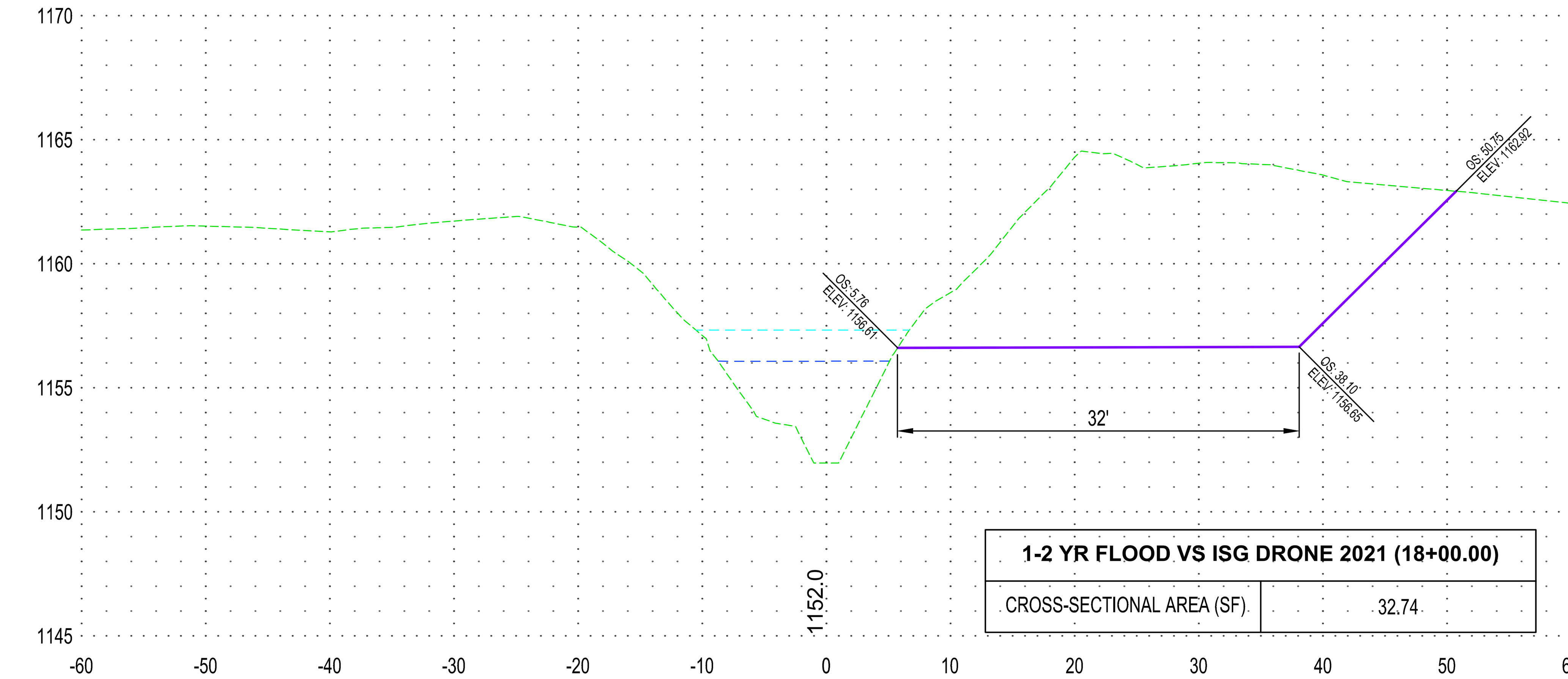
0 10 20
SCALE IN FEET

15+00



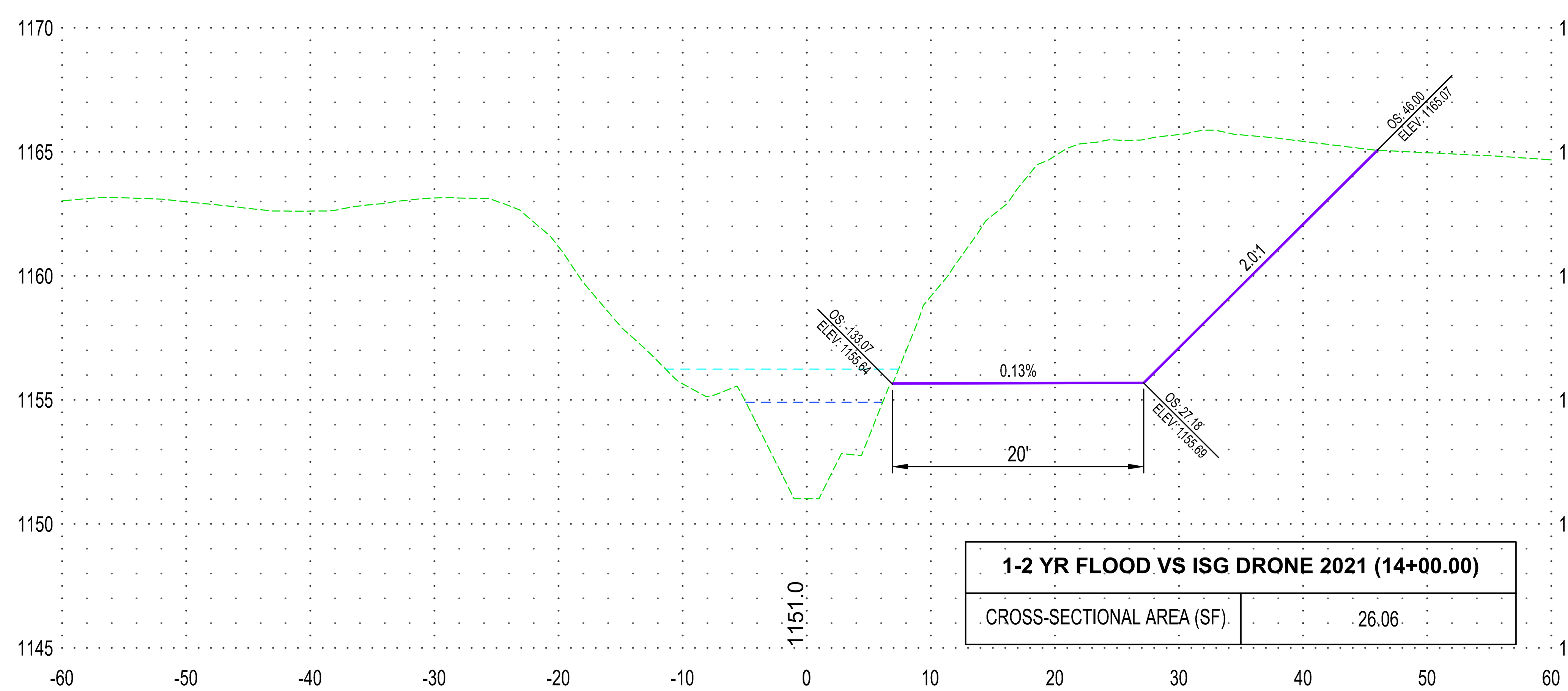
1-2 YR FLOOD VS ISG DRONE 2021 (15+00.00)	
CROSS-SECTIONAL AREA (SF)	23.68

18+00



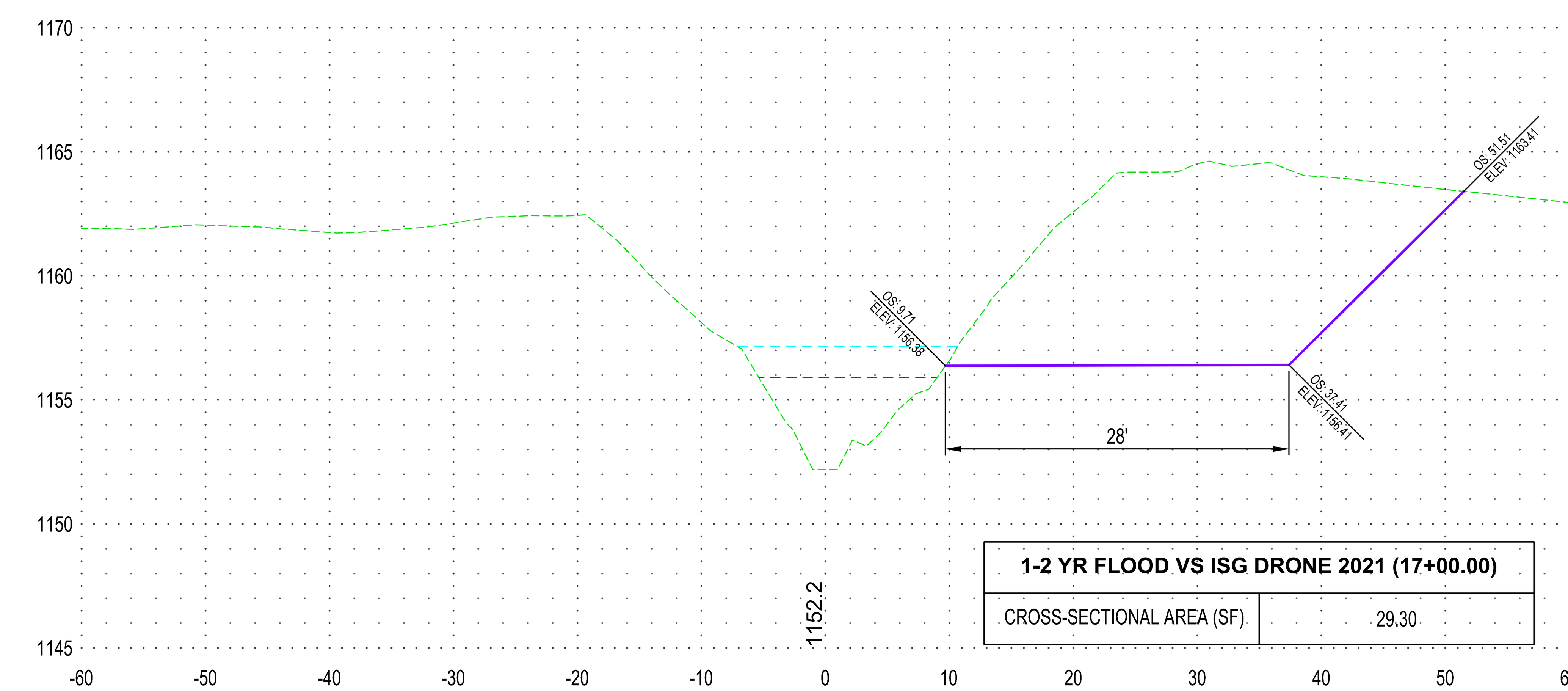
1-2 YR FLOOD VS ISG DRONE 2021 (18+00.00)	
CROSS-SECTIONAL AREA (SF)	32.74

14+00



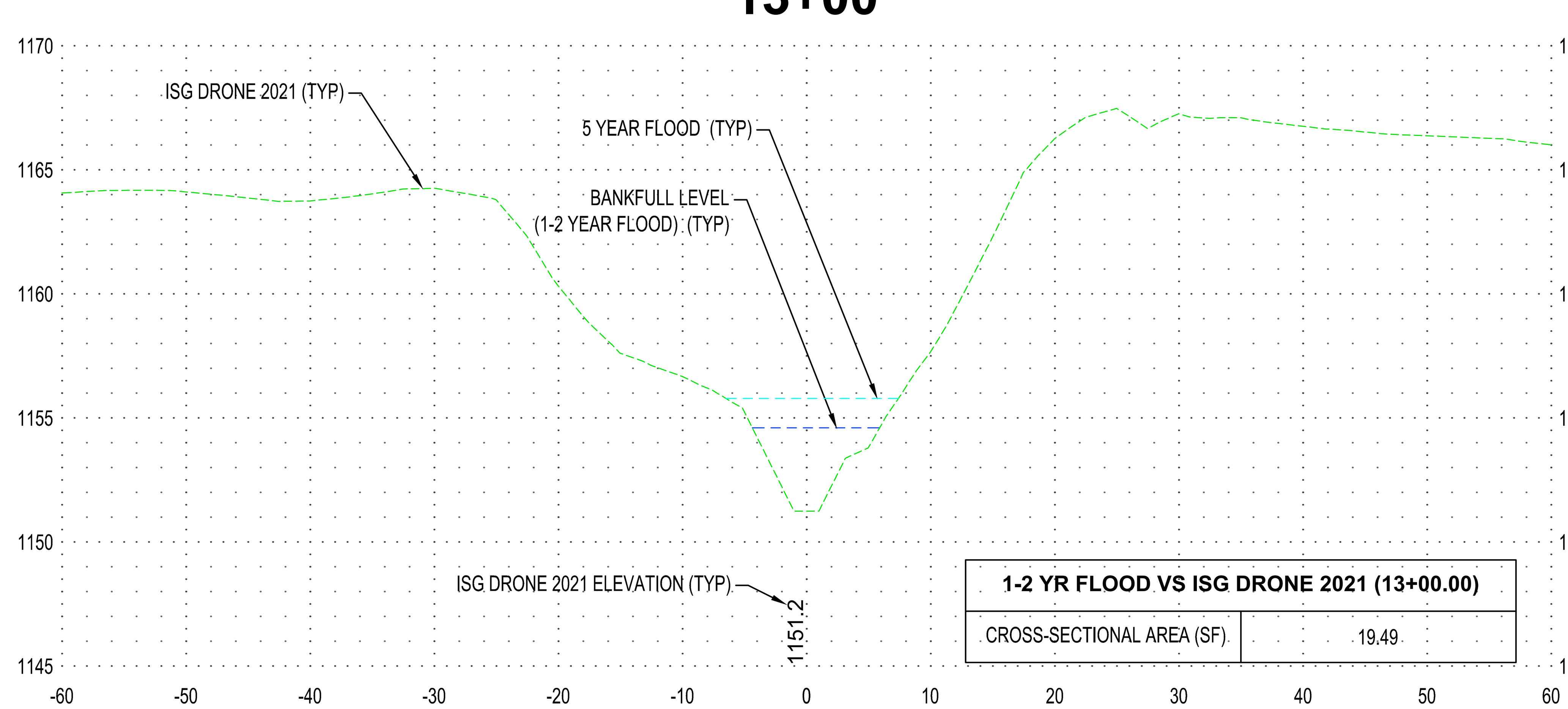
1-2 YR FLOOD VS ISG DRONE 2021 (14+00.00)	
CROSS-SECTIONAL AREA (SF)	26.06

17+00



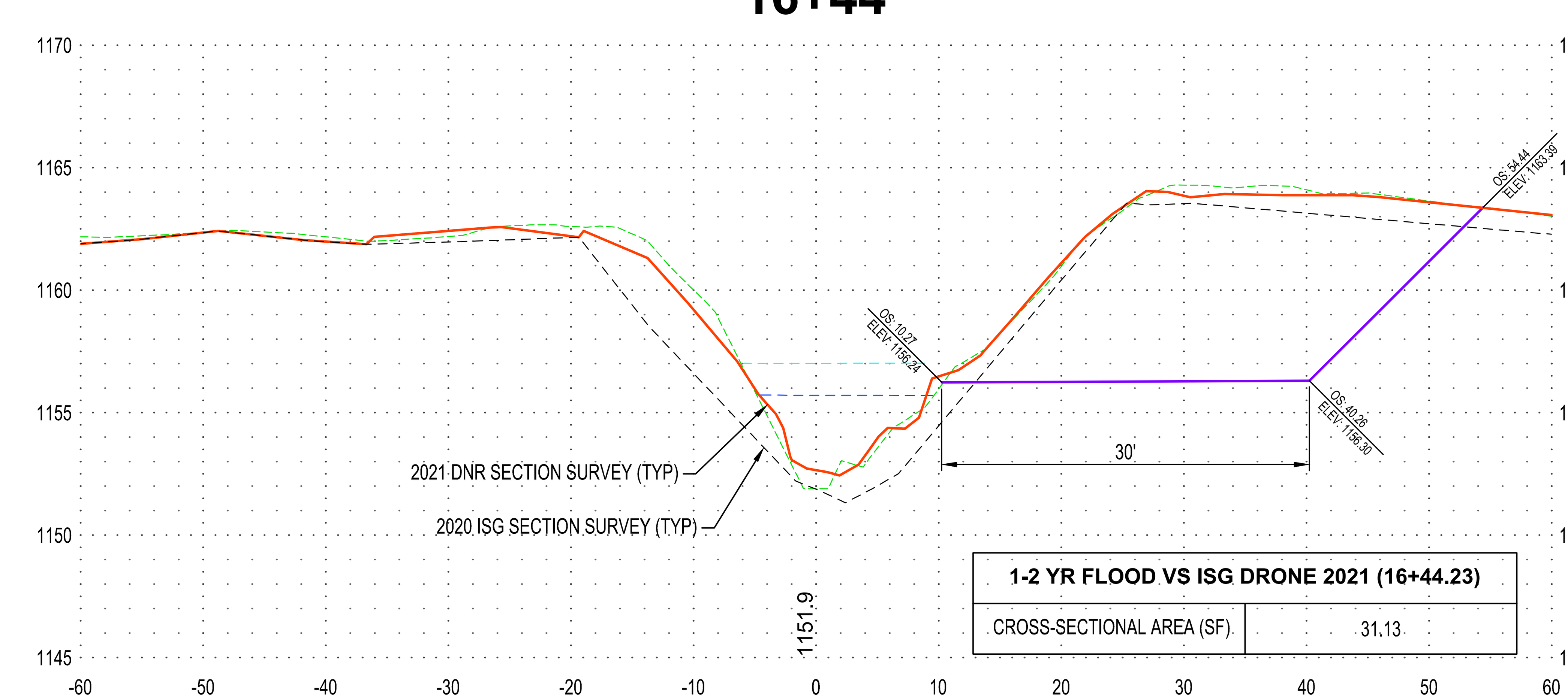
1-2 YR FLOOD VS ISG DRONE 2021 (17+00.00)	
CROSS-SECTIONAL AREA (SF)	29.30

13+00



1-2 YR FLOOD VS ISG DRONE 2021 (13+00.00)	
CROSS-SECTIONAL AREA (SF)	19.49

16+44



1-2 YR FLOOD VS ISG DRONE 2021 (16+44.23)	
CROSS-SECTIONAL AREA (SF)	31.13

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TITLE

CROSS SECTIONS (MAINLINE)

SHEET

12 OF 9

NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATION

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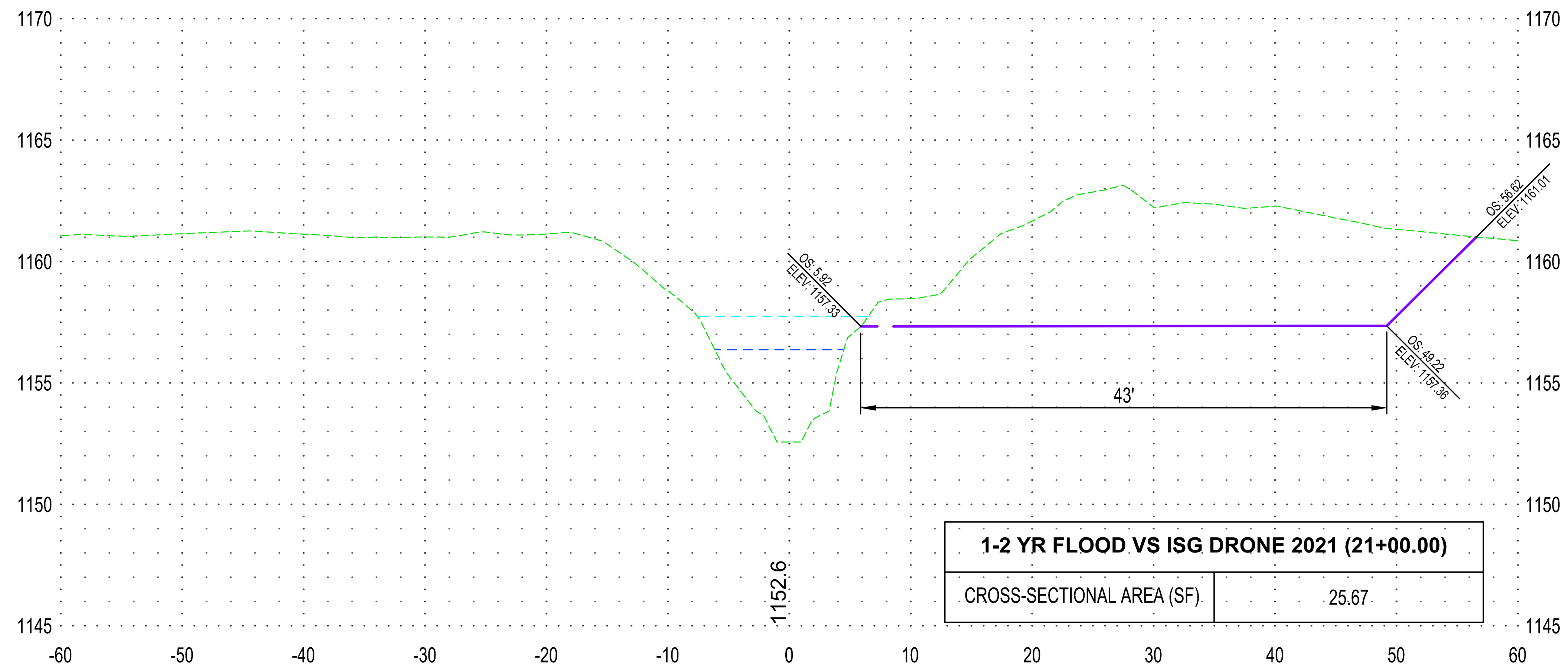
SCALE IN FEET

21+00



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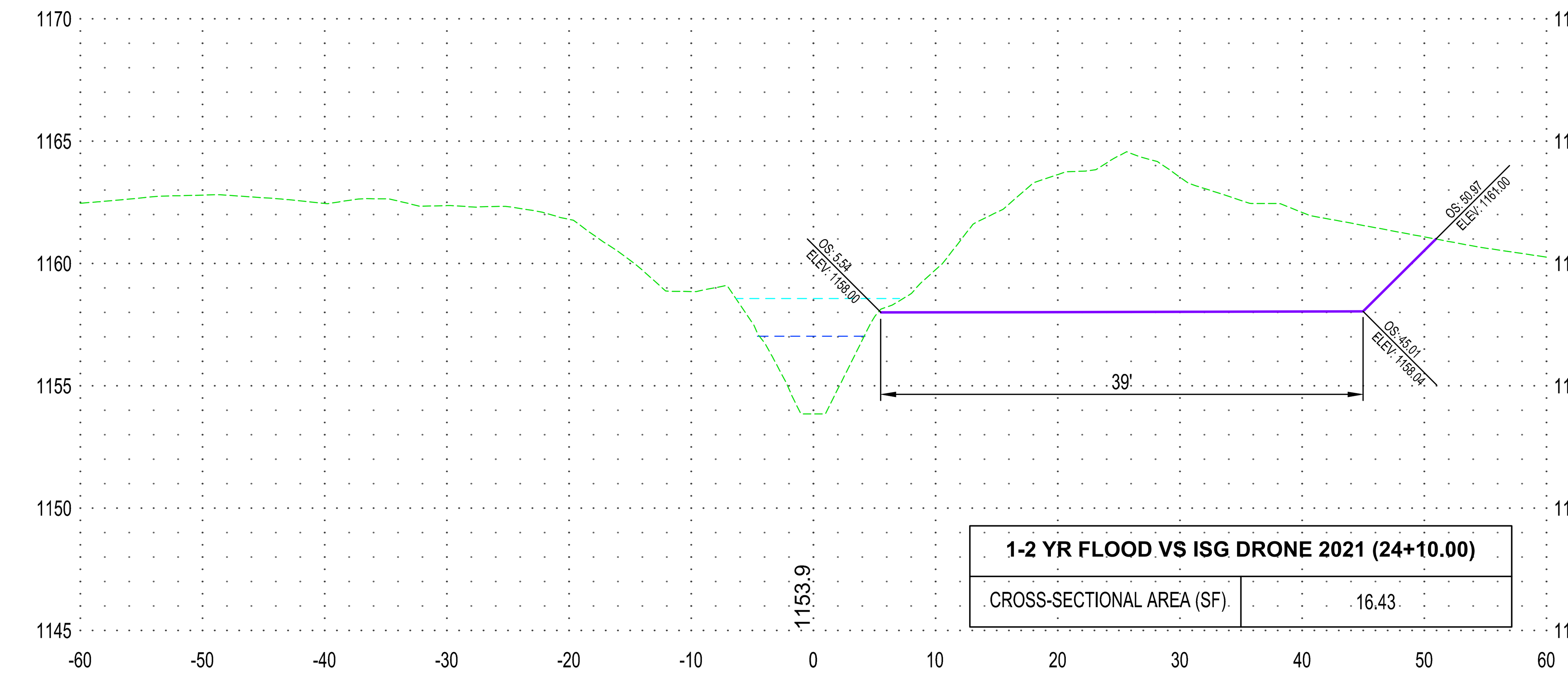
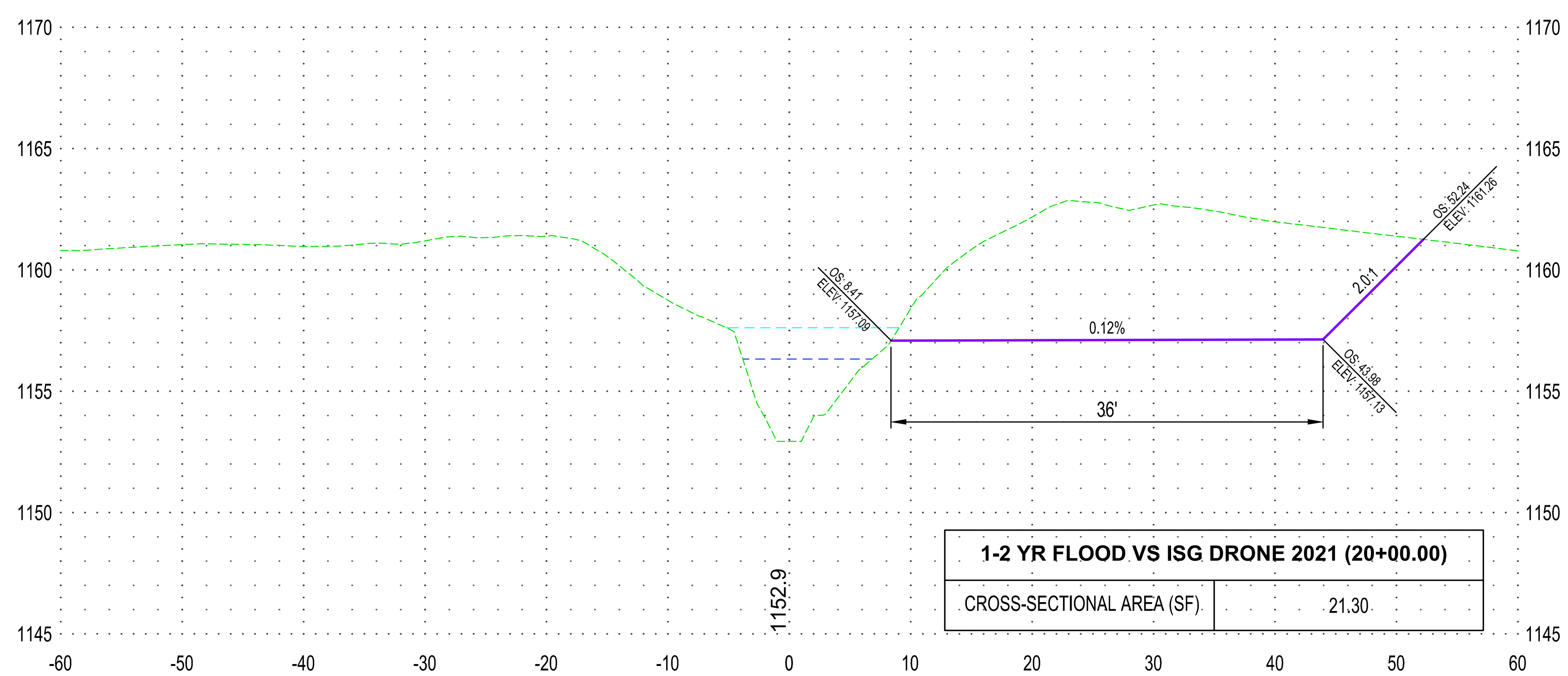
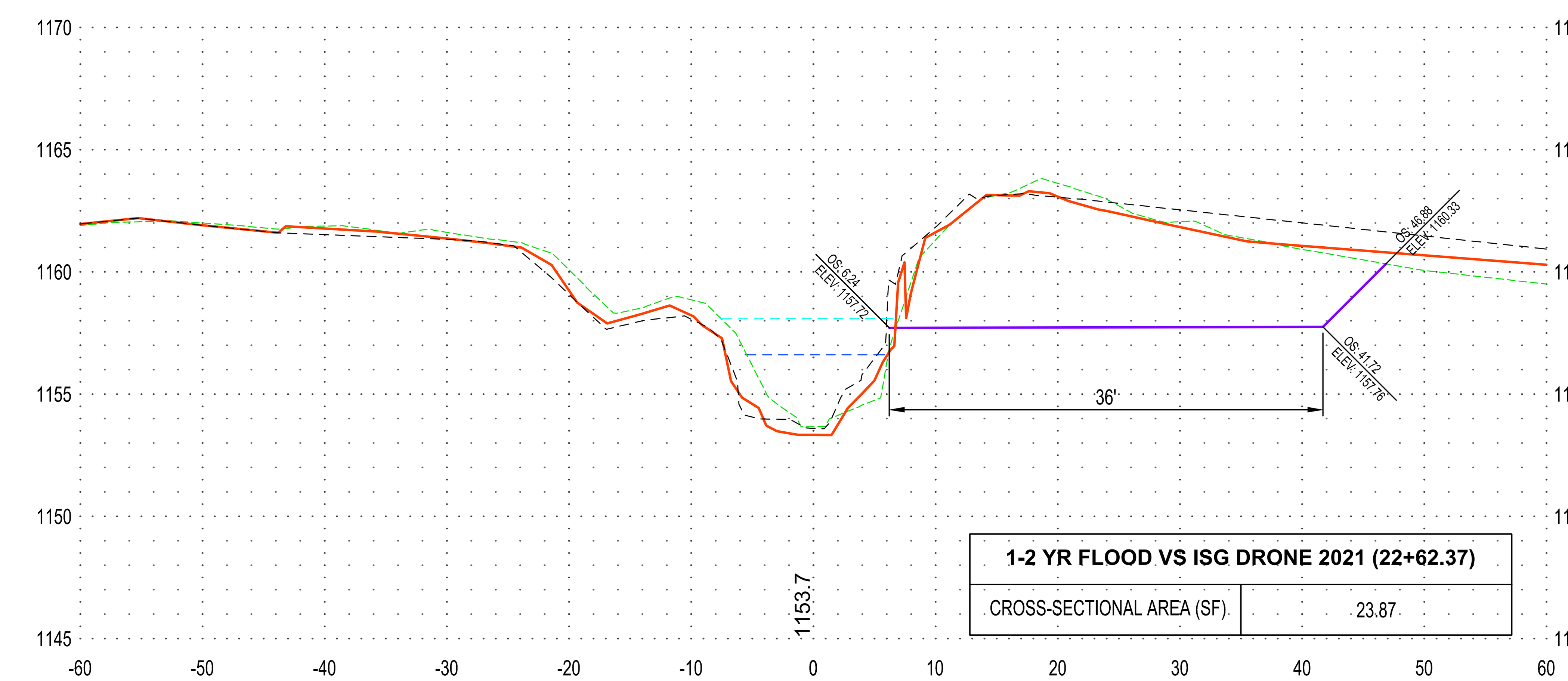


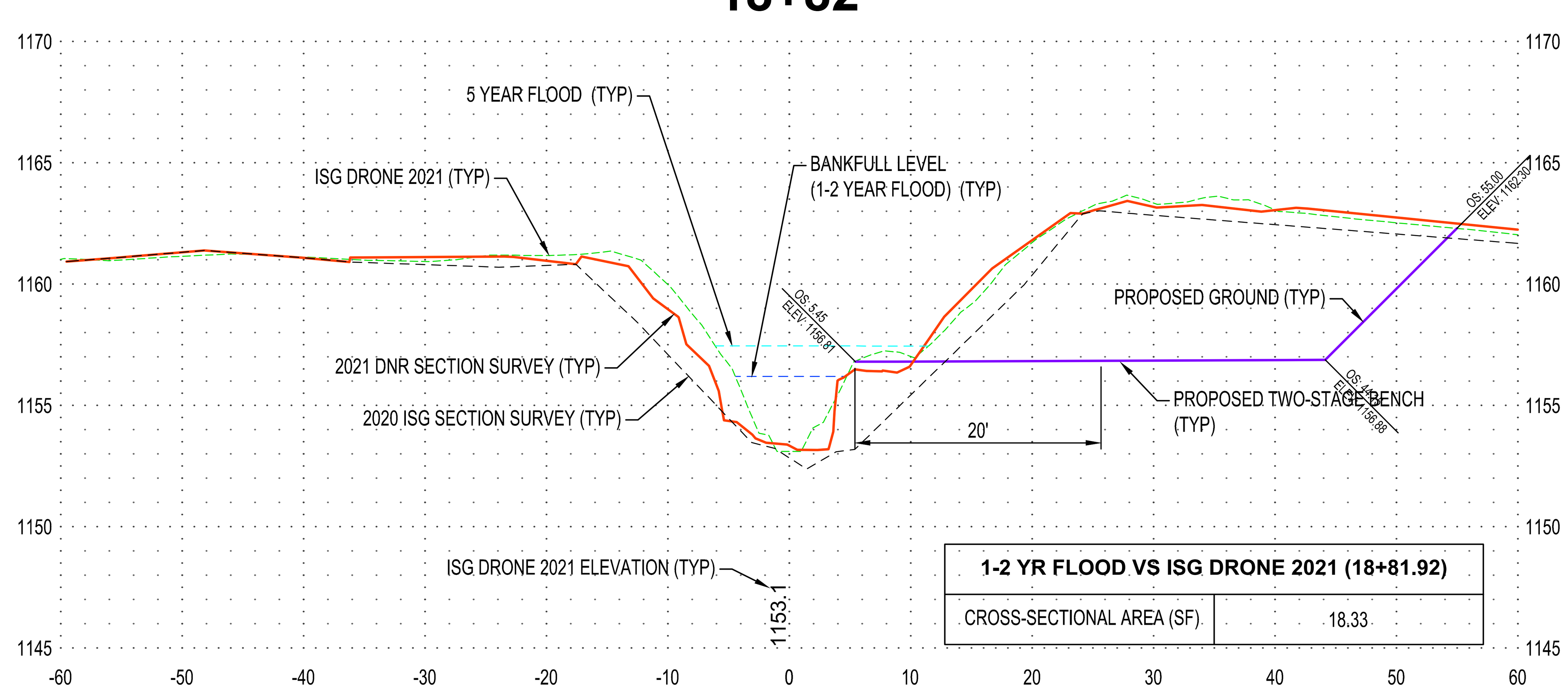
20+00



22+62



18+82



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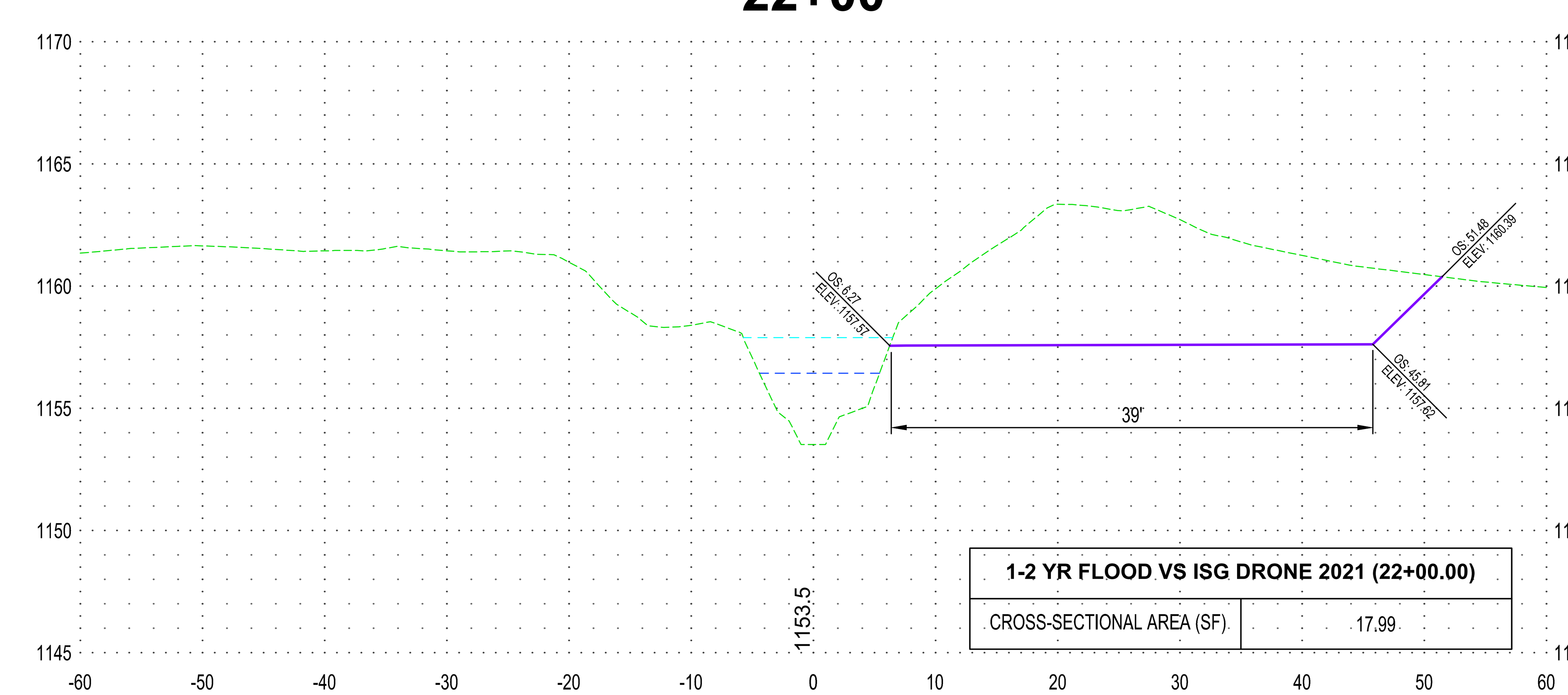

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CROSS SECTIONS (MAINLINE)

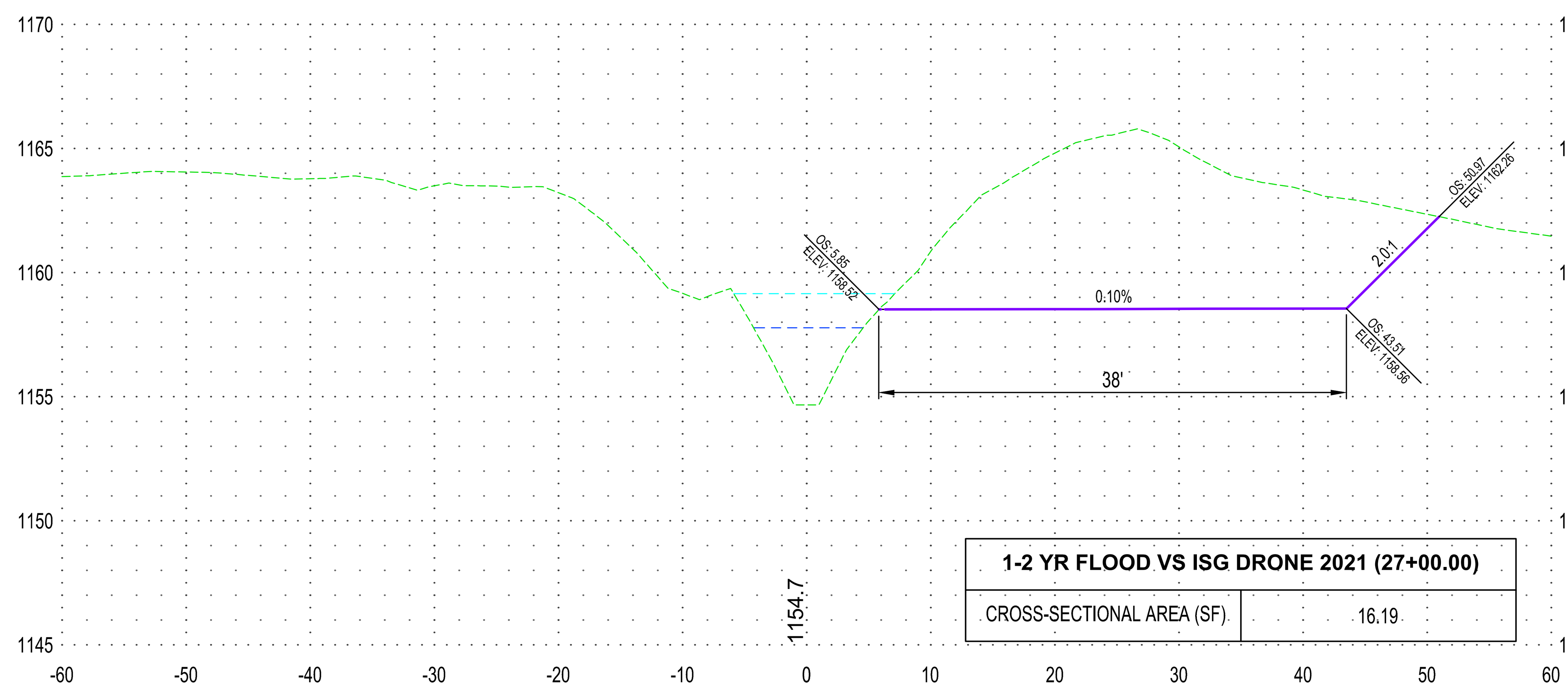
SHEET

13 OF 9

NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATION

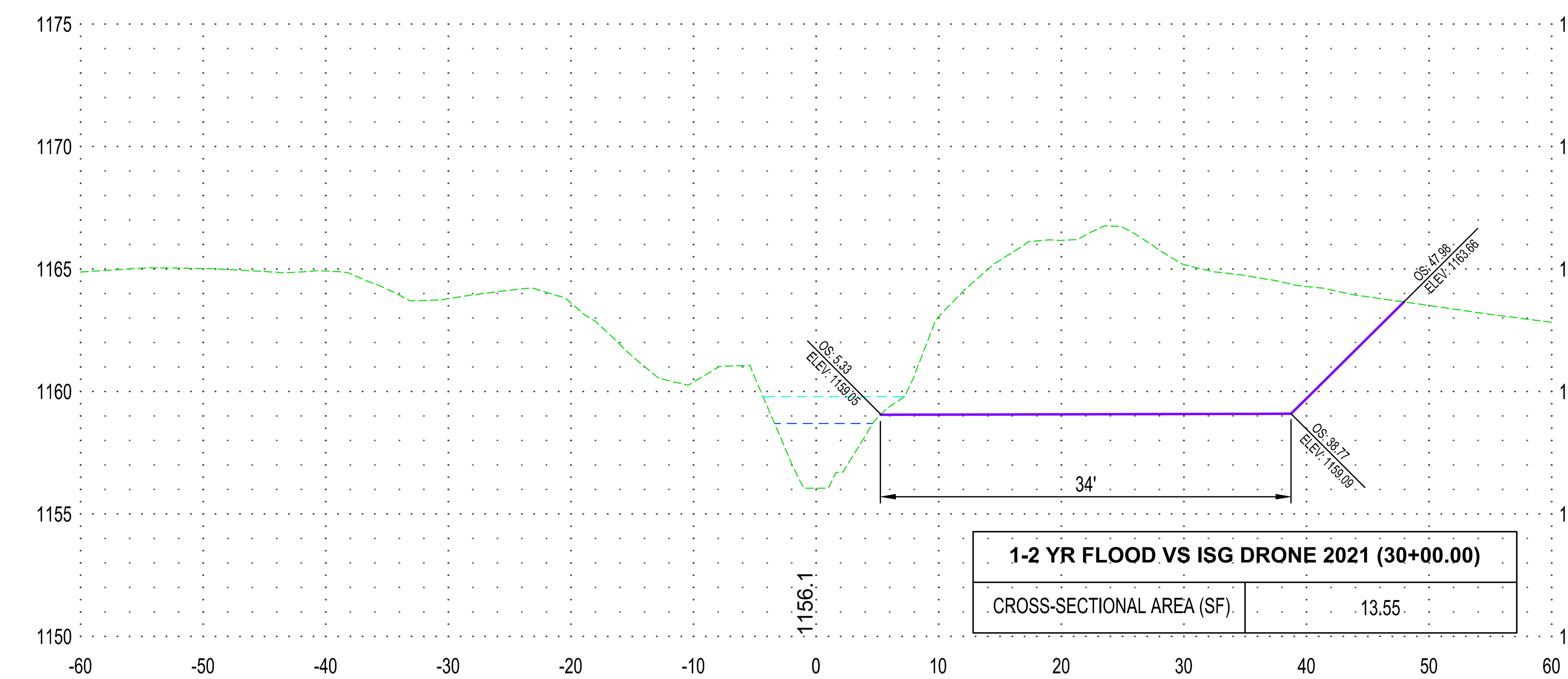
0 10 20
SCALE IN FEET

27+00



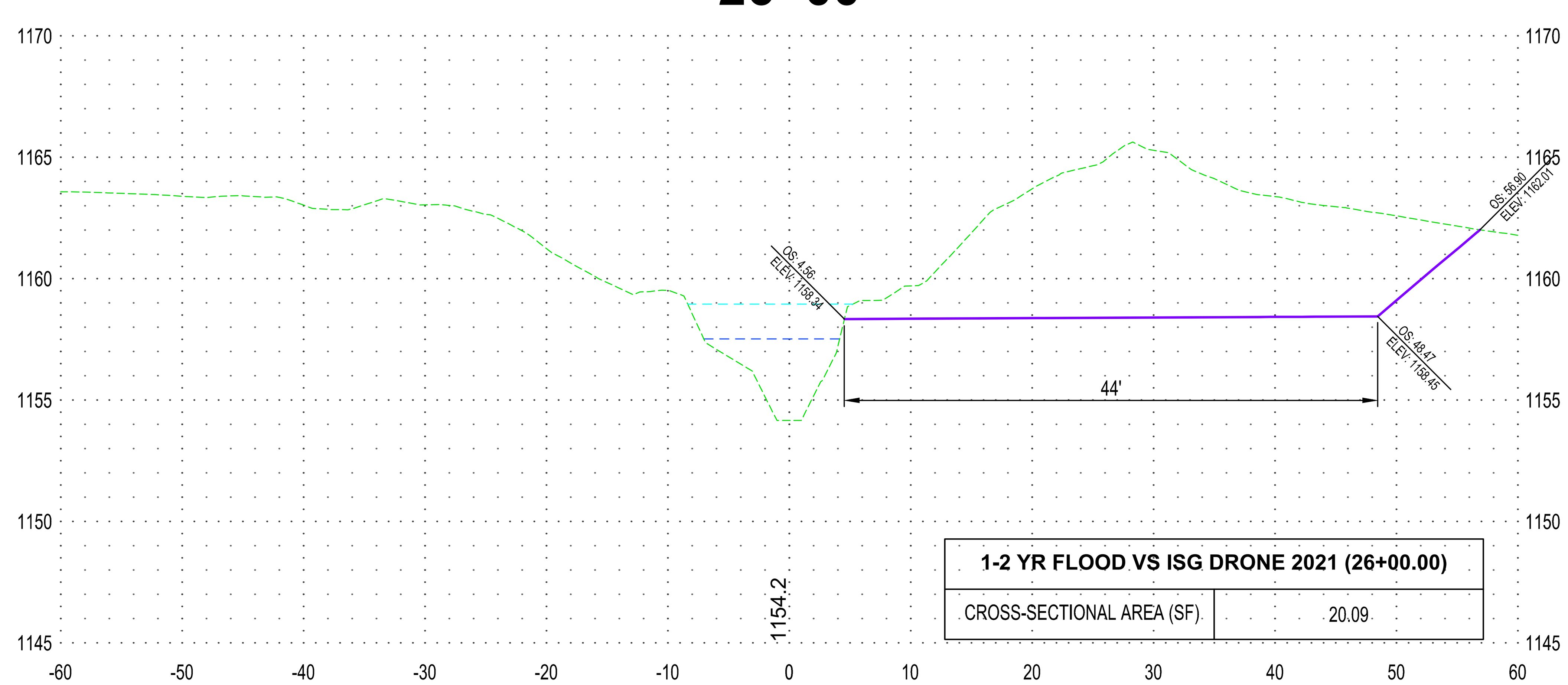
1-2 YR FLOOD VS ISG DRONE 2021 (27+00.00)	
CROSS-SECTIONAL AREA (SF)	16.19

30+00



1-2 YR FLOOD VS ISG DRONE 2021 (30+00.00)	
CROSS-SECTIONAL AREA (SF)	13.55

26+00



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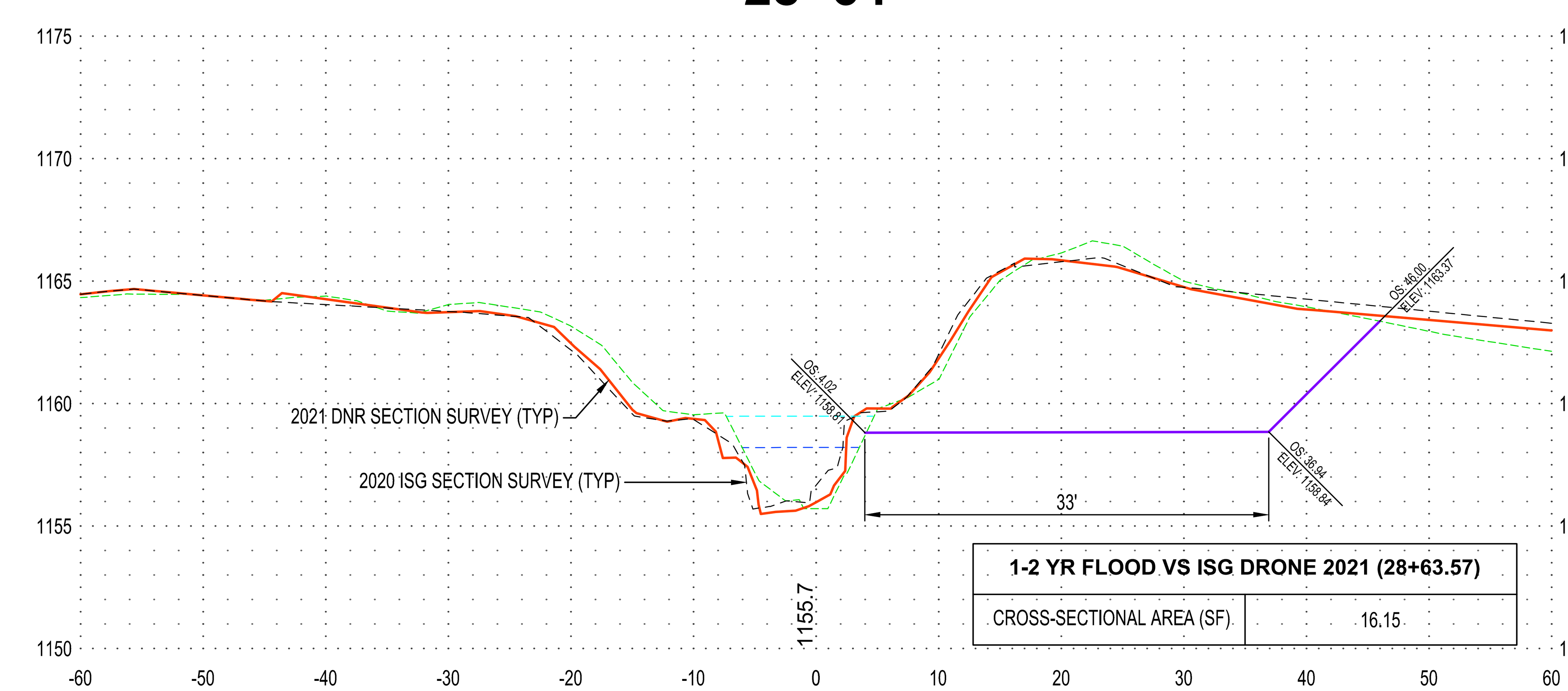
CROSS-SECTIONAL AREA (SF)	20.09

28+64



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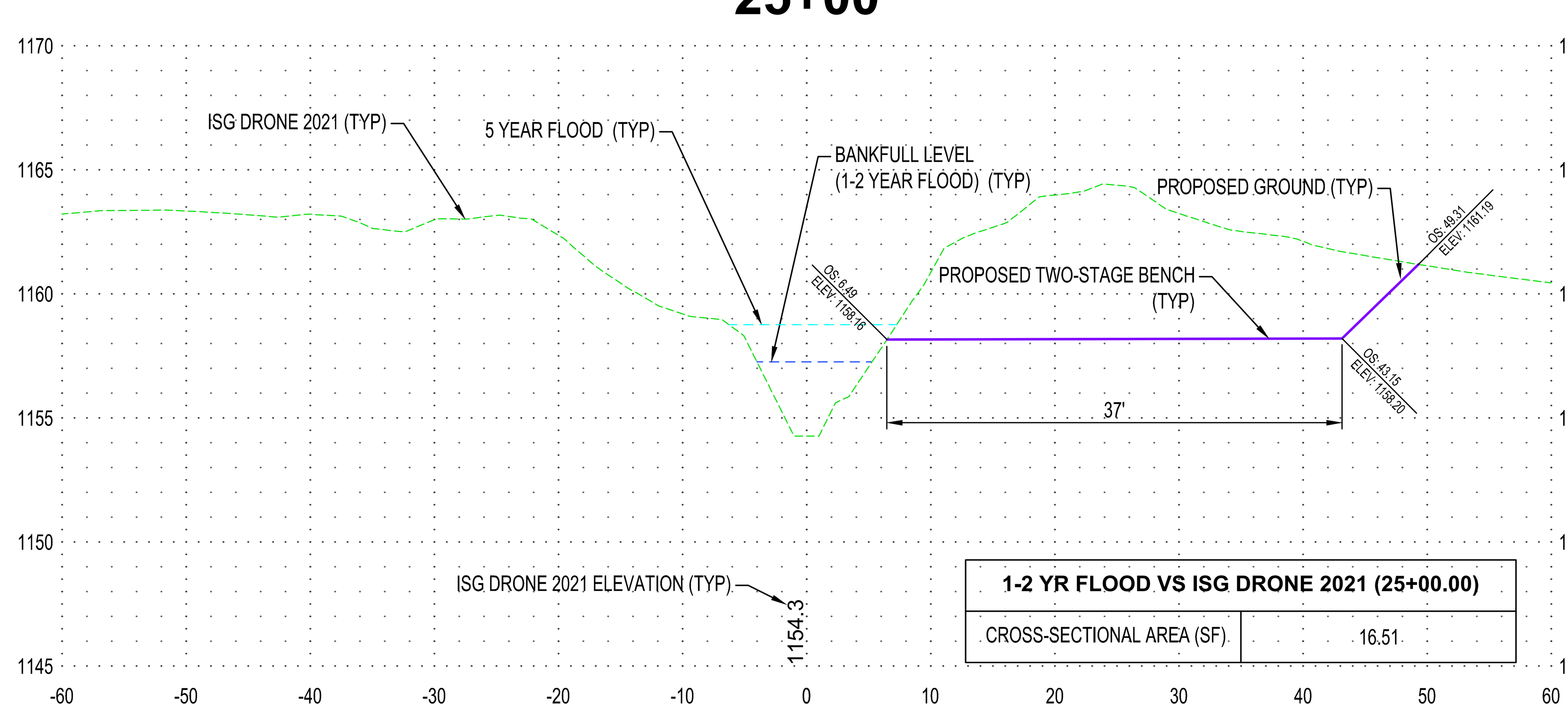
CROSS-SECTIONAL AREA (SF)	16.15

25+00



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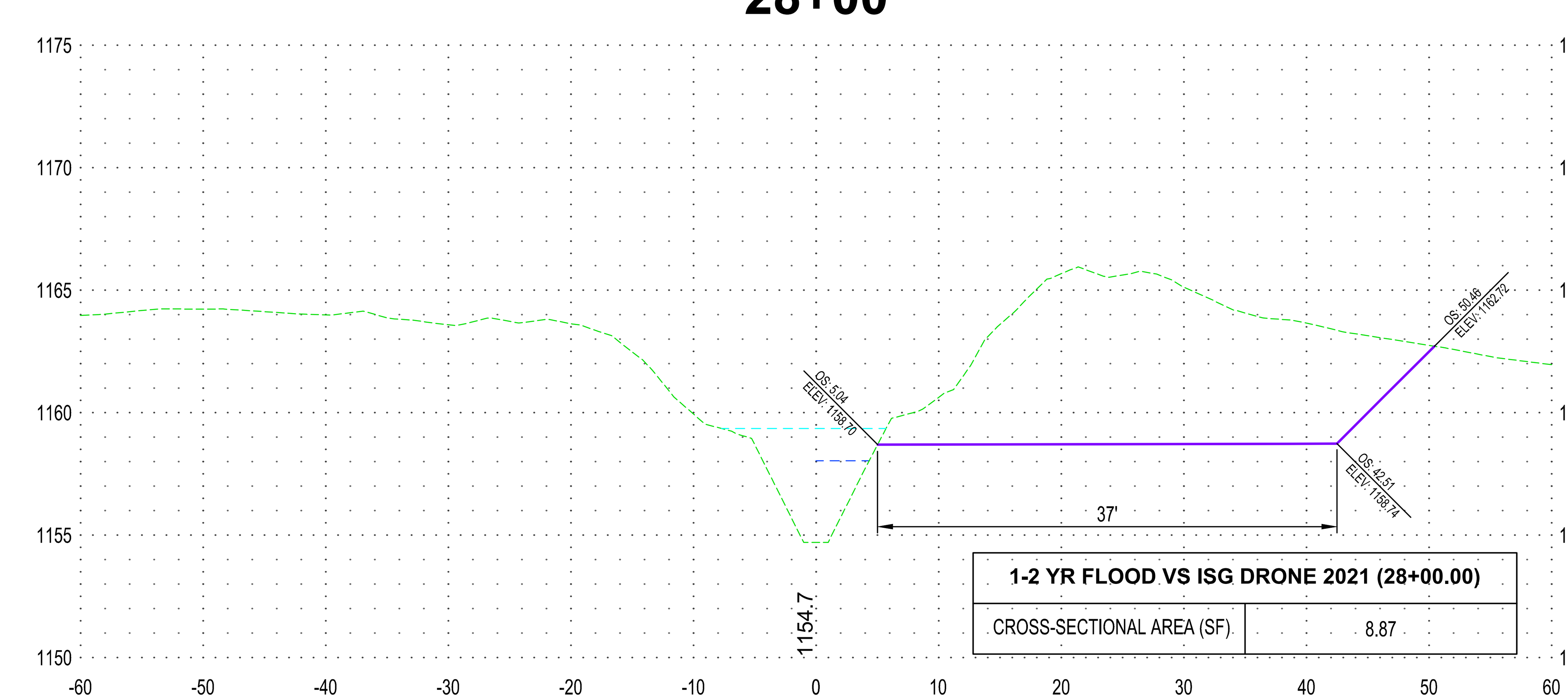
CROSS-SECTIONAL AREA (SF)	16.51

28+00



1-2 YR FLOOD VS ISG DRONE 2021 (28+00.00)	
CROSS-SECTIONAL AREA (SF)	8.87

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CROSS SECTIONS (MAINLINE)

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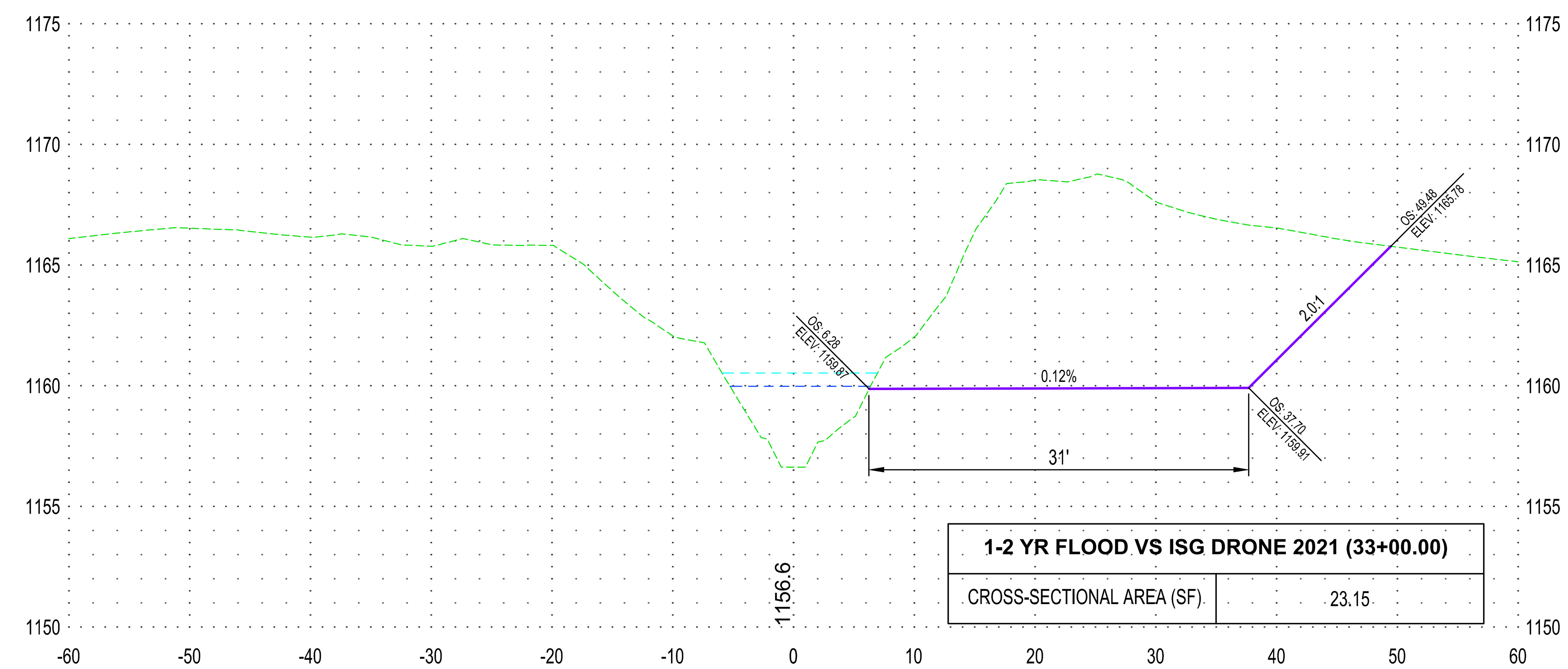
0 10 20
SCALE IN FEET

33+00



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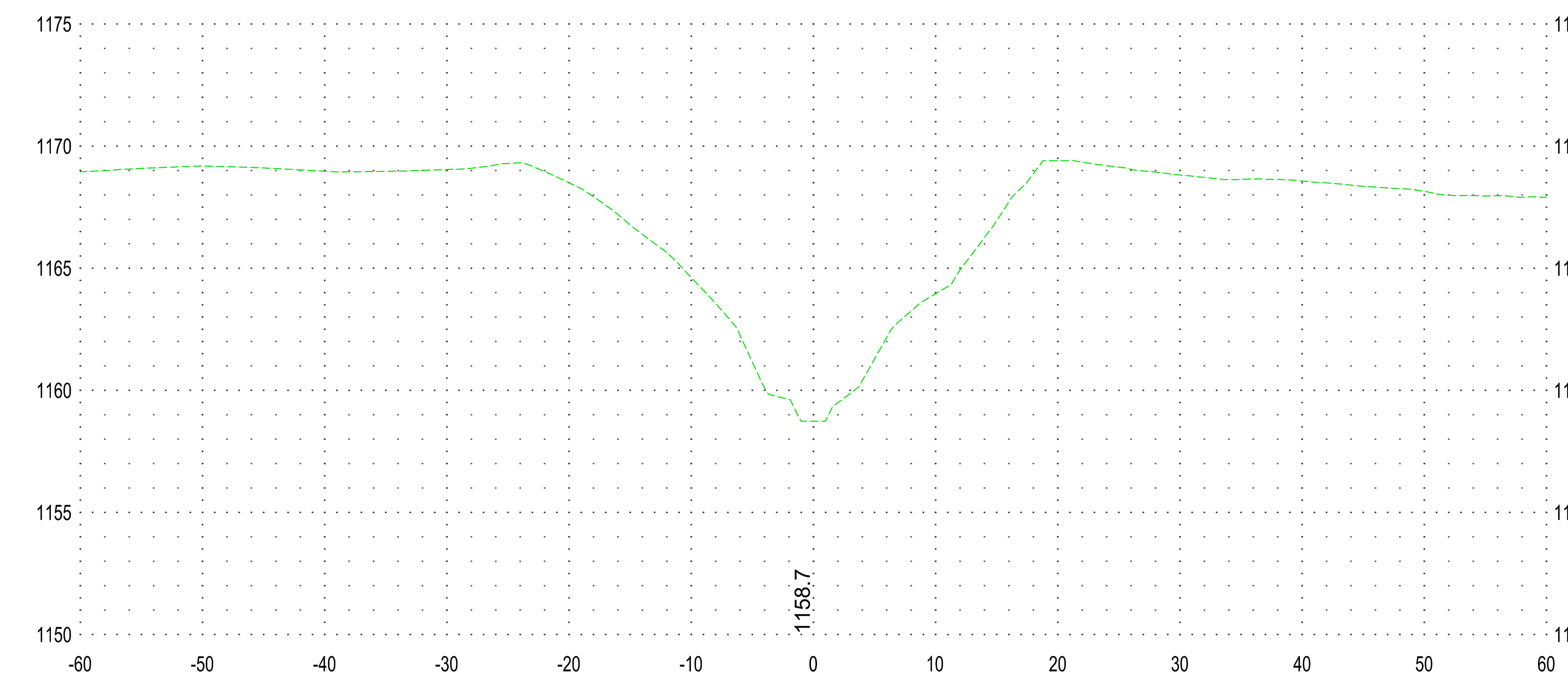
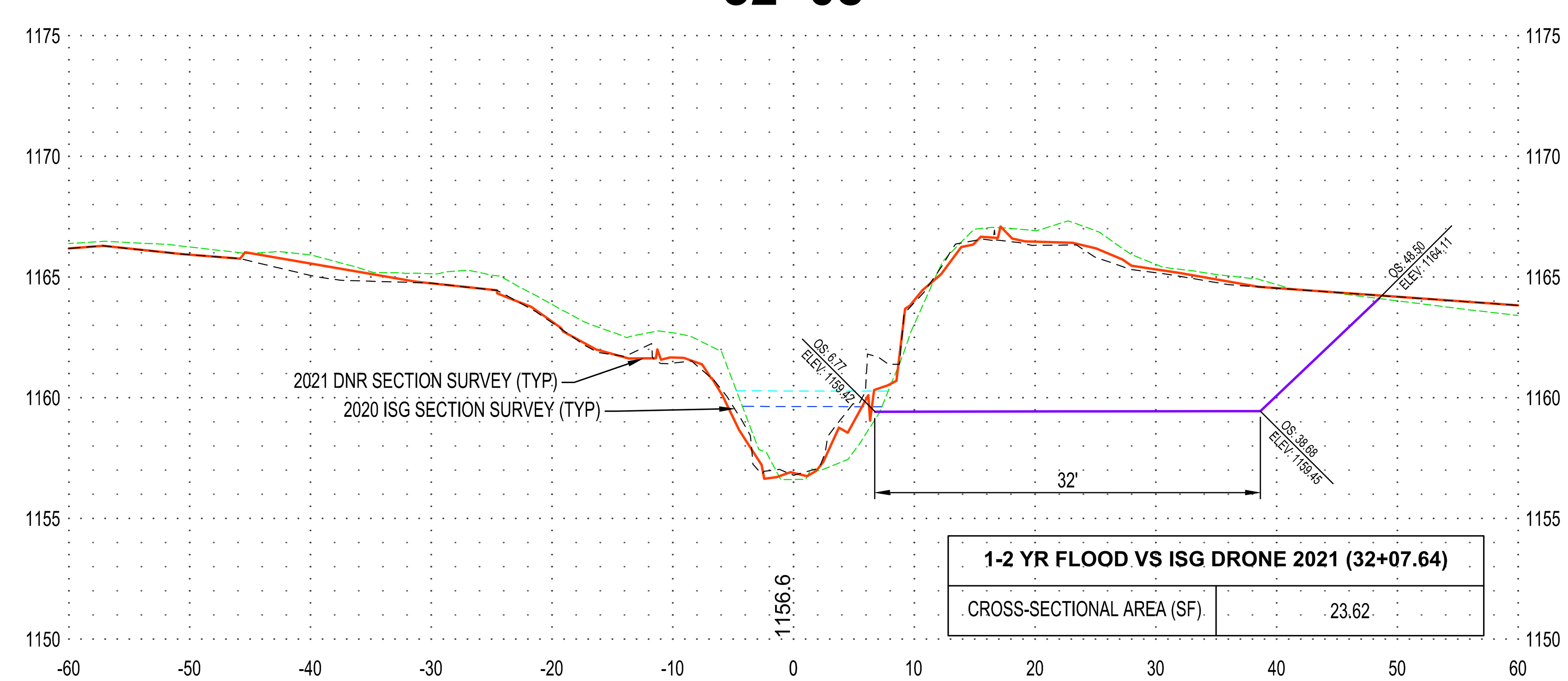


32+08



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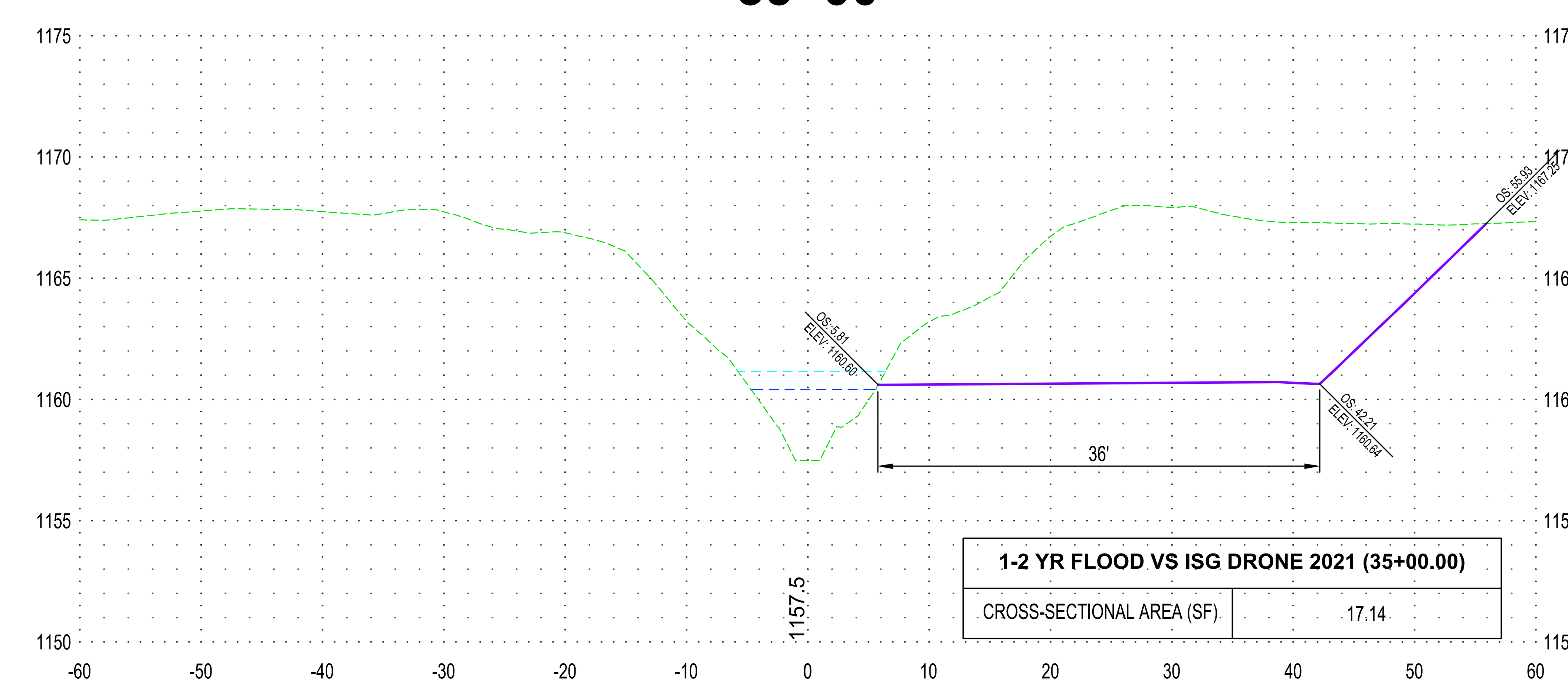
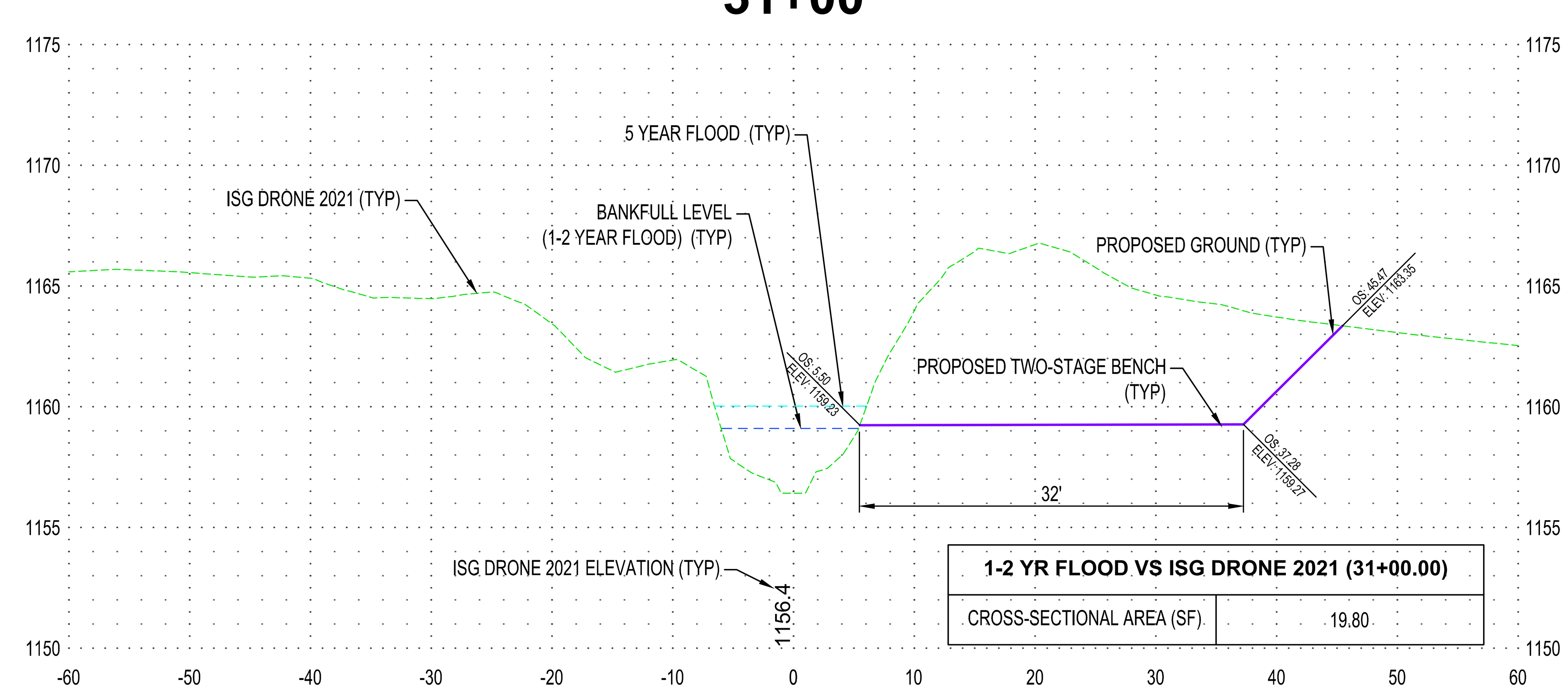


31+00



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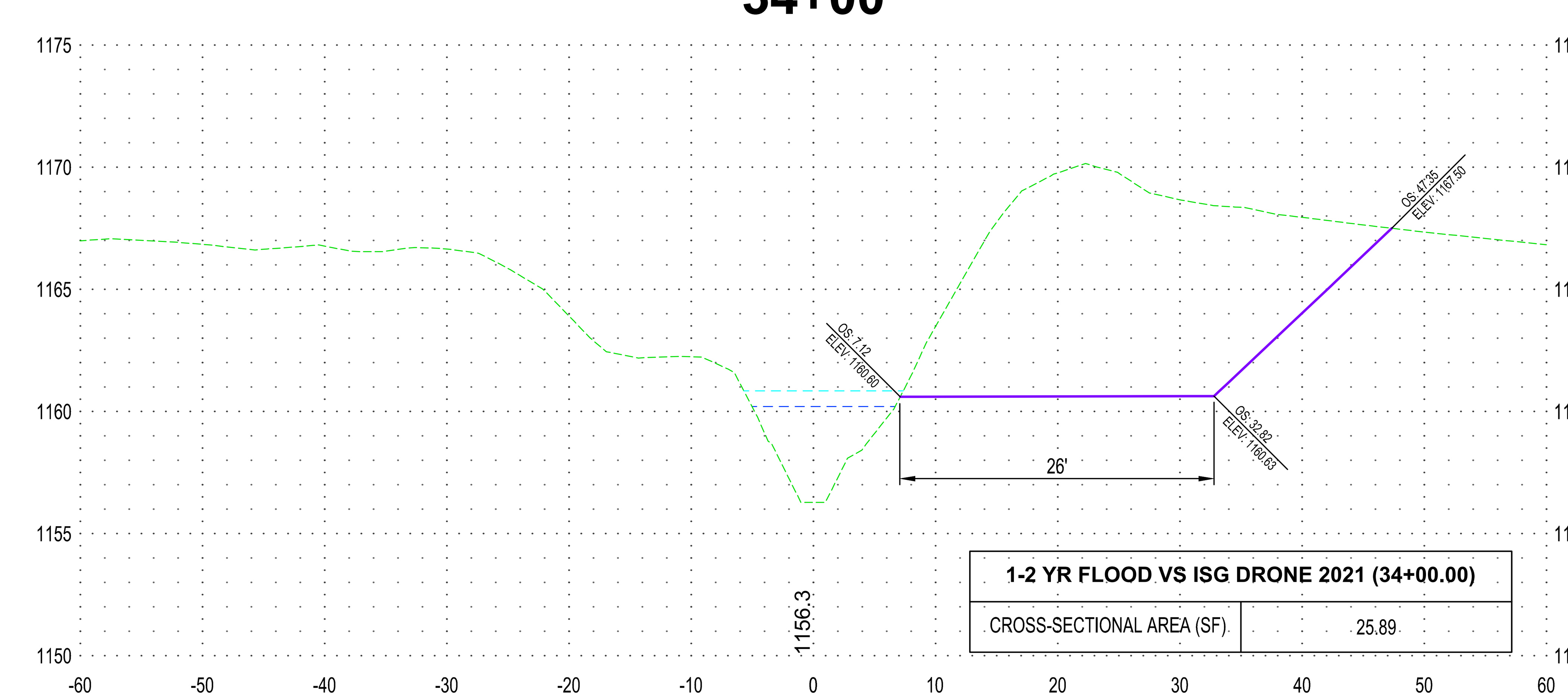

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TITLE

CROSS SECTIONS (MAINLINE)

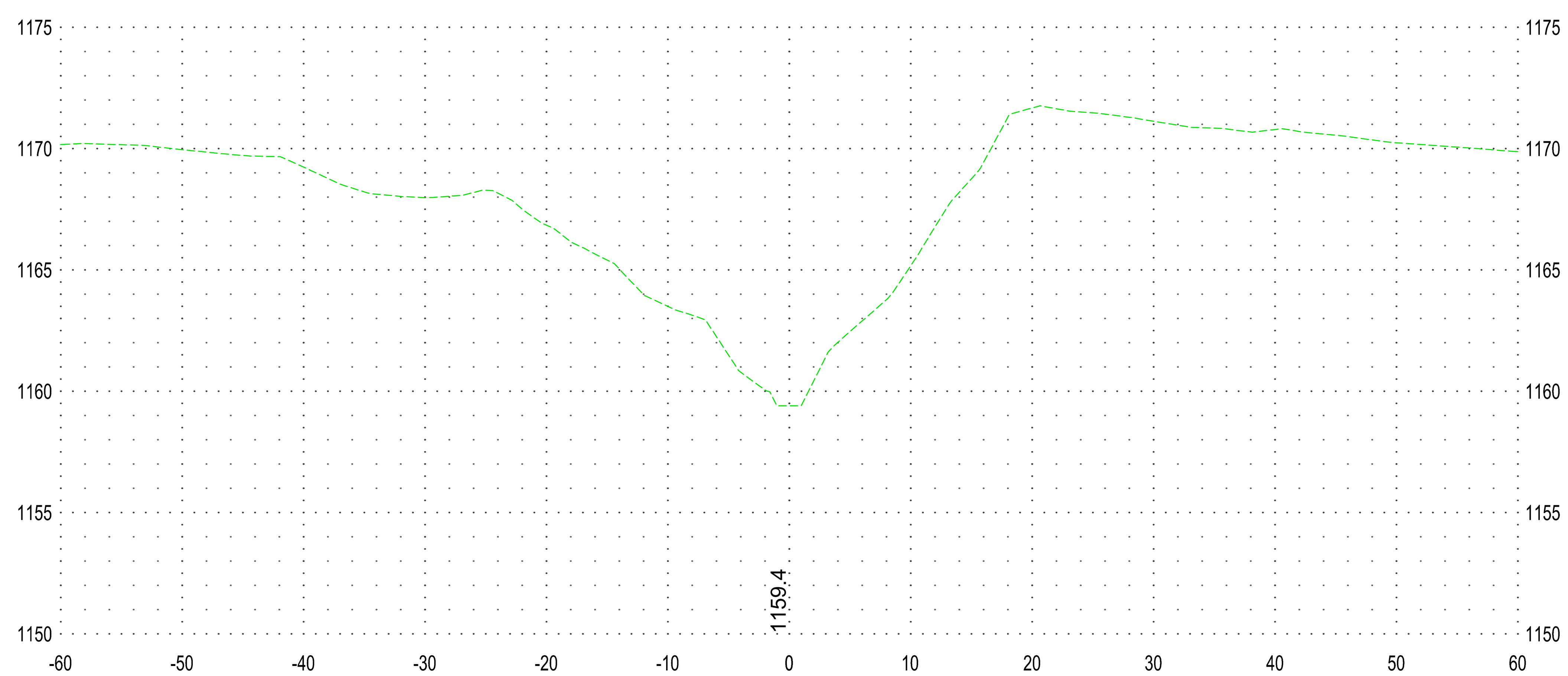
SHEET

15 OF 9

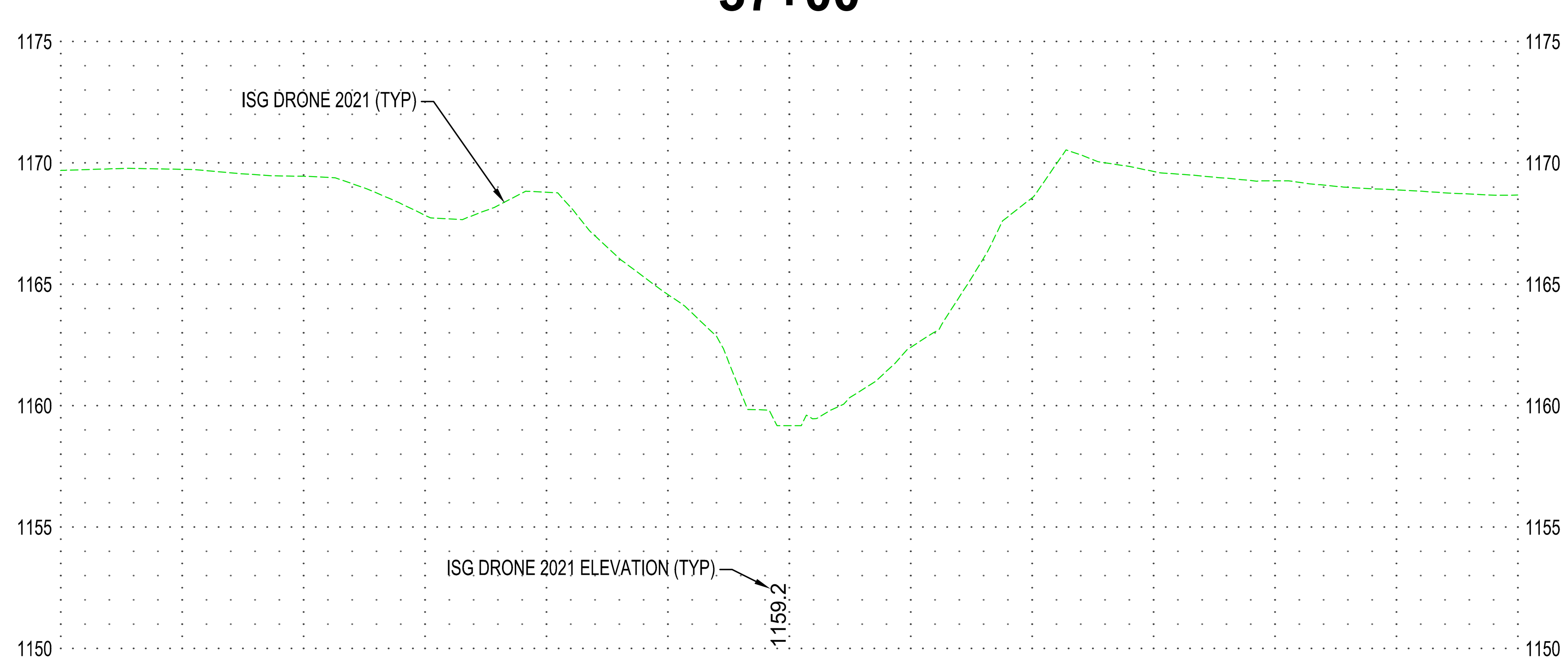
NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATION

0 10 20
SCALE IN FEET

38+00



37+00



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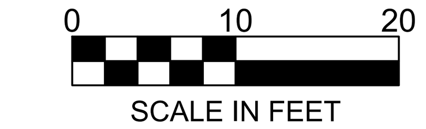
TITLE

CROSS SECTIONS (MAINLINE)

SHEET

16 OF 9

NOTE: AS VIEWED IN THE DIRECTION OF INCREASING STATION



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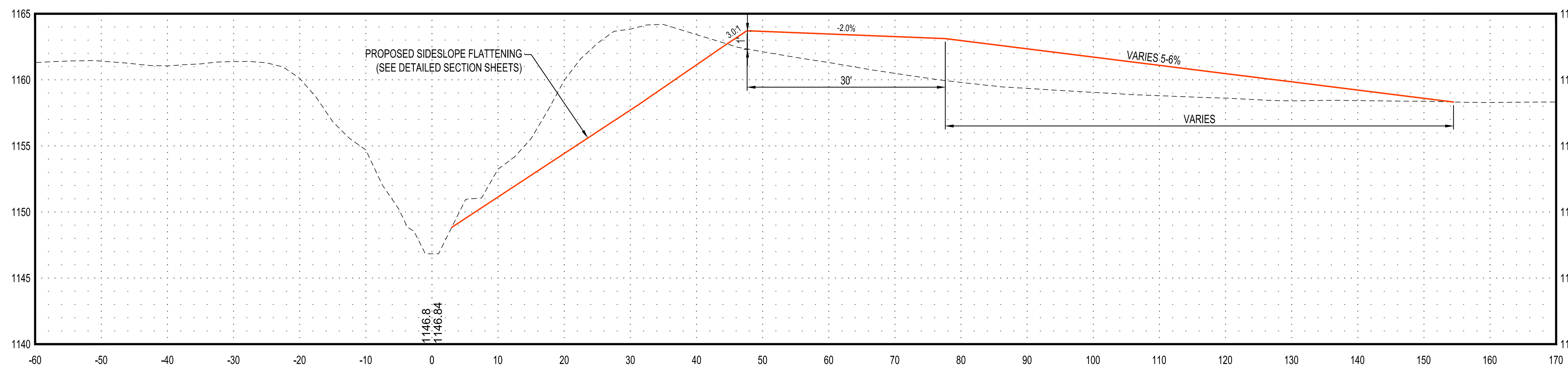
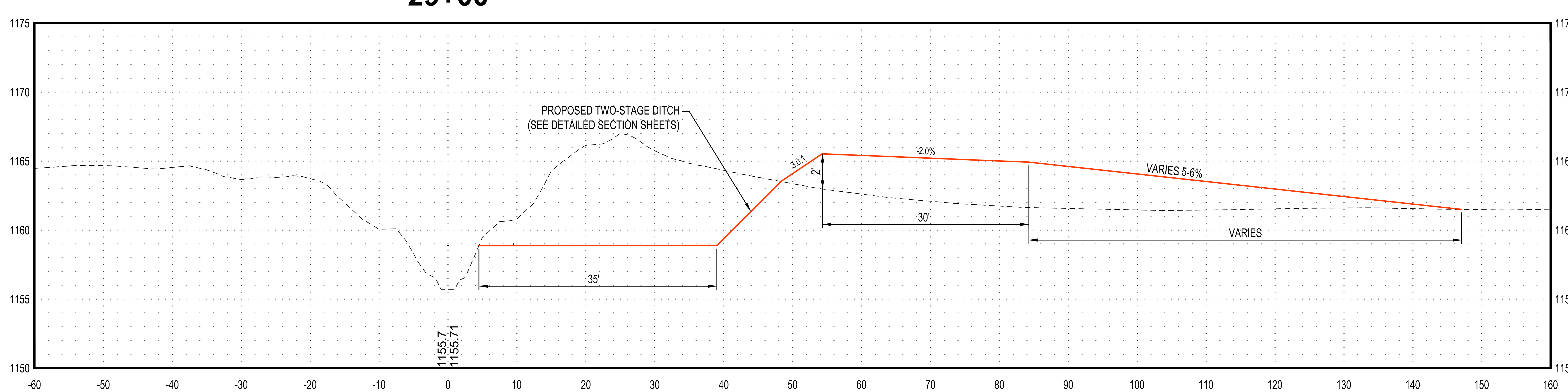


29+00



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PRELIMINARY
NOT FOR CONSTRUCTION

MARC KRIGER

DATE XX/XX/XX LIC. NO. 54863

PROJECT

FARIBAULT COUNTY DITCH No. 64 REPAIRS

FARIBAULT COUNTY MINNESOTA

REVISION SCHEDULE

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PROJECT NO.	18-21098
FILE NAME	21098 SPOILS SECTIONS
DRAWN BY	-
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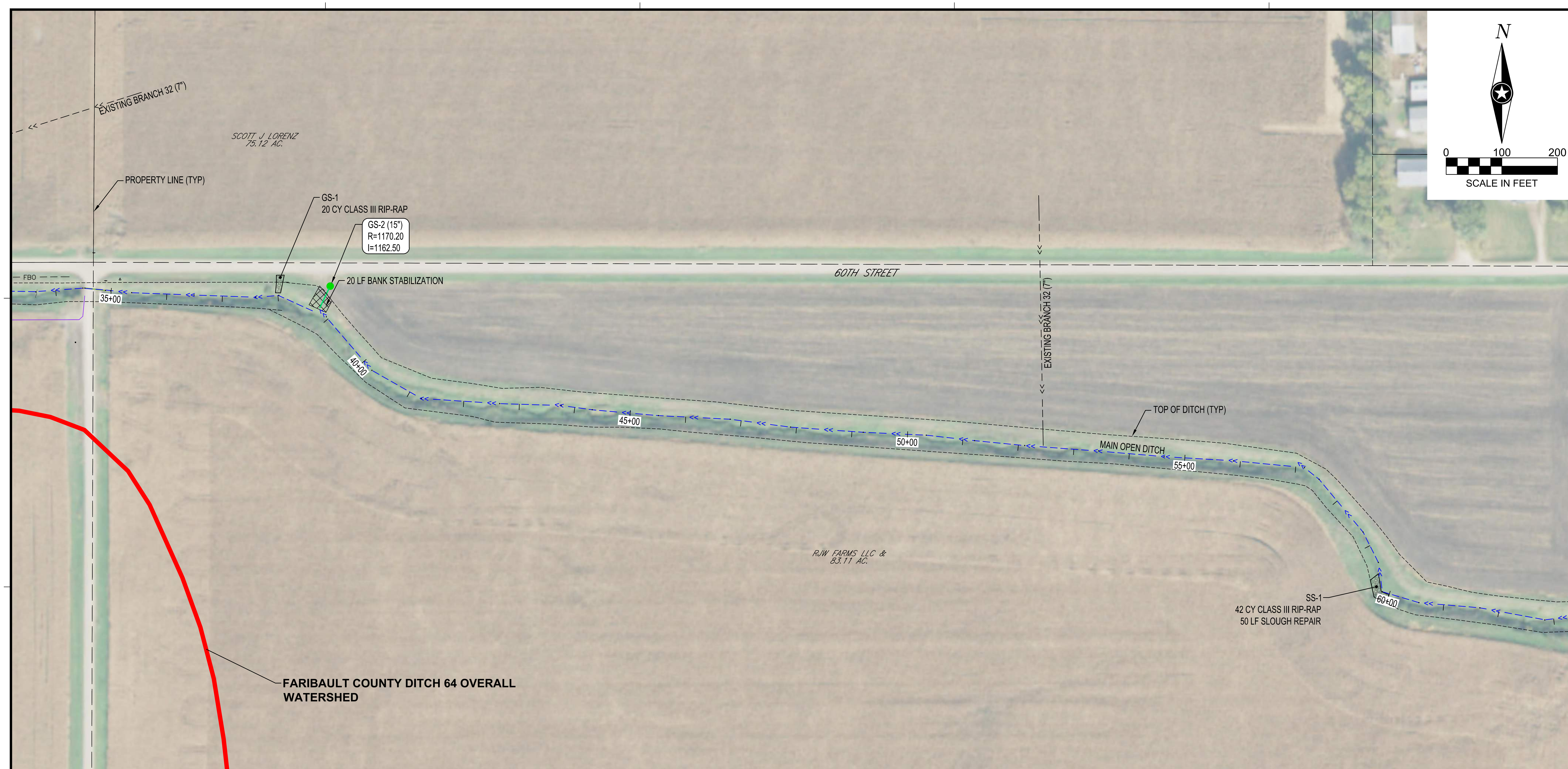
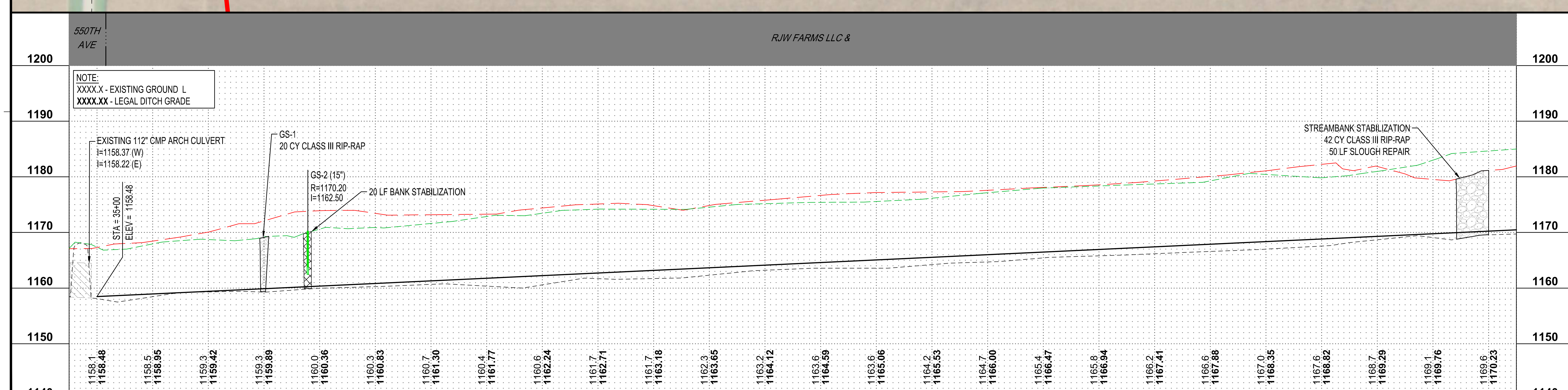
SPOILS CROSS SECTIONS

SHEET

17 OF 21





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FARIBAULT COUNTY DITCH No. 64 REPAIRS

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PROJECT NO.	18-21098
FILE NAME	21098 UPSTREAM PLN-PROF
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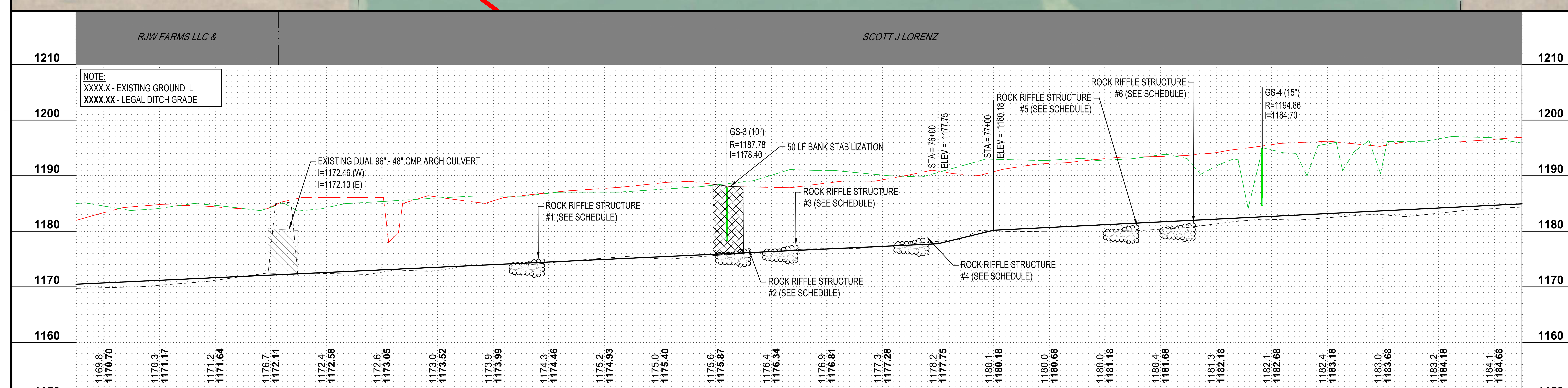
TITLE

UPSTREAM PLAN-PROFILE (MAINLINE)

SHEET

18 OF 21



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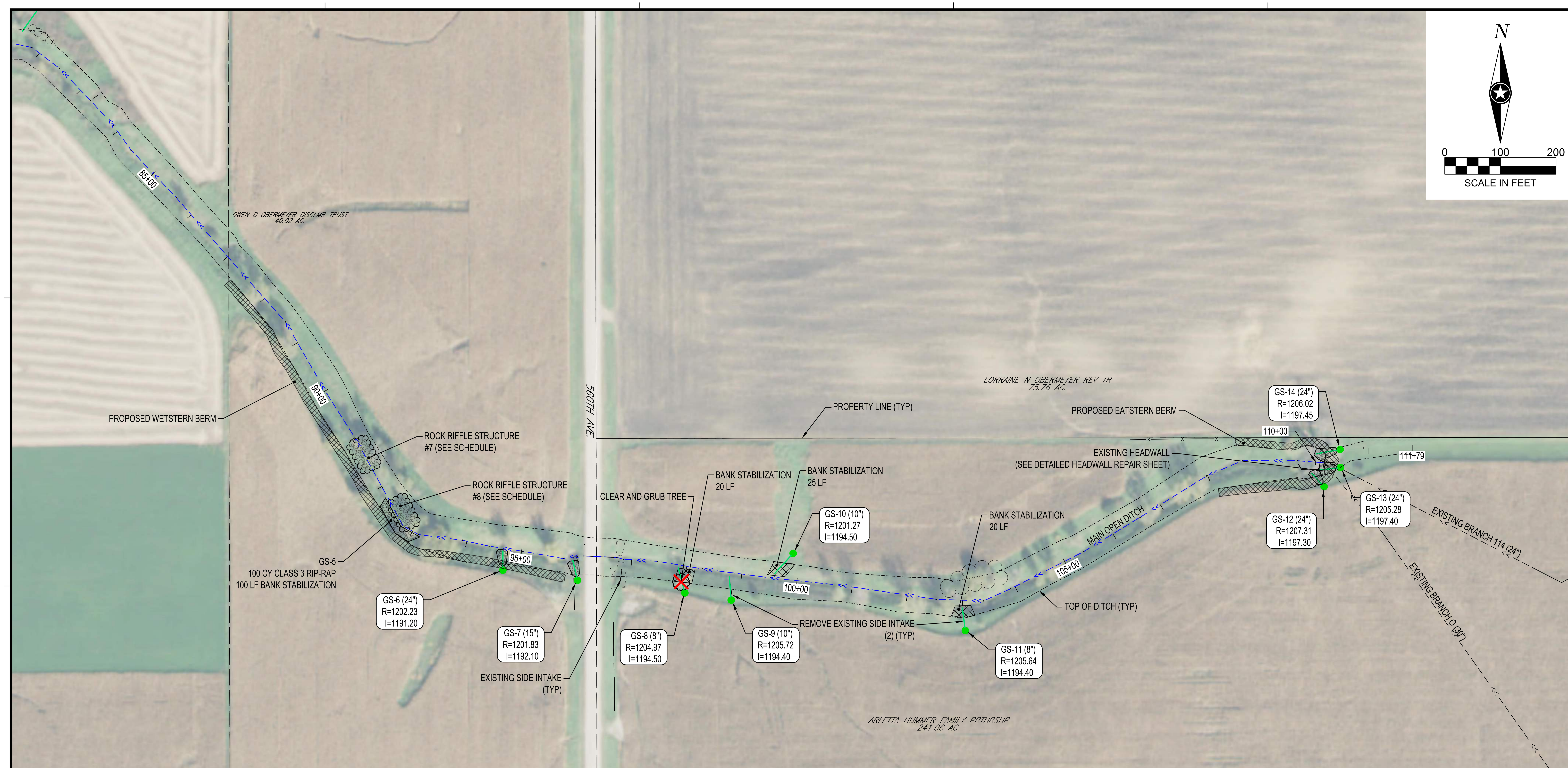
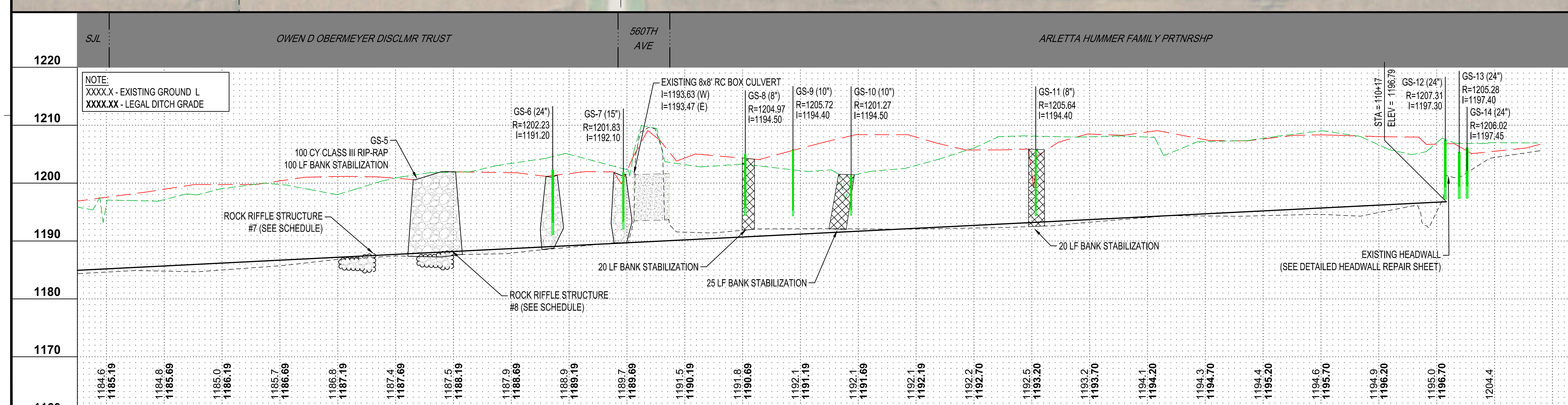
UPSTREAM PLAN-PROFILE (MAINLINE)

SHEET





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MARK ... GER

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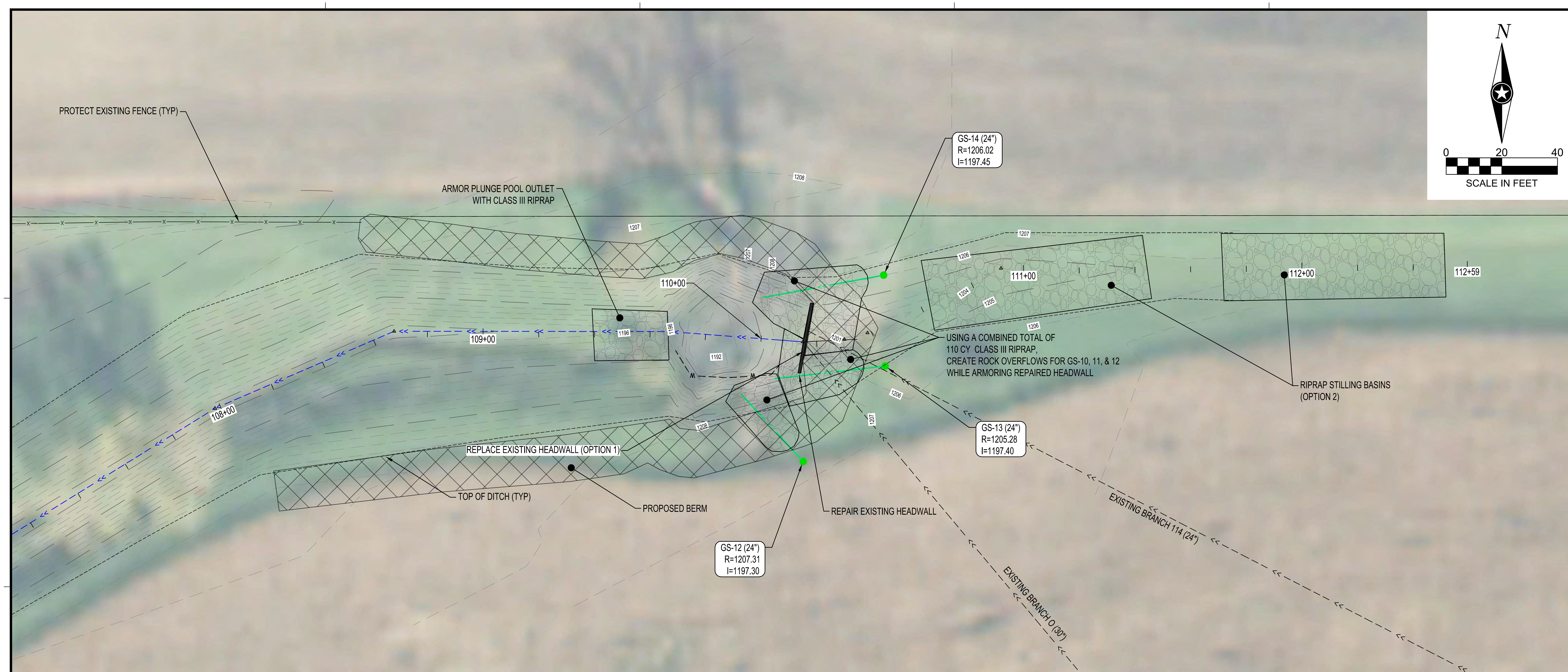

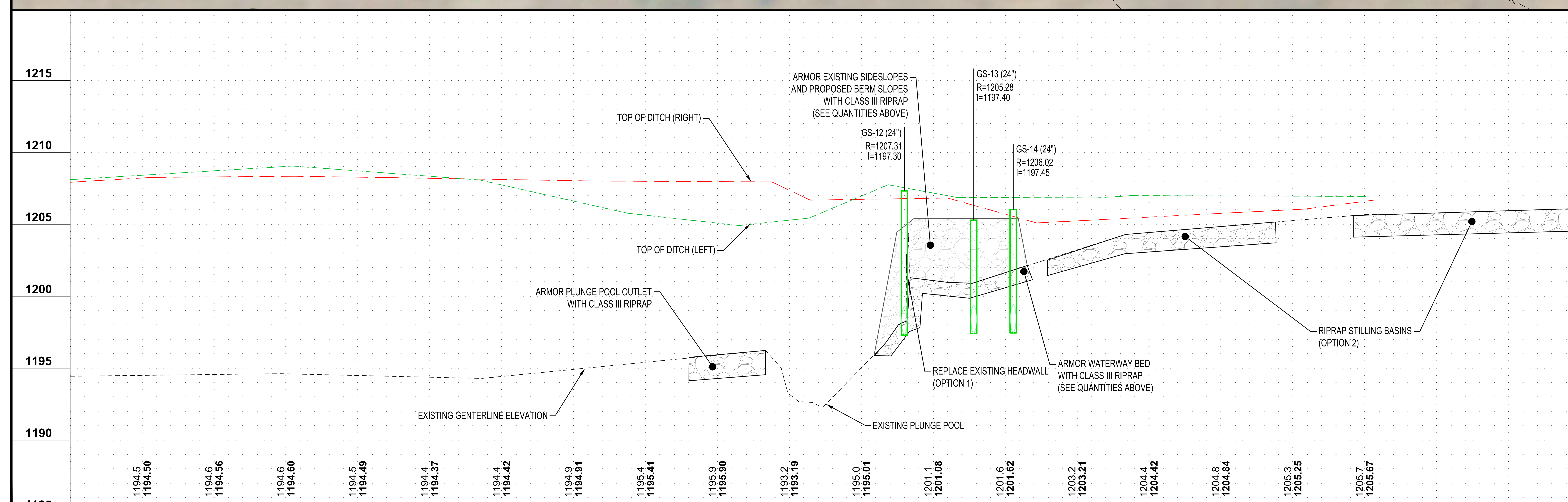

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PRELIMINARY NOT FOR CONSTRUCTION

MARK GRIEGER

DATE XX/XX/XX LIC. NO. 54863

PROJECT

FARIBAULT COUNTY DITCH No. 64 REPAIRS

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	18-21098
FILE NAME	21098 DETAILED HEADWALL REPAIR
DRAWN BY	-
DESIGNED BY	-
REVIEWED BY	-
ORIGINAL ISSUE DATE	--/--/--
CLIENT PROJECT NO.	-

TITLE

DETAILED HEADWALL REPAIR

SHEET

Appendix C: Cost Estimates

FARIBAULT COUNTY
COUNTY DITCH No. 64

ISG

COST ESTIMATE SUMMARY

TRADITIONAL DITCH REPAIRS	ESTIMATED COST
STANDARD OPEN DITCH REPAIRS	**$ 101,301**
OUTLET SIDE SLOPE FLATTENING	**$ 38,973**
MIDWAY OPEN DITCH SIDE SLOPE FLATTENING	$ 48,672
HEADWALL-REPLACE HEADWALL (OPTION 1)	**$ 134,268**
HEADWALL-RIPRAP STILLING BASINS (OPTION 2)	$ 91,092
FIELD CROSSING REPAIR	*PREVIOUSLY REPAIRED*
TREE REMOVALS	*PREVIOUSLY REPAIRED*
ALTERNATIVE BMP REPAIRS	**ESTIMATED COST**
TWO-STAGE DITCH	**$ 178,746**
RIPRAP RIFFLES	**$ 113,677**
560TH AVE WEST BERM AREA	**$ 15,247**
PRIORITY BMPS/GRADE STABILIZATION	**$ 90,077**
GRANT FUNDING	*$ 248,500*
OPTION 1-MINIMUM REPAR TOTAL	$ 365,365
OPTION 2-RECOMMENDED REPAIR TOTAL	**$ 423,789**

*OPTION 1 INCLUDES THE GRAY ROWS ONLY
**OPTION 2 INCLUDES THE GRAY ROWS AND THE BOLDED ROWS

FARIBAULT COUNTY

COUNTY DITCH No. 64

MINIMUM REPAIRS SUMMARY (OPTION 1)

TRADITIONAL REPAIRS	ESTIMATED COST	
STANDARD OPEN DITCH REPAIRS	$	101,301
OUTLET SIDE SLOPE FLATTENING	$	38,973
HEADWALL-RIPRAP STILLING BASINS (OPTION 2)	$	91,092
FIELD CROSSING REPAIR	*PREVIOUSLY REPAIRED*	
TREE REMOVALS	*PREVIOUSLY REPAIRED*	
ALTERNATIVE BMPS REPAIRS	**ESTIMATED COST**	
TWO-STAGE DITCH	$	178,746
RIPRAP RIFFLES	$	113,677
PRIORITY BMPS/GRADE STABILIZATION	$	90,077
GRANT FUNDING	*$*	*248,500*
TRADITIONAL REPAIRS SUBTOTAL	**$**	**231,365**
ALTERNATIVE BMPS REPAIRS SUBTOTAL	**$**	**134,000**
MINIMUM REPAIRS TOTAL COST ESTIMATE	$	365,365

FARIBAULT COUNTY
COUNTY DITCH No. 64

RECOMMENDED REPAIRS SUMMARY (OPTION 2)

TRADITIONAL REPAIRS	ESTIMATED COST	
STANDARD OPEN DITCH REPAIRS	$	101,301
OUTLET SIDE SLOPE FLATTENING	$	38,973
HEADWALL-REPLACE HEADWALL (OPTION 1)	$	134,268
FIELD CROSSING REPAIR	*PREVIOUSLY REPAIRED*	
TREE REMOVALS	*PREVIOUSLY REPAIRED*	
ALTERNATIVE BMPS REPAIRS	**ESTIMATED COST**	
TWO-STAGE DITCH	$	178,746
RIPRAP RIFFLES	$	113,677
560TH AVE WEST BERM AREA	$	15,247
PRIORITY BMPS/GRADE STABILIZATION	$	90,077
GRANT FUNDING	*$*	*248,500*
TRADITIONAL REPAIRS SUBTOTAL	**$**	**274,542**
ALTERNATIVE BMPS REPAIRS SUBTOTAL	**$**	**149,247**
MINIMUM REPAIRS TOTAL COST ESTIMATE	$	423,789

FARIBAULT COUNTY
COUNTY DITCH No. 64

OPEN DITCH REPAIRS

STANDARD OPEN DITCH REPAIRS

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 2,780.00	$ 2,780
102	SPOT DITCH CLEANING	LF	540	$ 3.50	$ 1,890
103	DITCH SIDESLOPE REPAIR	LF	500	$ 6.60	$ 3,300
104	30-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 2,161.70	$ 2,162
105	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 1,609.20	$ 1,609
106	18-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	3	$ 1,300.20	$ 3,901
107	15-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2	$ 1,225.20	$ 2,450
108	12-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	5	$ 1,076.80	$ 5,384
109	10-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2	$ 1,050.70	$ 2,101
110	8-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	2	$ 962.00	$ 1,924
111	6-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	7	$ 806.60	$ 5,646
112	ARMOR TILE OUTET (RIPRAP & GEOTEXTILE FABRIC)	EA	10	$ 549.30	$ 5,493
113	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	1.3	$ 1,388.40	$ 1,754
114	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	2950	$ 3.10	$ 9,145
115	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	100	$ 82.50	$ 8,250
	SUBTOTAL CONSTRUCTION COST				**$ 57,790**
	10% UNFORSEEN				$ 5,779
	TOTAL CONSTRUCTION COST				**$ 63,569**
	TEMPORARY DAMAGES	AC	0.75	$ 1,000.00	$ 750
	COUNTY ADMINISTRATION COSTS				$ 1,272
	TOPOGRAPHIC SURVEY				$ 7,050
	REPORTS, PLANS AND SPECIFICATIONS				$ 18,846
	CONSTRUCTION STAKING & ADMINISTRATION				$ 9,814
	TOTAL STANDARD OPEN DITCH REPAIRS REPAIR COST				**$ 101,301**

FARIBAULT COUNTY
COUNTY DITCH No. 64

OPEN DITCH REPAIRS

OUTLET SIDE SLOPE FLATTENING

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 1,160.00	$ 1,160
102	SPOT DITCH CLEANING	LF	50	$ 3.50	$ 175
103	COMMON EXCAVATION - DITCH (P) (EV)	CY	3800	$ 3.25	$ 12,350
104	TOP SOIL STRIP & PLACE SPOILS	AC	1.5	$ 3,875.00	$ 5,813
105	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	0.23	$ 1,388.40	$ 316
106	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	1100	$ 3.10	$ 3,410
107	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	10	$ 82.50	$ 825
				SUBTOTAL CONSTRUCTION COST	**$ 24,048**
				10% UNFORSEEN	$ 2,405
				TOTAL CONSTRUCTION COST	**$ 26,453**
	TEMPORARY DAMAGES	AC	1.50	$ 1,000.00	$ 1,500
	LAND ACQUISTION/ PERMANENT DAMAGES	AC	0.4	$ 7,500.00	$ 3,000
				COUNTY ADMINISTRATION COSTS	$ 530
				TOPOGRAPHIC SURVEY	$ -
				REPORTS, PLANS AND SPECIFICATIONS	$ 4,540
				CONSTRUCTION STAKING & ADMINISTRATION	$ 2,950
				TOTAL OUTLET SIDE SLOPE FLATTENING REPAIR COST	**$ 38,973**

MIDWAY OPEN DITCH SIDE SLOPE FLATTENING

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 1,400.00	$ 1,400
102	SPOT DITCH CLEANING	LF	75	$ 3.50	$ 263
103	COMMON EXCAVATION - DITCH (P) (EV)	CY	4100	$ 3.25	$ 13,325
104	TOP SOIL STRIP & PLACE SPOILS	AC	2.0	$ 3,875.00	$ 7,750
105	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	0.21	$ 1,388.40	$ 289
106	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	1300	$ 3.10	$ 4,030
107	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	25	$ 82.50	$ 2,063
				SUBTOTAL CONSTRUCTION COST	**$ 29,119**
				10% UNFORSEEN	$ 2,912
				TOTAL CONSTRUCTION COST	**$ 32,031**
	TEMPORARY DAMAGES	AC	1.90	$ 1,000.00	$ 1,900
	LAND ACQUISTION/ PERMANENT DAMAGES	AC	0.8	$ 7,500.00	$ 6,000
				COUNTY ADMINISTRATION COSTS	$ 641
				TOPOGRAPHIC SURVEY	$ -
				REPORTS, PLANS AND SPECIFICATIONS	$ 4,950
				CONSTRUCTION STAKING & ADMINISTRATION	$ 3,150
				TOTAL MIDWAY OPEN DITCH SIDE SLOPE FLATTENING REPAIR COST	**$ 48,672**

FARIBAULT COUNTY
COUNTY DITCH No. 64

OPEN DITCH REPAIRS

HEADWALL-REPLACE HEADWALL

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 14,590.00	$ 14,590
102	TILE INVESTIGATION	HR	1	$ 149.40	$ 149
103	30-INCH AGRICULTURAL TILE	LF	60	$ 54.80	$ 3,288
104	24-INCH AGRICULTURAL TILE	LF	60	$ 44.40	$ 2,664
105	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	2	$ 850.00	$ 1,700
106	GRANULAR PIPE FOUNDATION	CY	25	$ 27.60	$ 690
107	COMMON BORROW (P) (CV)	CY	700	$ 10.20	$ 7,140
108	30-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 2,161.70	$ 2,162
109	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 1,609.20	$ 1,609
110	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	900	$ 3.10	$ 2,790
111	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	125	$ 82.50	$ 10,313
112	STEEL SHEET PILING	SF	1300	$ 45.00	$ 58,500
				SUBTOTAL CONSTRUCTION COST	**$ 105,595**
				10% UNFORSEEN	$ 10,559
				TOTAL CONSTRUCTION COST	**$ 116,154**
	TEMPORARY DAMAGES	AC	1.00	$ 1,000.00	$ 1,000
				COUNTY ADMINISTRATION COSTS	$ 2,324
				TOPOGRAPHIC SURVEY	$ 1,500
				REPORTS, PLANS AND SPECIFICATIONS	$ 8,500
				CONSTRUCTION STAKING & ADMINISTRATION	$ 4,790
				TOTAL HEADWALL-REPLACE HEADWALL REPAIR COST	**$ 134,268**

HEADWALL-RIPRAP STILLING BASINS

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 3,300.00	$ 3,300
102	30-INCH AGRICULTURAL TILE	LF	60	$ 54.80	$ 3,288
103	24-INCH AGRICULTURAL TILE	LF	60	$ 44.40	$ 2,664
104	CONNECT EXISTING TILE (SIZE & MATERIAL MAY VARY)	EA	2	$ 850.00	$ 1,700
105	GRANULAR PIPE FOUNDATION	CY	25	$ 27.60	$ 690
106	COMMON BORROW (P) (CV)	CY	700	$ 10.20	$ 7,140
107	30-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 2,161.70	$ 2,162
108	24-INCH TILE OUTLET (20 LF OF PIPE & RIPRAP ON GEOTEXTILE FABRIC)	EA	1	$ 1,609.20	$ 1,609
109	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	900	$ 3.10	$ 2,790
110	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	500	$ 82.50	$ 41,250
111	CLASS V RIPRAP	CY	30	$ 70.53	$ 2,116
				SUBTOTAL CONSTRUCTION COST	**$ 68,709**
				10% UNFORSEEN	$ 6,871
				TOTAL CONSTRUCTION COST	**$ 75,580**
	TEMPORARY DAMAGES	AC	1.00	$ 1,000.00	$ 1,000
				COUNTY ADMINISTRATION COSTS	$ 1,512
				TOPOGRAPHIC SURVEY	$ 1,500
				REPORTS, PLANS AND SPECIFICATIONS	$ 6,850
				CONSTRUCTION STAKING & ADMINISTRATION	$ 4,650
				TOTAL HEADWALL-RIPRAP STILLING BASINS REPAIR COST	**$ 91,092**

FARIBAULT COUNTY
COUNTY DITCH No. 64

BMP REPAIRS

TWO-STAGE DITCH

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 4,880.00	$ 4,880
102	CONSTRUCT TWO-STAGE DITCH (P) (EV)	CY	18100	$ 3.25	$ 58,825
103	TOP SOIL STRIP & PLACE SPOILS	AC	4.6	$ 3,875.00	$ 17,825
104	16.5' BUFFER STRIP SEEDING	AC	0.50	$ 1,388.40	$ 688
105	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	6300	$ 3.10	$ 19,530
				SUBTOTAL CONSTRUCTION COST	**$ 101,748**
				10% UNFORSEEN	$ 10,175
				TOTAL CONSTRUCTION COST	**$ 111,923**
	LAND ACQUISTION/ PERMANENT DAMAGES	AC	1.50	$ 7,500.00	$ 11,250
	TEMPORARY DAMAGES	AC	4.60	$ 1,000.00	$ 4,600
				COUNTY ADMINISTRATION COSTS	$ 2,239
				TOPOGRAPHIC SURVEY	
				REPORTS, PLANS AND SPECIFICATIONS	$ 26,996
				CONSTRUCTION STAKING & ADMINISTRATION	$ 21,738
				TOTAL TWO-STAGE DITCH REPAIR COST	**$ 178,746**

RIPRAP RIFFLES

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 3,440.00	$ 3,440
102	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	522	$ 82.50	$ 43,065
103	CLASS V RIPRAP	CY	194	$ 70.53	$ 13,683
104	RIFFLE ACCESS RAMP CONSTRUCTION	EA	8	$ 1,000.00	$ 8,000
105	FIELD STONE	CY	175	$ 20.00	$ 3,500
				SUBTOTAL CONSTRUCTION COST	**$ 71,688**
				10% UNFORSEEN	$ 7,169
				TOTAL CONSTRUCTION COST	**$ 78,857**
	LAND ACQUISTION/ PERMANENT DAMAGES	AC	0.00	$ 7,500.00	$ -
	TEMPORARY DAMAGES	AC	3.5	$ 1,000.00	$ 3,500
				COUNTY ADMINISTRATION COSTS	$ 1,578
				TOPOGRAPHIC SURVEY	
				REPORTS, PLANS AND SPECIFICATIONS	$ 13,099
				CONSTRUCTION STAKING & ADMINISTRATION	$ 16,643
				TOTAL RIPRAP RIFFLES REPAIR COST	**$ 113,677**

FARIBAULT COUNTY
COUNTY DITCH No. 64

ISG

BMP REPAIRS

560TH AVE WEST BERM AREA

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	MOBILIZATION	LS	1	$ 1,000.00	$ 1,000
102	SPOT DITCH CLEANING	LF	50	$ 3.50	$ 175
103	COMMON BORROW (P) (CV)	CY	600	$ 4.50	$ 2,700
104	TOP SOIL STRIP & PLACE SPOILS	AC	0.5	$ 3,875.00	$ 1,938
105	16.5' BUFFER STRIP SEEDING (SEED MIX: BUFFER BLEND WITH TYPE 3 MULCH)	AC	0.34	$ 1,388.40	$ 473
106	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	800	$ 3.10	$ 2,480
				SUBTOTAL CONSTRUCTION COST	**$ 8,766**
				10% UNFORSEEN	$ 877
				TOTAL CONSTRUCTION COST	**$ 9,642**
	LAND ACQUISTION/ PERMANENT DAMAGES	AC	0.00	$ 7,500.00	$ -
	TEMPORARY DAMAGES	AC	0.7	$ 1,000.00	$ 682
				COUNTY ADMINISTRATION COSTS	$ 193
				TOPOGRAPHIC SURVEY	
				REPORTS, PLANS AND SPECIFICATIONS	$ 2,580
				CONSTRUCTION STAKING & ADMINISTRATION	$ 2,150
				TOTAL 560TH AVE WEST BERM AREA REPAIR COST	**$ 15,247**

FARIBAULT COUNTY
COUNTY DITCH No. 64

ISG

PRIORITY BMPs

GRADE STABILIZATION STRUCTURE (GS-1)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	COMMON BORROW	CY	61	$ 10.20	$ 622.20
102	DITCH SIDESLOPE REPAIR	LF	20	$ 6.60	$ 132.00
103	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	53	$ 3.10	$ 164.30
104	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	20	$ 82.50	$ 1,650.00
				TOTAL	**$ 2,568.50**
				10% UNFORSEEN	$ 256.85
				PRACTICE 1 TOTAL	**$ 2,825.35**

GRADE STABILIZATION STRUCTURE (GS-2)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	15-INCH TRASH GRATE ASI	EA	1	$ 2,000.00	$ 2,000.00
102	DITCH SIDESLOPE REPAIR	LF	20	$ 6.60	$ 132.00
103	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	53	$ 3.10	$ 164.30
				TOTAL	**$ 2,296.30**
				10% UNFORSEEN	$ 229.63
				PRACTICE 2 TOTAL	**$ 2,525.93**

STREAMBANK STABILIZATION (SS-1)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	COMMON BORROW	CY	122	$ 10.20	$ 1,244.40
102	DITCH SIDESLOPE REPAIR	LF	50	$ 6.60	$ 330.00
103	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	89	$ 3.10	$ 275.90
104	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	42	$ 82.50	$ 3,465.00
				TOTAL	**$ 5,315.30**
				10% UNFORSEEN	$ 531.53
				PRACTICE 3 TOTAL	**$ 5,846.83**

GRADE STABILIZATION STRUCTURE (GS-3)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	10-INCH HICKENBOTTOM ASI	EA	1	$ 1,530.00	$ 1,530.00
102	DITCH SIDESLOPE REPAIR	LF	50	$ 6.60	$ 330.00
103	CLEAR AND GRUB TREE (OVER 6")	EA	1	$ 285.00	$ 285.00
104	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	106	$ 3.10	$ 328.60
				TOTAL	**$ 2,473.60**
				10% UNFORSEEN	$ 247.36
				PRACTICE 4 TOTAL	**$ 2,720.96**

FARIBAULT COUNTY
COUNTY DITCH No. 64

PRIORITY BMPs

GRADE STABILIZATION STRUCTURE (GS-4)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	15-INCH TRASH GRATE ASI	EA	1	$ 2,000.00	$ 2,000.00
102	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	78	$ 3.10	$ 241.80
				TOTAL	**$ 2,241.80**
				10% UNFORSEEN	$ 224.18
				PRACTICE 5 TOTAL	**$ 2,465.98**

GRADE STABILIZATION STRUCTURE (GS-5)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	DITCH SIDESLOPE REPAIR	LF	100	$ 6.60	$ 660.00
102	CLASS III RIPRAP WITH GEOTEXTILE FABRIC	CY	100	$ 82.50	$ 8,250.00
				TOTAL	**$ 8,910.00**
				10% UNFORSEEN	$ 891.00
				PRACTICE 6 TOTAL	**$ 9,801.00**

GRADE STABILIZATION STRUCTURE (GS-6)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	24-INCH TRASH GRATE ASI W/ RIPRAP OVERFLOW	EA	1	$ 3,700.00	$ 3,700.00
102	COMMON BORROW	CY	104	$ 10.20	$ 1,060.80
103	DITCH SIDESLOPE REPAIR	LF	50	$ 6.60	$ 330.00
104	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	67	$ 3.10	$ 207.70
				TOTAL	**$ 5,298.50**
				10% UNFORSEEN	$ 529.85
				PRACTICE 7 TOTAL	**$ 5,828.35**

GRADE STABILIZATION STRUCTURE (GS-7)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	15-INCH TRASH GRATE ASI W/ RIPRAP OVERFLOW	EA	1	$ 2,940.00	$ 2,940.00
				TOTAL	**$ 2,940.00**
				10% UNFORSEEN	$ 294.00
				PRACTICE 8 TOTAL	**$ 3,234.00**

GRADE STABILIZATION STRUCTURE (GS-8)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	8-INCH HICKENBOTTOM ASI	EA	1	$ 1,440.00	$ 1,440.00
102	DITCH SIDESLOPE REPAIR	LF	20	$ 6.60	$ 132.00
103	CLEAR AND GRUB TREE (OVER 6")	EA	1	$ 285.00	$ 285.00
104	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	64	$ 3.10	$ 198.40
				TOTAL	**$ 2,055.40**
				10% UNFORSEEN	$ 205.54
				PRACTICE 9 TOTAL	**$ 2,260.94**

FARIBAULT COUNTY
COUNTY DITCH No. 64

PRIORITY BMPs

GRADE STABILIZATION STRUCTURE (GS-9)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	10-INCH HICKENBOTTOM ASI	EA	1	$ 1,530.00	$ 1,530.00
102	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	60	$ 3.10	$ 186.00
				TOTAL	**$ 1,716.00**
				10% UNFORSEEN	$ 171.60
				PRACTICE 10 TOTAL	**$ 1,887.60**

GRADE STABILIZATION STRUCTURE (GS-10)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	10-INCH HICKENBOTTOM ASI	EA	1	$ 1,530.00	$ 1,530.00
102	DITCH SIDESLOPE REPAIR	LF	25	$ 6.60	$ 165.00
103	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	86	$ 3.10	$ 266.60
				TOTAL	**$ 1,961.60**
				10% UNFORSEEN	$ 196.16
				PRACTICE 11 TOTAL	**$ 2,157.76**

GRADE STABILIZATION STRUCTURE (GS-11)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	8-INCH HICKENBOTTOM ASI	EA	1	$ 1,440.00	$ 1,440.00
102	DITCH SIDESLOPE REPAIR	LF	20	$ 6.60	$ 132.00
103	SEED MIX 25-142 W/MNDOT EROSION CONTROL BLANKET CATEGORY 20	SY	58	$ 3.10	$ 179.80
				TOTAL	**$ 1,751.80**
				10% UNFORSEEN	$ 175.18
				PRACTICE 12 TOTAL	**$ 1,926.98**

GRADE STABILIZATION STRUCTURE (GS-12)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	24-INCH TRASH GRATE ASI W/ RIPRAP OVERFLOW	EA	1	$ 3,700.00	$ 3,700.00
102	COMMON BORROW	CY	93	$ 10.20	$ 948.60
103	CLEAR AND GRUB TREE (OVER 6")	EA	1	$ 285.00	$ 285.00
				TOTAL	**$ 4,933.60**
				10% UNFORSEEN	$ 493.36
				PRACTICE 13 TOTAL	**$ 5,426.96**

GRADE STABILIZATION STRUCTURE (GS-13)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	24-INCH TRASH GRATE ASI W/ RIPRAP OVERFLOW	EA	1	$ 3,700.00	$ 3,700.00
102	COMMON BORROW	CY	93	$ 10.20	$ 948.60
				TOTAL	**$ 4,648.60**
				10% UNFORSEEN	$ 464.86
				PRACTICE 14 TOTAL	**$ 5,113.46**

FARIBAULT COUNTY
COUNTY DITCH No. 64

PRIORITY BMPs

GRADE STABILIZATION STRUCTURE (GS-14)

Item No.	Item	Unit	Quantity	Unit Price	Amount
101	24-INCH TRASH GRATE ASI W/ RIPRAP OVERFLOW	EA	1	$ 3,700.00	$ 3,700.00
102	COMMON BORROW	CY	93	$ 10.20	$ 948.60
				TOTAL	**$ 4,648.60**
				10% UNFORSEEN	$ 464.86
				PRACTICE 15 TOTAL	**$ 5,113.46**

CONSTRUCTION SUBTOTAL	**$ 53,759.60**
MOBILIZATION	$ 5,375.96
COUNTY ADMINISTRATION COSTS	$ 2,687.98
REPORTS, PLANS AND SPECIFICATIONS	$ 23,953.00
CONSTRUCTION STAKING & ADMINISTRATION	$ 4,300.77

COMPLETE BMP COST	**$ 90,077.31**