

# **High Island Creek Watershed District Proposed Improvements to Project 10**



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November 2020**

**Draft Final Engineers Report  
for  
High Island Creek Watershed District  
Proposed Improvements to Project 10**

**Certification**

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.

November 13, 2020

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## **1.0 CHAPTER 1 – Introduction**

### **1.1 Petition and Order**

#### **IN THE MATTER OF THE PETITION FOR THE IMPROVEMENT OF HIGH ISLAND CREEK WATERSHED DISTRICT PROJECT 10**

On June 24, 2019, the High Island Creek Watershed District received a Petition for Improvement of Project 10 in Sibley County in accordance with Minnesota Statute 103.E.215 with the purpose of relocating and improving the pump station associated with the project (Appendix A). High Island Watershed District approved the Petition on the same date. In response to that authorization, preliminary field surveys were performed to determine the condition of the existing drainage facilities, to consider moving the pump station, to consider increasing the capacity of the pump station, and to analyze the outlet for the system. A detailed analysis was completed of the drainage capacity of the system, water storage designs, alternatives to the proposed improvement, potential impacts of the improvement, and recommendations on the allocation of separable maintenance.

High Island Watershed District appointed Ulteig Engineers as the engineer and the subsequent order added no further refinements.

This report summarizes findings of the investigations, surveys and analysis and is submitted for consideration by the Board of Managers of the High Island Creek Watershed District.

## 1.2 Project Location and Proposed Improvements

High Island Creek Watershed District Project 10 is located in Sections 27, 28, 32, 33, and 34 of Washington Lake Township, Sibley County. Project 10 consists of a main line open ditch (Main Line) which includes a lift-pump system, the pump station being located in the east ½ of the southeast ¼ of Section 33 of Washington Lake Township. The open ditch outlets through a culvert crossing of Sibley County Highway 164 into the northeast ¼ of Jessenland Township. At that point a natural channel conveys water south approximately one quarter mile to a legal Minnesota Department of Natural Resources flowage easement at Silver Lake.

The Petitioners proposed to increase the Project 10 drainage capacity and efficiency of its outlet by the following:

1. Relocating the existing lift-pump station closer to Sibley County Road 164 (220<sup>th</sup> Street) and utilize the road culvert as a restriction for the purpose of water quality management.
2. Improving the lift-pump system by replacing the existing lift-pump and upgrading the pump size to current design capacities (“Proposed Improvements”) which would increase the pump system from 2,000 gallons per minute to 15,100 gallons per minute.

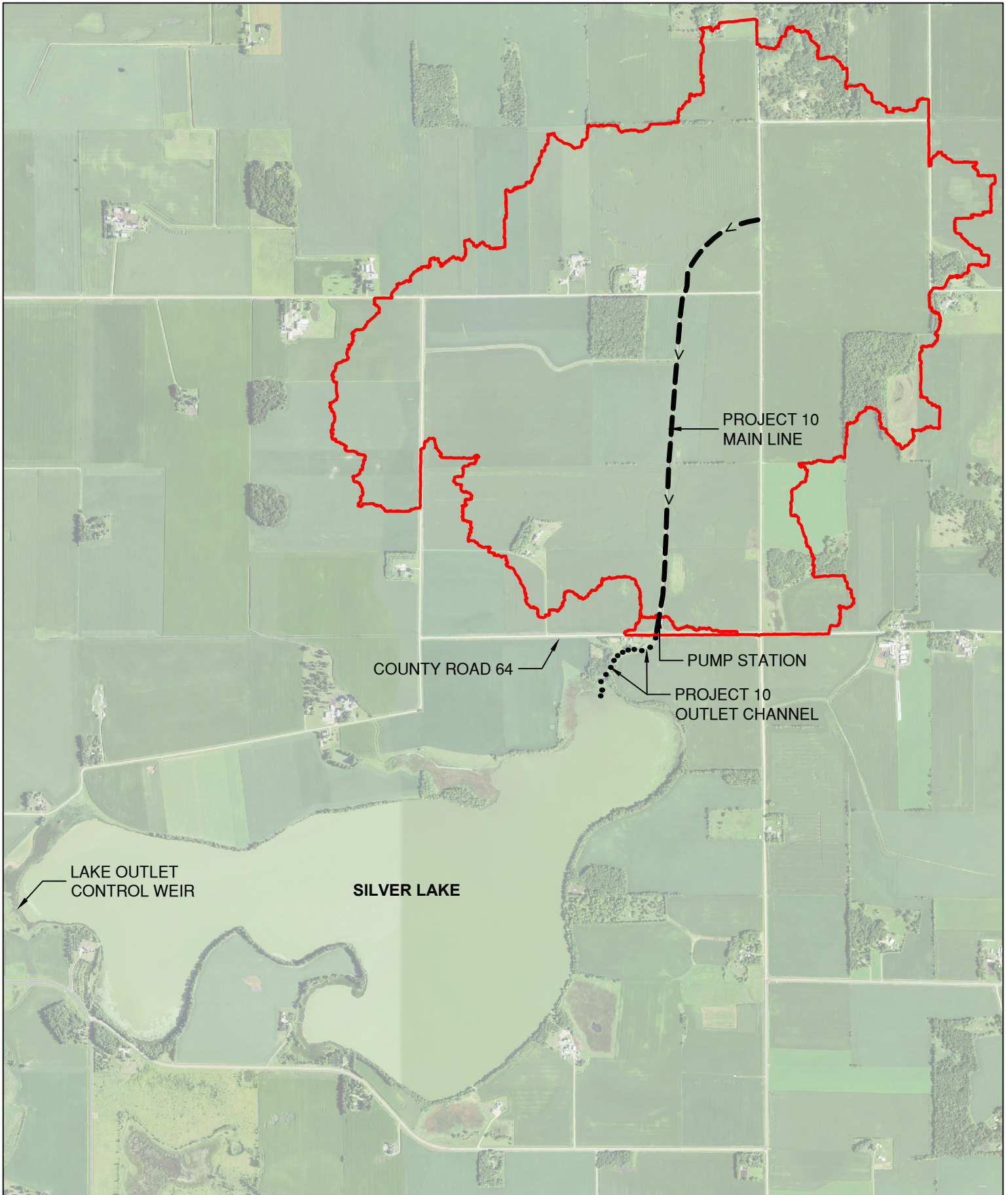
The petition proposes to make Project 10 more efficient by several means. By moving the pump station closer to County Road 164 the petitioners desire to gain a more efficient discharge hydraulically into the natural channel downstream of the county road. In addition, the larger pump station capacity would provide more timely draw down of water in the Main Line to allow private tile systems discharging to the Main Line to function more efficiently.




No improvements are requested for the Main Line open ditch system. Installation of public tile lines is not requested by the Petition.

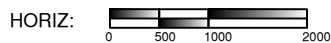
## 1.3 Watershed Characteristics and History

The Project 10 watershed is gently rolling agricultural land and provides drainage to approximately 1,400 acres. A network of private tile lines and one private ditch drain to the Project 10 Main Line. At the outlet of the watershed the elevation is approximately 982-ft and the elevation ranges up to 1034-ft near the watershed boundary. Figure 1 provides an overview of the project location.

Project 10 discharges under Sibley County Road 164 to an approximately 1430-ft long natural channel that discharges into Silver Lake. This lake is a Public Water for which the Minnesota Department of Natural Resources has a flowage easement. Silver Lake has a surface area of approximately 650 acres and has an outlet control weir at the western end of the lake. The elevation of the outlet control weir is 981.46-ft (NGVD-1929), compared to the



LEGEND	
	WATERSHED BOUNDARY
	MAIN LINE
	OUTLET CHANNEL



	<b>EXHIBIT 1</b> <b>PROJECT 10 OVERVIEW</b>
	HIGH ISLAND CREEK WATERSHED DISTRICT
	SIBLEY COUNTY, MINNESOTA

downstream invert of the County Road 164 culvert, which has elevation 981.93-ft (NGVD-1929). The existing upstream invert elevation of this culvert is 981.59-ft (NGVD-1929).

A private open ditch system was constructed in the 1970's in Washington Lake Township through the east half of Section 33, southeast quarter of the southeast quarter of Section 28 and terminating in the southwest quarter of the southwest quarter of Section 27 (RCM, 1995). A pump station was constructed about 1977 and consisting of a berm to pond water and a 2,000 gallon per minute (gpm) pump having a lift of 16-ft. In addition to the pump station, a 36-inch overflow pipe was constructed to provide additional drainage during spring runoff and periods of high flows in the Main Line.

In 1996 the private open ditch (Main Line), with the exception of one lateral ditch entering from the west, became a public drainage system with High Island Creek Watershed District (HICWD) becoming the drainage authority. The public drainage system also included the pump station comprised of a berm, a 2000 gallon per minute pump, and two overflow culverts. Both overflow culverts are at an elevation relatively near the top of the berm and only discharge water during periods of high flow in the Main Line. The pump station ponds water upstream of the berm, with the Main Line functioning as a long linear settling pond. There was no construction or improvements in 1996 when the system became public with the exception of the addition of a one rod wide vegetated buffer strip along both sides of the Main Line.

In November of 2017 two maintenance activities were completed. The first was the removal of accumulated sediment from the entire Main Line. Secondly, the pump was replaced with a similar unit having the same pumping capacity as the original, 2000 gpm.

## **1.4 Existing Conditions**

The Project 10 Main Line ditch is approximately 7200-ft long and has varying design bottom width and side slopes. On the basis of the 1996 plans by RCM, the bottom width is estimated to be 4-ft at the upper end of the ditch, and a maximum of 12-ft at the lower end. Ditch side slopes range from approximately 1 vertical to 1.5 horizontal to 1 vertical to 2 horizontal. Depths of ponding during high water in the Main Line are estimated to be approximately 7-ft at the upper end and 13-ft near the pump station.

Field investigation for this Preliminary Engineering Report only identified one isolated area where the Main Line ditch bank needs repair, and that is on the east bank immediately downstream of the pump station. There was also scour damage to the channel banks immediately downstream of the CR 164 culvert. The 48-inch diameter reinforce concrete pipe (RCP) county road culvert, which has extensions that were installed in 1963, was observed to be near its useful life span.



The vegetated buffer strip along the Main Line was observed to be densely vegetated with grasses. Most but not all landowners periodically mow the buffer strip. Maintenance operations by the HICWD include periodic tree removal in the buffer strips where they are found to have grown.



Main Line with Vegetated Buffers

A review of bank conditions in the channel downstream of CR 164 did not identify eroding banks there. The channel banks were well vegetated with grasses and appeared to be stable.

A comprehensive up to date inventory of private tile drains entering the Main Line is not available. A tile inventory was not completed as part of this review because potential construction for the proposed improvement will not conflict with tile drains, nor will it involve the installation of additional tile. The Project 10 ditch plans that were developed in 1995 show tile that were inventoried at that time.

The tile lines that discharge into the Main Line are all privately owned and typically at about 4-ft deep. Maintenance of these tile lines is the responsibility of the individual owners. Landowners report that the existing pump station does not draw down the water in the Main Line to an elevation where the tile lines would function for relatively long periods of time, particularly during spring runoff and periods of heavy or frequent rain events.

The hydraulic gradient between CR 164 and the outlet of Silver Lake is limited. There is a distance of approximately 11,600-ft between the lake outlet structure and the CR 164 culvert. Using the upsteam invert elevation of the culvert, which is the lower of the two culvert inverts, the slope (hydraulic gradient) available to drive flow is only 0.00001 ft/ft, or 0.001 percent, a low value. There are significant periods of time when backwater from Silver Lake affects the hydraulic conditions at CR 164.

## **2.0 CHAPTER 2 – ALTERNATIVE SOLUTIONS**

Chapter 2 discusses alternatives solutions to the improvements requested by the Petition including the alternative in the Petition and an alternative identified in the preliminary engineering report. A primary purpose of the petition was to increase the pumping capacity, and this work will review pumping capacity and other factors related to pumping capacity.

### **2.1 Alternative 1 – Petition Proposal**

Foremost in the Petition were two requests, the first being relocating the pump station closer to Sibley County Road 164 with the second being the increase in pump capacity from 2000 to 15,100 gpm. The increase in pump capacity has the greatest influence on cost and potential impacts of the two proposals and will be discussed first.

#### **2.1.1 Discussion of Pump Capacity**

To put the pump capacity for the Petition Alternative into prospective, the proposed pump capacity was compared to peak flows generated by the Project 10 watershed at the CR 164 culvert for different recurrence interval flood events. The flow rate of 15,100 gpm is equivalent to 33.6 cubic feet per second (cfs), the typical unit used for stream flow. Using the peak flow prediction software StreamStats (US Geological Survey, 2019), peak flow statistics were computed. Results from StreamStats for the 1.5 and 2-year recurrence interval storms for the Project 10 watershed are found in Table 1. It is seen that the 1.5-year peak flow has a magnitude just under the proposed pumping rate. The significance of the 1.5-year recurrence interval peak flow is it lies in the range of stream flows known as channel forming flows (FISRWG, 1998). When the channel forming stream flow range occurs, scour of the banks and bed is likely. The conclusion drawn by this analysis, when considering the channel downstream of County Road 164, is it would not be prudent to have a system that discharges

**Table 1**  
StreamStats Results for Project 10 Watershed

Recurrence Interval Storm (year)	Predicted Peak Flow Rate (cfs)
1.5	31
2	46

in the channel forming stream flow range multiple times a year, and a lower pump capacity should be selected.

### **2.1.2 Discussion of Relocating the Pump Station**

One reason for moving the pump station is to potentially reduce head losses associated with the discharge of water through the county road culvert. Moving the pump station would require reconstruction of the pump station berm at the edge of the county road right-of-way. The road embankment itself was not constructed to impound water and would not be capable of that purpose. It may be necessary to construct a separate discharge pipe from the new pump station through the embankment, which would be another expense. Furthermore, the existing 300-ft of ditch between the pump station and CR 164 provides water quality benefits which would be lost if the pump station were moved. There are other means of reducing head loss associated with the discharge of Project 10 pump station through the CR 164 culvert. For example, replacing the culvert with a larger culvert and adding end sections. Overall, moving the pump station closer to CR 164 is not seen as having significant benefit.

### **2.1.3 Summary of Petition Alternative**

The alternative for the pumping capacity found in the Petition, increasing the pump capacity to 12,500 gpm, is not feasible because the discharge rate is higher than expected thresholds for scour and erosion in the downstream channel and the alternative is dismissed.

## **2.2 Alternative 2**

Alternative 2 includes adding a new 7,500 pump, keeping the existing 2000 gpm pump and 36-inch overflow culvert in operation, and leaving the pump station at the existing location. This alternative would include a substantial increase in pumping rate, continued use of the 3-year old 2000 gpm pump, improving hydraulics at the county road by replacing the culvert and adding culvert end sections, and keeping the 300 feet of channel between the pump station and county road as an area for water quality improvement.

### **2.2.1 Discussion of Alternative 2 Pump Capacity**

A combined pump capacity of 9,500 gpm (21.2 cfs) was chosen because it is below the range of flows associated with channel forming flows. Velocities for this discharge rate were calculated for the channel downstream of the county road and found to be below 2 feet per

second (fps), except immediately below the county road, where velocities were found to be 4 fps. The predicted velocities are in the range withstood by vegetation (MNDOT, 2000), allowing the conclusion that scour will not be an issue at this proposed pump capacity.

There is an added benefit to having 2 pumps which is increased reliability. If one of the pumps was to experience a mechanical failure there would remain another pump that could continue to function.

The set points (elevations) for when the pumps are turned on and off would not need to be the same for the two pumps. For instance, the larger of the two pumps could be turned off at a slightly higher elevation, for instance 1.0-ft higher, such that the final draw down of the ditch would be completed by the smaller pump. This would be an operation measure that assures draw down of the water to below the tile elevation in the most timely basis, but also limits the time when the discharge downstream is at the maximum rate.

### **2.2.1.1 Discussion of Draw Down Rate**

Increasing the pump capacity will decrease the time it takes to drain the water in the ditch upstream of the pump station. Likewise, the faster draw down time of water in the ditch will improve the functioning of drainage tile discharging to the ditch. An analysis was completed to quantify how much faster the water would be drawn down in the ditch by the new pump station. To incorporate storage within the watershed, and full characterization of hydraulic conditions, a fully dynamic XPSWMM model was developed to complete the drawdown analysis. The new pump station does not improve overland flow paths of water draining to the ditch.

The basic drawdown improvement would be the ratio of the proposed pump capacity to the existing pump capacity, which is 4.75. In other words, the new pump station will draw the water down in the ditch 4.75 times as fast as the existing pump station. To put the drawdown improvement in context with rain events, Table 2 was created. Runoff volume was computed for a range of storms using NRCS methods (NRCS, 1986). Because of losses such as evapotranspiration and infiltration, there is less runoff volume per unit of rainfall for smaller storm events than larger.

The proposed pump would completely empty the ditch of surface runoff in 24-hours after a 2-year recurrence interval 2-hour storm (1.35-inches), compared to a 4.75 day draw down time for the existing pump. The runoff inches in the table can also be considered snow melt, with the estimated drawdown times applicable to both rainfall and snow melt conditions.

The benefits for rain storms greater than a depth of 2.5 inches need to consider that some water will discharge through the culverts or even over the berm at the pump station in the case of an extreme storm. Furthermore, the 48-inch culvert downstream at CR 161, now proposed to be replaced with a 60-inch culvert, will control draw down rates during the peak of an extreme storm (10-year 24-hour rain (4.22-in) or greater). The benefits for rain storms greater than a depth of 2.5 inches need to consider that some water will discharge

**Table 2**

## Analysis of Drawdown Time Improvement From New Pump Station

## 9500 gpm New Combined Pump Capacity

Storm Recurrence Interval	Duration	Rainfall Depth	Runoff <sup>1</sup>	Maximum Ponding Depth	Drawdown Time (day)	
					To Elevation 985-ft <sup>2</sup>	To Elevation 983-ft <sup>2</sup>
(yr)	(hr)	(in)	(in)	(ft)		
1	12	2.14	0.87	984.26	0 <sup>4</sup>	1.1
1	24	2.46	1.18	984.70	0 <sup>4</sup>	1.6
2	24	2.85	1.46	985.43	0.6	2.4
5	24	3.56	2.07	985.43	0.9	2.4
10	24	4.22	2.66	986.59	2.6	4.0
25	24	5.25	3.60	987.18	3.3	4.8
50	24	6.13	4.43	987.58	3.8	5.2
100	24	7.08	5.33	988.00	4.2	5.7

1. Surface runoff produced by given storm computed by NRCS methods.
2. Elevation at which ponding adjacent to ditch begins.
3. Elevation where water is drawn down 2-ft below minimum top of bank.
4. Maximum water level does not reach 985-ft.

## 2000 gpm Existing Pump Capacity

Storm Recurrence Interval	Duration	Rainfall Depth	Runoff <sup>1</sup>	Maximum Ponding Depth	Drawdown Time (day)	
					To Elevation <sup>2</sup> 985-ft	To Elevation <sup>3</sup> 983-ft
(yr)	(hr)	(in)	(in)	(ft)		
1	12	2.14	0.87	984.45	0 <sup>4</sup>	2.8
1	24	2.46	1.18	984.88	0 <sup>4</sup>	2.9
2	24	2.85	1.46	985.47	1.1	4.4
5	24	3.56	2.07	986.16	2.1	5.4
10	24	4.22	2.66	986.65	2.8	6.4
25	24	5.25	3.60	987.23	3.7	6.8
50	24	6.13	4.43	987.65	4.2	7.4
100	24	7.08	5.33	988.02	4.4	7.7

1. Surface runoff produced by given storm computed by NRCS methods.
2. Elevation at which ponding adjacent to ditch begins.
3. Elevation where water is drawn down 2-ft below minimum top of bank.
4. Maximum water level does not reach 985-ft.

through the overflow culverts or even over the berm at the pump station in the case of an extreme storm. Once the water recedes downstream of the pump station and below the overflow culverts at the pump station, then the ratio of the two pump sizes solely determines the benefit provided by the proposed pump.

### **2.2.2 Discussion of Replacing the County Road 164 Culvert**

The hydraulic capacity of the County Road 164 reinforced concrete pipe (RCP) culvert can be improved by adding end sections, and by increasing the pipe size from 48-inch to 60-inch. The existing pipe is in poor enough condition such that end sections could not be added to it requiring the culvert to be replaced to add end sections. However, end sections will decrease head loss at this culvert, with the decrease being proportion to flow rate with a maximum improvement of approximately a 20 percent decrease in head loss.

The culvert design software HY-8 was used to compare the hydraulic characteristics of 48 and 60-inch RCP within the pump discharge and stream flow range expected at County Road 164. At the proposed Alternative 2 pump capacity of 9,500 gpm, the 60-inch RCP would have 0.2-ft less head loss than a 48-inch RCP. At higher flow rates, such as when the pump station and overflow pipes are both functioning, there will be a larger difference in head loss between these two RCP sizes. It is anticipated that the maximum headloss difference between these two pipe diameters would be approximately 0.5-ft, which is significant given the backwater conditions that can occur upstream of Silver Lake. A decision on which diameter to replace the culvert with will need input from the Sibley County Highway Department. However, using the 60-inch diameter pipe would improve the hydraulics of the pump station. It would also decrease velocities in the channel immediately downstream of the culvert reducing scour potential there.

Replacing the CR 164 culvert will require county highway clear zone design requirements be met. This could be accomplished several ways, including constructing guard rails near the culvert or by bringing in dill to flatten the county road side slopes.

The XPSWMM model developed for the drawdown analysis shows that Project 10 attenuates peak flows at County Road 161. That is, storage in the main line ditch, and backwater created by the berm during extreme storms, provides additional storage in the watershed, reducing peak flow rates below that which would naturally occur. A comparison of headwater conditions upstream of County Road 161 is found in Appendix B.

RCM (1996) reported that the existing 48-inch RCP culvert was improved in 1963 by adding extensions to the RCP culvert that existed at that time. No documentation has been found regarding the age of the original 48-inch RCP culvert, but it is reasonable to believe it is on the order of 80-years old. Based on that assumption, and field inspection in 2019 and

2020 of the County Road 161 culvert, it is estimated this culvert is at 80 percent of its useful life.

### **2.2.3 Other Features of Alternative 2**

Alternative 2 would leave the pump station at its present location, and keep the 300-ft long section of Main Line between the pump station and county road. This short section of channel has several beneficial aspects including providing an area where turbulence associated with the pump discharge can disipate prior to the entrance of the culvert and providing an area where sediment can settle or be filtered by vegetation growing on the banks.

Work completed as part of Alternative 2 would include repair of the east ditch bank immediately downstream of the pump station and repair of the channel bank immediately downstream of the CR 164 culvert. This work, however, would be routine maintenance of Project 10 facilities and would not be part of the cost for work completed for the petition.

### **2.2.4 Summary of Alternative 2**

Alternative 2 provides a substantial increase in pump capacity and drawdown rates of wataer entering the mainline ditch. Alternative 2 retains the relatively new 2000 gpm pump, improves the hydraulics of the CR 164 culvert crossing, and does not involve moving the pump station. Plans and specifications for construction of the improvements included in Alternative 2 are found in Appendix C.

## **2.3 Other Alternatives**

### **2.3.1 Do Nothing Alternative**

The do nothing alternative was considered. However, the petitioners have experienced poor functioning of drain tiles and subsequent crop loss. Loss of productivity experienced by poor drainage in the Project 10 watershed equates to an economic loss to Sibley County and the State of Minnesota and a reduced return on the investment made by the petitioners.

The Do Nothing Alternative was dismissed for these economic reasons and because it does not solve the drainage issues in the Project 10 watershed. The economic balance between the cost of improvements versus benefits derived still needs to be addressed.

### **2.3.2 Lower Pump Capacity**

There is a range of pump station capacities that could be considered between the existing capacity and the proposed Alternative 2 capacity (9,500 gpm). The alternative 2 capacity balances the need to protect the natural channel downstream of CR 164 and wetlands in the watershed with the time needed to draw down water in the Main Line. Therefore additional pump station capacities were not considered.

## **2.4 Feasibility**

The proposed Alternative 2 Improvement of the High Island Creek Watershed District Project 10, as described in this report, is feasible and practical and is necessary to provide effective drainage for the cultivation of crops.

## **2.5 Probable Cost**

Details of the Opinion of Probable Construction Cost are found in Appendix D. A total cost of \$261,506.00 was estimated for the Proposed Improvements. There would be no land permanently lost from production. Additional county road right-of-way would need to be purchased to provide lands needed for the clear zone and new CR 164 culvert. Temporary easements would be needed for less than 0.1 acres of lands in production because other than this temporary impact the work can be contained to lands within the Project 10 lands or land not in production. The temporary easement is for land south of County Road 164. The two work items involving bank restoration are Separable Maintenance.

## **3.0 CHAPTER 3 – Environmental, Land Use and Multipurpose Water Management (MS 103E.015 Sub. 1)**

### **3.1 Private and Public Benefits and Costs**

The estimated cost of the proposed improvement of Project 10 is found in Appendix D. Benefits from the improvement, both public and private, will be identified by the Viewers and their report will be available at the final Improvement Hearing.

The improvement will provide increased effectiveness of tile systems by drawing down water ponded in the Main Line at a faster rate to levels where tile drains operate efficiently. This would allow land owners economic benefits by allowing for less saturated conditions and reducing crop loss. It may also reduce sloughing of the ditch banks by allowing them to dry sooner, reducing the need for ditch maintenance.

Landowners have other costs associated with the construction and maintenance of their individual drainage systems. The proposed improvements will only serve to improve the outlet of runoff and drainage flows from lands within the watershed. Each landowner is responsible to construct and maintain his or her private drainage system to adequately drain their farm lands. Individual benefits for an adequate drainage system are an increase in crop production from farm lands. It is difficult, if not impossible, to set a per acre value for individual land owner costs or benefits of an adequate drainage system due to the many variables that affect value derived. Among these variables are the weather conditions during crop production, and the price the producer receives for their crop.



A statement of the estimated public and private benefits and damages will be prepared for the final Improvement Hearing.

A conservative calculation was completed to estimate how much additional bounce in Silver Lake would occur as a result in the proposed increase in pump station capacity (9,500 gpm). It is estimated that Silver Lake would rise approximately an additional 0.06-ft in 24-hours compared to existing conditions, assuming there was no outflow. Taking outflow into account would reduce this estimate. The surface area of Silver Lake is large in comparison to the size of the Project 10 watershed, and flow attenuation by the lake is therefore significant. Bounce on the order of that conservatively estimated would not create a flooding issue.

Silver Lake and the channel downstream of CR 164 are mapped as having a 100-year floodplain with no base elevation determined. The Proposed Improvements will not alter the mapped floodplain.

### **3.2 Alternative Measures**

Increasing the pumping rate as proposed will not decrease the water quality of existing conditions. The Main Line will continue to pond water over its 6,800-ft length upstream of the pump station, providing settling of sediment which is periodically removed during routine maintenance.

The proposed improvements involve only the immediate area of the Project 10 pump station and the CR 164 culvert. Existing densely vegetated buffers along the Main Line will be maintained in that condition. Private landowners in the Project 10 watershed can work independently with resource agencies such as the Sibley County Soil and Water Conservation District or the USDA Service Office located in Gaylord to identify additional best management practices to implement such as winter cover crops, alternative inlets, wetland restoration, or additional water storage to reduce soil erosion and protect water quality.

### **3.3 Land Use**

The present land use within the Project 10 watershed is predominantly agricultural, with there also being wood lots, wetlands, farm building sites and roads. This is consistent with the Sibley County zoning map, which shows the watershed to either have agricultural lands or areas with non-prime soils. No change in land use is expected as a result of the proposed improvements.

### **3.4 Flood Characteristics**

Runoff from the Project 10 watershed is significantly influenced by the ponding in the Main Line, the pump station, the overflow culverts at the berm and the CR 164 culvert. In addition, peak flows leaving the Project 10 watershed will undergo a significant amount of attenuation in the 650-acre Silver Lake, which is approximately one quarter mile downstream of CR 164. When a major storm occurs the Project 10 infrastructure and Silver Lake serve to attenuate peak flows discharged from the watershed.

### **3.5 Adequacy of Outlet**

The outlet of Project 10 is the natural channel downstream of CR 164 and Silver Lake. Both have the capacity to convey the proposed pump station flows (9,500 gpm or 21.2 cfs). The proposed pump station capacity is a rate lower than the mean annual flood of the watershed draining to the CR 164 culvert. In periods of relatively high water levels in Silver Lake there will be a backwater influence on the hydraulics of the CR 164 culvert. However, during operation of the pump station water levels on upstream side of CR 164 will balance with the downstream conditions and the discharge from the pump station will pass downstream. The outlet is adequate for the Proposed Improvement.

### **3.6 Wetlands**

The Proposed Improvements will have no direct impact on wetlands. There will be no excavation or fill of wetlands, nor will the project involve construction of new tile line. The proposed improvement would decrease the time it takes to draw down water ponded in the Main Line. However, it is the responsibility of the private landowners to provide the conditions and facilities needed for water drain from the land into the ditch. The proposed project does not increase hydraulic connections from the land into the Main Line. Landowners can work with resource agencies, such as described in Section 3.2, to obtain assistance with the installation of BMPs such as alternative inlets. A figure depicting wetlands in the Project 10 watershed is found in Appendix D.

### **3.7 Water Quality**

The proposed increase in pumping rate will not decrease the water quality of the existing conditions. The Main Line ditch system will continue to function as a linear water quality pond where settling of sediment will occur. Flow velocities in the Main Line in the first 2000-ft upstream of the pump station will be approximately 0.1 feet per second when the ditch is relatively full and the pump station operating at capacity. Vegetative buffers along the Main line are in excellent shape and will continue to be maintained. Private landowners in the Project 10 watershed can work with resource agency to implement additional water quality BMPs as discussed in Section 3.2, Alternative Measures.

The 2013 Sibley County Water Plan includes a targeting of locations in the Silver Lake watershed with potential soil erosion. None of those locations are in the Project 10 watershed.

### **3.8 Fish and Wildlife Resources**

There are no identified potential impacts of the proposed improvements on Fish and Wildlife Resources. Habitat will not be created or degraded by the project, with no overall change in the habitat. Existing wood lots, wetland and other habitat areas will remain.

### **3.9 Shallow Groundwater**

Project 10 and private tile systems in the Project 10 watershed were constructed to maintain the elevation of shallow groundwater to a level that controls soil saturation in the root zone of crops grown there. Groundwater levels will be controlled by the depth of the Main Line and private tile lines. Typically the private tile lines are approximately 4-ft below the ground surface. The purpose of the proposed improvement is to provide a depth of water in the Main Line on a timely basis which allows effective operation of the private tile lines.

### **3.10 Overall Environmental Impact**

It is expected that the proposed improvement would overall have no environmental impact.

### **3.11 Permits**

It is anticipated that the following permits will need to be obtained:

- Public Waters Permit from the Minnesota Department of Natural Resources
- Sibley County Highway Department
- Nationwide 404 Permit from the Army Corps of Engineers

### **3.12 Potential Sources of Funding**

As proposed improvements to Project 10 related to increasing the capacity of the pump station are not improvements where cost share funding would be available. However, it is anticipated that County Road 164 culvert and clear zone improvements will be managed by Sibley County, with cost share funding arranged through the Minnesota Department of Transportation. Additional environmental practices could be applied within the watershed if funding becomes available.

## **4.0 CHAPTER 4 – RECOMMENDATIONS**

The Proposed Improvements involve increasing the pumping capacity of the Project 10 pump station, and increasing the hydraulic efficiency of the County Road 164 culvert to improve upstream drainage. The Proposed Improvements, as described in this report, are practical and feasible, and will be a public benefit and contribute to the public welfare of this area. Therefore, the Proposed Improvements should be considered for construction.

It is recommended that the High Island Creek Watershed District call the Final Hearing for this project and submit this report to the regulatory agencies for input on project features and environmental concerns. If this project is received favorably at the Final Hearing, then the detailed plans and specifications should be used for bidding, and once bids are received, the lowest qualified bidder be selected for construction of the project.

## 5.0 CHAPTER 5 – REFERENCES

Federal Emergency Management Agency, revised 1999, Flood Insurance Study for Sibley County MN, Unincorporated Areas.

Federal Interagency Stream Restoration Workgroup (FISRWG), 1998, Stream Corridor Restoration, Principals, Processes, and Practices.

Minnesota Department of Transportation, 2000, Drainage Manual.

RCM, 1996, Engineer's Report, Project No. 10, High Island Watershed District.

US Geological Survey, 2019, StreamStats: Streamflow Statistics and Spatial Analysis Tools for Water Resources Applications, web-based software accessed 9/30/2019. <https://streamstats.usgs.gov/ss/>

# Appendix A

## Petition

**STATE OF MINNESOTA  
BEFORE THE HIGH ISLAND CREEK WATERSHED DISTRICT  
SITTING AS THE DRAINAGE AUTHORITY  
FOR HIGH ISLAND CREEK WATERSHED DISTRICT PROJECT 10**

In the Matter of the Petition  
for Improvement to High Island Creek Watershed District Project 10

---

**PRELIMINARY FINDINGS AND ORDER ACCEPTING PETITION**

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WHEREAS, a Petition for an Improvement of High Island Watershed District Project No. 10 (the "Petition") has been filed by Robert A. Kloth and R H Grand, LLC (collectively "Petitioners") with the High Island Creek Watershed District ("HICWD"), acting as the drainage authority for High Island Creek Watershed District Project 10 ("Project 10"); and

WHEREAS, the HICWD, sitting as a drainage authority, considered the Petition during its regularly scheduled meeting on June 25, 2019; and

WHEREAS, Improvements to existing drainage systems managed by the HICWD must be initiated by filing a petition with the HICWD; and

WHEREAS, Pursuant to Minn. Stat. § 103D.625 subd. 4, proceedings for the improvement of a drainage system in the watershed district must conform to chapter 103E.

WHEREAS, Minn. Stat. § 103E.215 sets forth the requirements for a petition for improvement of a drainage system,

WHEREAS said Board of Managers of the HICWD has received and considered the Petition;

NOW, THEREFORE, on motion duly made by Manager Bryan Peris, and seconded by Manager Vern Schlueter the HICWD adopts the following findings and makes the following orders:

1. Said Board hereby finds that that:
  - a. At least 26% of the owners of the property that the proposed improvement passes over have signed the petition. The proposed improvement involves relocating the current pumping station and increasing the size of the pump, all of which will occur on a single 40-acre tract located at the SW ¼ of the SE ¼ Section 33, Township 114, Range 26, which is part of a parcel

owned by R H Grand, LLC, one of the Petitioners herein. The Petition meets the signature requirement of Minn. Stat. 103E.215 subd. 4(a)(2).

- b. The Petition adequately designates the drainage system proposed to be improved, by identifying the Project 10 system.
- c. The Petition states that Project 10 has insufficient capacity.
- d. The Petition does not propose any extension of the of Project 10
- e. The Petition adequately describes the improvement, including describing the names and addresses of the owners of the 40-acre tracts or government lots and property that the improvement passes over.
- f. The Petition states that the proposed improvement will be of public utility and promote the public health.
- g. The Petition contains an agreement by the petitioners that they will pay all costs and expenses that may be incurred if the improvement proceedings are dismissed.
- h. The Petition is adequate and meets the legal requirements applicable to this proceeding.
- i. Pursuant to Minn. Stat. § 103E.215, because Petitioners have presented a Petition that meets the legal requirements applicable to an improvement proceeding, the Board is required to appoint an engineer to examine the drainage system and make an improvement report.
- j. Pursuant to Minn. Stat. § 103E.202, and Minn. Stat. § 103D.705, Petitioners must post a bond or deposit security conditioned on paying all costs and expenses incurred by HICWD in the event the project petitioned for is not constructed or the proceedings are dismissed. Petitioners have submitted a Surety Bond dated May 15, 2019, as amended by a Bond Rider effective June 5, 2019. The Bond Rider amends the name of the description of the project from "Sibley County Project #10" to "High Island Watershed Project #10." This amended named still differs from the name of the "High Island Creek Watershed District Project 10." In addition, the Bond, as amended, names the obligee as the "High Island Watershed District Board of Managers." This differs from the correct name of the HICWD.

2. Subject to Petitioners satisfying the conditions set forth in Paragraph 2.a., below, the Board accepts the Petition.

- a. Within two weeks of this Resolution, Petitioners shall submit a new or amended Surety Bond, naming the "High Island Creek Watershed District" as the Obligee, and identifying "High Island Creek Watershed



District Project 10" as the risk described. The Bond shall be submitted through Dean M. Zimmerli, attorney for the Board.

3. If Petitioners fail to submit a new or amend bond as required above, the Petition shall be immediately dismissed without further action. Regardless of whether a new or amended bond is submitted, Petitioners shall remain liable to HICWD for the costs of the project.

4. The Board appoints Roger Clay + Ulteig Engineers to serve as an engineer for this proposed improvement.

5. The engineer shall prepare a preliminary improvement report and file said report within 120 days of this order. The preliminary improvement report shall comply with Minn. Stat. § 103E.245.

6. The engineer shall file and oath to faithfully perform the assigned duties in the best manner possible and file a bond with the auditor. The bond shall be in the amount of \$5,000.00 and must be conditioned to pay any person or the HICWD for damages and injuries resulting from negligence of the engineer while the engineer is acting in the proceedings or construction provide that the engineer will diligently and honestly perform the engineer's duties.

7. The preliminary improvement report shall include an investigation of the current condition of the portion of the project proposed to be improved, and provide a recommendation on separable maintenance allocations of project costs.

8. The preliminary improvement report shall include an investigation of the scope of the improvement, alternatives to the proposed improvement, the impact of any regulatory, permitting, and wetland requirements, and other environmental factors. The preliminary improvement report shall include analysis of downstream impacts of the proposed improvement on drainage, flooding, water quality, and similar environmental factors.

Dated this 24 day of June, 2019.

  
\_\_\_\_\_  
President of the High Island Creek Watershed  
District Board of Managers

**PETITION FOR AN IMPROVEMENT OF  
HIGH ISLAND WATERSHED PROJECT NO. 10**

TO: THE HIGH ISLAND WATERSHED DISTRICT (“DISTRICT”) BOARD OF MANAGERS, AS DRAINAGE AUTHORITY FOR HIGH ISLAND WATERSHED PROJECT NO. 10 (“DRAINAGE AUTHORITY”)

The Petitioners herein respectfully represent:

WHEREAS, High Island Watershed Project No. 10 is located in Sections 27, 28, 32, 33, 34 Washington Lake Township, Sibley County, and consists of a Mainline open ditch (“Mainline”) which includes a lift-pump system, the station being located in E ½ of the SE ¼ Section 33 of Washington Lake Township. Said open ditch outlets through a culvert across Sibley County Road No. 64 into the NE ¼ of Section 4, Jessenland Township, where the open ditch continues to its outlet to a legal DNR flowage easement into Silver Lake (together, “the system”); and

DNR

WHEREAS, the current Mainline commences in the SW corner of Section 27 of Washington Lake Township and proceeds southwesterly to cross the SE ¼ of the SE ¼ of Section 28, thence southerly through the NE ¼ of Section 33 and terminates at said outlet in Section 4 of Jessenland Township. Sibley County Road No. 64 lies upon the common boundary between Washington Lake and Jessenland Townships; and

CR64

WHEREAS, the existing system has insufficient capacity or requires maintenance and repairs, as well as improvements to furnish sufficient capacity or a better outlet; and

WHEREAS, the Petitioners' intention is to increase the system's drainage capacity and efficiency of its outlet by (1) relocating the existing lift-pump station closer to Sibley County Road 64 (220<sup>th</sup> Street) and utilizing the road culvert as a restriction for the purpose of water quality management, and (2) improving the lift-pump system by replacing the existing lift-pump and upgrading the pump size to current design capacities (“Proposed Improvement”) which would increase the pump system from 2,000 gallons per minute to 15,100 gallons per minute; and

WHEREAS, the starting point, general course and terminus of the proposed improvement project for the system is depicted on Exhibit A which is attached hereto for reference; and

WHEREAS, Petitioners assert that the proposed Improvement Project will benefit and be useful to the public and will promote the public health by controlling and alleviating the damage by flood waters; improving stream channels; regulating flow of streams and conserving the waters thereof; preventing, controlling, and alleviating soil erosion and sediment deposition in the water courses and other affected bodies of water; and

WHEREAS, Petitioners recognize that water storage benefits the entire system and requests that the engineer appointed by the Drainage Authority consider water storage designs into the Improvement Project. Petitioners further request and will support actively seeking outside funding for said water storage; and

WHEREAS, Petitioners further request that the engineer be specifically ordered to determine and offer alternative proposals for the consideration of the Drainage Authority which relate to the improvement of the drain capacity of the system that the engineer deems feasible, if any, including the cleaning of the Mainline as well as improvement to other portions of the ditch as necessary to improve the drainage capacity of the system to current standards; and

WHEREAS, a separable part of the drainage system may need repair, and Petitioners request, pursuant to Minn. Stat. §103E.215, subd. 6, that separable maintenance be used for those locations where existing tiles are being replaced with open ditch and/or new tile. Petitioners request that the engineer appointed by the Drainage Authority be ordered to determine a proportionate share of life span based on the existing condition versus the tiles original designed capacity, and further ordered to include in its detailed survey report and statement the proportionate estimated cost of the proposed improvement required to repair the separable part of the existing system and the estimated proportionate share of the cost of the added work required for the improvement.

WHEREAS, Petitioners recommend that the separable maintenance to be paid by the entire system is that percentage of the open ditch and in-place tile whose life span capacity has been used and that the improvement pay for that percentage of the open ditch and tile, life span or capacity that still is in repair. The landowners are requesting that a percentage be paid as separable maintenance by the entire system and a percentage be paid for by the improvement benefits as determined by the engineer and viewers; and

WHEREAS, the names and addresses of owners of the 40 acre tracts that the Proposed Improvement affects and passes over (indicated with a \*), as depicted on the attached Exhibit A, are as follows:

Parcel 1	
Owner/Address:	Darren R. & Ursula M. Kroells 34355 200th St. Green Isle, MN 55338

Parcel 2  
Owner/Address: Brian & Mark Zeiher and  
Scott & Cory Zeiher  
c/o Scott Zeiher  
33956 206th St.  
Green Isle, MN 55338

Parcel 2  
Owner/Address: Scott A. Zeiher  
33956 206th St.  
Green Isle, MN 55338

Parcel 3  
Owner/Address: Mark A. & Elaine A. Bates  
P.O. Box 95  
Green Isle, MN 55338

Parcel 4  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 5  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 6  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 7  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 8  
Owner/Address: Mark A. & Elaine A. Bates  
P.O. Box 95  
Green Isle, MN 55338

Parcel 9  
Owner/Address: Mark A. & Elaine A. Bates  
P.O. Box 95  
Green Isle, MN 55338

Parcel 10  
Owner/Address: Randy & Sandy Malkow  
34472 210th St.  
Green Isle, MN 55338

Parcel 10  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 11  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 12  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 13  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 14  
Owner/Address: Paul R. Gohlke Revocable Trust and  
Lisa M. Gohlke Revocable Trusts  
31873 State Hwy. 25  
Belle Plaine, MN 56011

Parcel 14  
Owner/Address: Robert & Brenda Holtberg  
824 Sunrise Ln.  
Belle Plaine, MN 56011

Parcel 15  
Owner/Address: Gordon M. Bates & Sherry B. Bates  
35479 210th St.  
Green Isle, MN 55338

Parcel 16  
Owner/Address: Gordon M. Bates & Sherry B. Bates  
35479 210th St.  
Green Isle, MN 55338

Parcel 17  
Owner/Address: Gordon M. Bates & Sherry B. Bates  
35479 210th St.  
Green Isle, MN 55338

Parcel 18  
Owner/Address: Fuller Family Farms Trust  
c/o Walter H. Fuller  
9124 W 47th St.  
Brookfield, IL 60513

Parcel 19  
Owner/Address: Fuller Family Farms Trust  
c/o Walter H. Fuller  
9124 W 47th St.  
Brookfield, IL 60513

Parcel 20  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 21  
Owner/Address: Daniel P. Graham  
32420 224th St.  
Henderson, MN 56044

Parcel 21  
Owner/Address: John Dieball & Jennifer Faust Dieball  
136 Morningside Dr. S.  
Le Sueur, MN 56058

Parcel 21  
Owner/Address: Randy Marttinen  
417 2nd Ave. SE  
Young America, MN 55397

Parcel 21  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 22  
Owner/Address: Gordon M. Bates & Sherry B. Bates  
35479 210th St.  
Green Isle, MN 55338

Parcel 23  
Owner/Address: Gordon M. Bates & Sherry B. Bates  
35479 210th St.  
Green Isle, MN 55338

Parcel 24  
Owner/Address: Gordon M. Bates & Sherry B. Bates  
35479 210th St.  
Green Isle, MN 55338

Parcel 25  
Owner/Address: Fuller Family Farms Trust  
c/o Walter H. Fuller  
9124 W 47th St.  
Brookfield, IL 60513

Parcel 26  
Owner/Address: Fuller Family Farms Trust  
c/o Walter H. Fuller  
9124 W 47th St.  
Brookfield, IL 60513

Parcel 27  
Owner/Address: Robert A. Kloth  
13150 Tacoma Ave.  
Nya, MN 55368

Parcel 28  
Owner/Address: John Dieball & Jennifer Faust Dieball  
136 Morningside Dr. S.  
Le Sueur, MN 56058

Parcel 28  
Owner/Address: Karl H. Dieball & Rosemary V. Dieball  
33691 220th St.  
Green Isle, MN 55338

Parcel 29  
Owner/Address: Gordon M. Bates & Sherry B. Bates  
35479 210th St.  
Green Isle, MN 55338

Parcel 30  
Owner/Address: Gerald & Jeanne C. Kreger  
34726 220th St.  
Henderson, MN 56044

Parcel 31  
Owner/Address: Gerald & Jeanne C. Kreger  
34726 220th St.  
Henderson, MN 56044

Parcel 32  
Owner/Address: Gerald & Jeanne C. Kreger  
34726 220th St.  
Henderson, MN 56044

Parcel 33  
Owner/Address: Gerald & Jeanne C. Kreger  
34726 220th St.  
Henderson, MN 56044

Parcel 34  
Owner/Address: Brian & Mark Zeiher and  
Scott & Cory Zeiher  
c/o Scott Zeiher  
33956 206th St.  
Green Isle, MN 55338



Parcel 35  
Owner/Address: Gerald & Jeanne C. Kreger  
34726 220th St.  
Henderson, MN 56044

Parcel 35  
Owner/Address: R H Grand, LLC  
c/o Bruce E. Jeurissen  
19450 281st Ave.  
Belle Plaine, MN 56011

Parcel 36\*  
Owner/Address: R H Grand, LLC  
c/o Bruce E. Jeurissen  
19450 281st Ave.  
Belle Plaine, MN 56011

Parcel 37  
Owner/Address: R H Grand, LLC  
c/o Bruce E. Jeurissen  
19450 281st Ave.  
Belle Plaine, MN 56011

Parcel 38  
Owner/Address: Brian & Mark Zeiher and  
Scott & Cory Zeiher  
c/o Scott Zeiher  
33956 206th St.  
Green Isle, MN 55338

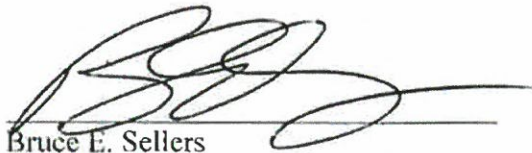
WHEREAS, this Petition is signed by: (1) at least 26% of the owners of the property affected by the proposed improvements; (2) at least 26% of the owners of the property that the proposed improvement passes over; (3) the owners of at least 26% of the property area affected by the proposed improvement; or (4) the owners of at least 26% of the property area that the proposed improvement passes over; and

WHEREAS, Petitioners provide herewith a corporate surety bond in the face amount of \$50,000 payable to the High Island Watershed District Board of Managers, as Drainage Authority for High Island Watershed Project No. 10, said bond conditioned to pay the costs incurred if the proceeding are dismissed or a contract is not awarded to allow the costs incurred to exceed the amount of the bond and that they will cause additional bond to be filed if it appears that the costs exceed the amount of the bond; and

WHEREAS, Petitioners have been informed and understand that they may not withdraw as a Petitioner at any time after this Petition is accepted by the Drainage Authority. Petitioners further acknowledge that if the proposed drainage project is not constructed, they are, and each Petitioner is, liable to the Drainage Authority for all of the costs incurred including engineering, legal and miscellaneous fees and expenses in relation to this Petition as outlined under Minnesota Statutes 103E; and

WHEREAS, this Petition may be signed in counterparts.

NOW THEREFORE, we, as Petitioners, ask the Sibley County Auditor to present this petition to legal counsel for the High Island Watershed District for examination and determination of its legal sufficiency. If the petition is determined sufficient, the Petitioners ask that the petition be presented to the High Island Watershed District Board of Managers, acting as the drainage authority for High Island Watershed Project No. 10, for the appointment of Jacob Rischmiller, I+S Group, or, in the alternative, another engineer skilled in drainage matters to examine the proposed work.



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

This petition is prepared by:  
Bruce E. Sellers, Attorney at Law  
Wendland Sellers Bromeland, P.A.  
825 East Second Street, P.O. Box 247  
Blue Earth, MN 56013  
507-526-2196

**SIGNATURE PAGE FOR PROPOSED IMPROVEMENT PROJECT  
TO HIGH ISLAND WATERSHED PROJECT NO. 10**

**Printed or Typed Name of Petitioner(s):** Robert A. Kloth

**Ownership (check one)**

- Individual  
 Business  
 Partnership  
 Co-owner. How many \_\_\_\_\_  
 Trust. How many trustees \_\_\_\_\_  
 Other. \_\_\_\_\_

TRACT DESCRIPTION	ACRES "PASSED" OVER	ACRES AFFECTED
Tract 4	0.00	38.09
Tract 5	0.00	40.52
Tract 6	0.00	39.35
Tract 7	0.00	40.70
Tract 10	0.00	28.85
Tract 11	0.00	40.53
Tract 12	0.00	39.14
Tract 13	0.00	40.60

Tract 20	0.00	39.15
Tract 21	0.00	20.72
Tract 27	0.00	39.77

Robert A. Klath \_\_\_\_\_ 5-10-19 \_\_\_\_\_  
Signature Title Date

Ron Klath \_\_\_\_\_ 5-10-19 \_\_\_\_\_  
Signature Title Date

**SIGNATURE PAGE FOR PROPOSED IMPROVEMENT PROJECT  
TO HIGH ISLAND WATERSHED PROJECT NO. 10**

Printed or Typed Name of Petitioner(s): R H Grand, LLC

**Ownership (check one)**

- Individual
- Business
- Partnership
- Co-owner. How many
- Trust. How many trustees
- Other.

TRACT DESCRIPTION	ACRES "PASSED" OVER	ACRES AFFECTED
Tract 35	0.00	12.43
Tract 36	38.69	38.69
Tract 37	0.00	40.82

Bruce Ferriss                      President                      5-4-19  
Signature                                      Title                                      Date

\_\_\_\_\_  
Signature                                      Title                                      Date

\_\_\_\_\_  
Signature                                      Title                                      Date

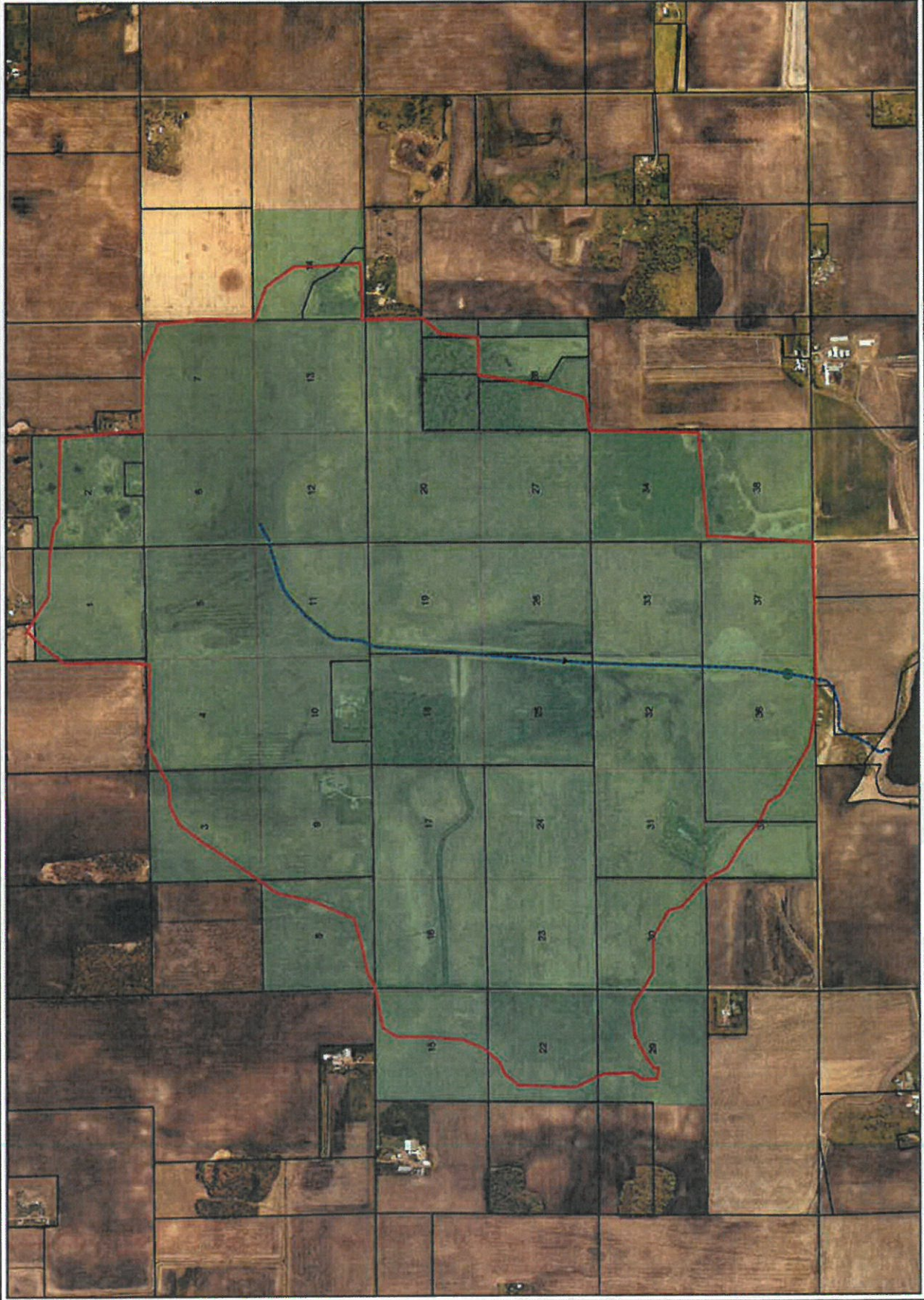
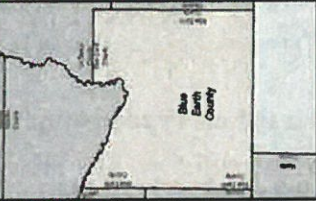
\_\_\_\_\_  
Signature                                      Title                                      Date



**Exhibit A**  
**High Island**  
**Project No 10**  
Sibley County,  
Minnesota  
Friday, April 26, 2019

- Legend**
- Project 10 Wetland
  - Drainage Ditch
  - 1st Drainage Ditch
  - Sibley Parish
  - Pump Station
  - Party Layer

**PN: 19-XXXXX**  
**Source:**  
Orthorectified (NAD83, 2015)  
Traverse (Sibley County, 1916/1918)  
Pond (Sibley County, 1916/1918)  
Lake (NAD 83, 1916-1918)  
Map (Sibley County, 2015, July 2018)  
County (Sibley County, 2015)  
PLS (2018/04/26)



# ENGINEER'S REPORT

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Project No. 10

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High Island Watershed District, Minnesota  
RCM File No. 39040

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rieke  
carroll  
muller  
associates, Inc.  
engineers  
architects  
land surveyors

Exh 4

RCM 39040

**STATE OF MINNESOTA**

**HIGH ISLAND WATERSHED DISTRICT**

**TO THE HIGH ISLAND WATERSHED BOARD:**

In the matter of High Island Watershed Project No. 10, the professional engineer appointed to act on this project reports that all matters set forth in the Petition and Order of the Board have been examined. A survey, plans, and specifications and a General Report on the watershed have been made.

**THE PETITION**

The Petition now under consideration states that:

"The Petitioners constitute a majority of the resident owners of the property over which this proposed improvement and extension passes.

"There presently exists a ditch created by private, and undertaking which commences in the Southwest Quarter of Section 27 of Washington Lake Township then proceeds to cross the Southeast Quarter of Section 28 and the East Half of Section 33 in Washington Lake Township. Sibley County Road No. 64 lies upon common boundary between Washington Lake and Jessenland Townships. On the north side of that road a pumping device has been lawfully installed which outlets the water through a culvert across the road into the Northeast Quarter of Section 4, Jessenland Township where the ditch continues and outlets into Silver Lake.

"It is the Petitioner's desire that said existing open ditch and pump be included as part of the High Island Watershed ditch system.

"That the inclusion of the private ditch within the High Island Watershed system is necessary to promote the orderly and efficient drainage of waters in the area and to provide for a system assessment for the costs incurred and the maintenance and repair of the ditch and pump."

**THE LOCATION**

The private ditch and pump station that is petitioned to become a public system is located in the Southwest Quarter of the Southwest Quarter of Section 27, Southeast Quarter of the Southeast Quarter of Section 28, and East One Half of Section 33, all located in Township 114, Range 26, Sibley County, Minnesota.



RCM 39040

### THE WATERSHED

Lands that drain into this private ditch system are located in Sections 27, 28, 32, 33, and 34 of Township 114, Range 26, Sibley County, Minnesota.

The watershed consists of flat to gently rolling agricultural land currently drained by private ditches and networks of private tile lines. There are approximately 1,440 acres in the watershed of this project.

*1,440 ac*

### EXISTING CONDITIONS

A private open ditch system was constructed in the 1970's through the East Half of Section 33, Southeast Quarter of Southeast Quarter of Section 28, and terminated in the Southwest Quarter of the Southwest Quarter of Section 27. A pump station was installed about 1977 at Station 3+00. The pump installed was Parma Model No. 6, Serial No. 120432-2-6, consisting of a 30 hp motor, 12" suction pipe, capable of pumping approximately 2000 gpm (4.46 cfs) at a lift of 16.0'; the pump discharges through a 15" CMP outlet pipe into an open ditch. In addition to the pump station, a 36" overflow pipe was installed to carry spring runoff and flows from large rainstorm events.

The above open channel and pump station is proposed to be a part of the public drainage system.

There is also another private open ditch system that outlets into proposed High Island Ditch No. 10. This open ditch is located from the center of the Northeast Quarter of Section 33 to the west line of Section 33. This private open ditch is proposed to be left as a private ditch system. All of the private tile lines in the watershed are to remain as private tile lines.

### NATURE OF THE PROJECT

No construction is proposed under this report. The private ditch from Station 0-33 (south right-of-way line of County Road #64) to Station 72+00 is to become a public drainage system including the pump station located at Station 3+00. The depths and widths of the open ditch are shown on the profile and cross section sheets.

The viewers on this project will be notified that Minnesota Statutes require a minimum of one-rod grass strip be left on each side of the open ditch as a permanent easement. The viewers should consider this when awarding benefits and damages to this project.

### DESIGN & OUTLET CONSIDERATION

Storm water runoff from the watershed area drains downstream to the pump station location at ditch station 3+00 which is approximately 300 feet north of County Road #64. At this location there is the pump station and a 36 inch diameter overflow culvert.

RCM 39040

The pump station consists of a 6 foot diameter vertical sump with a 57"x38" CMP Arch inlet pipe. At present, there is one No. 6 Parma Pump with a 30 Hp electrical motor. The static lift is about 16 feet. The pump is reported to pump at a rate of about 2000 gpm (4.46 cfs). The pump invert is at about elevation 974.0 which is near the existing ditch bottom (see plans).

The 36 inch CMP overflow pipe has an invert elevation of 982.6 and a top of pipe elevation of 985.6. The top of pipe elevation is above or very close to low spot elevations which are present at various locations along the ditch system.

The 36 inch CMP overflow pipe was installed to discharge high flows in the ditch system from larger intensity rainfall events and spring snow melt/runoff. The pump station serves to pump ground water and low intensity rainfall events out of the lower portions of the ditch system in order to lower the water table and provide drainage to low lands along the system that would otherwise have ponding or a poor outlet into the drainage system.

The outlet system for proposed H.I. #10 consists of an existing 48 inch RCP culvert under Sibley County Road #64 and a drainage channel which leads into Silver Lake. The drainage channel is somewhat shallow and runs through a broad wetland/lake fringe area.

Because of low lying lands upstream of the 36 inch overflow culvert, this culvert can function as an acceptable drainage device when no surcharge or headwater exists at the upstream end of the culvert. Under this condition, the flow through the culvert is approximately 31 cfs. Even at this flow condition, some of the lowlands in the watershed have ponded areas of water. If the pump station is also running, its discharge is 4.46 cfs. The total discharge into the outlet system is 35.46 cfs.

The capacity of the 48 inch County Road #64 culvert at full flow conditions is 68 cfs. The channel from the county culvert to Silver Lake is a channel running through a broad wetland area capable of receiving the discharge from the pump station and the 36 inch overflow culvert.

The outlet is adequate.

### **CONFORMANCE WITH THE OVERALL PLAN OF THE HIGH ISLAND WATERSHED PROJECT**

#### **WATERSHED OBJECTIVES: (Revised 1988)**

The High Island District was created by order of the Water Resources Board for the following enumerated purposes:

1. Control and alleviation of damage by flood waters.
2. Improvement of stream channels.
3. Reclaiming wet and overflowed lands.

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4. Regulating the flow of streams and conserving the waters thereof.
5. Diverting and changing water courses in part.
6. Conserving water supply for domestic, recreational and other public uses.
7. Consolidation of existing drainage systems within the District and the repair and improvement thereof.
8. The imposition of preventive and remedial measures for the control and alleviation of land and soil erosion and sediment deposition in water courses and other bodies of water affected thereby.
9. Providing the regulation and control of the use of streams, ditches and other water courses for the purpose of disposing of sewage and other wastes.

The following are also considered by the Managers and their advisory committee to be proper District objectives:

1. Providing for wildlife by controlling, preserving and regulating waters and by reclaiming wet and overflowed lands.
2. Providing for recreational areas such as parks and camps by controlling, preserving and regulating waters, by reclaiming wet and overflowed lands and by acquisition of lands where necessary in the public interest.

Comments on those objectives are as follows:

1. The project as completed in 1977 reduced the flooding of agricultural lands by construction of an open ditch and pump station. The petition requests that this construction now become a public system.
2. Prior to construction in the 1970's, this channel was a natural waterway affording minimal drainage to the watershed area. This waterway was realigned and deepened in the 1970's.
3. The majority of the lands in the watershed prior to 1970 were wet and overflowed because of inadequate outlet into Silver Lake.
4. The existing open ditch acts as a reservoir during certain periods of excess rainfall when the channel has been emptied by the pump station. The 36" overflow culvert at Station 3+00 meters the discharge rate of water flowing into Silver Lake during high rainfall events.
5. The channel was realigned during the 1970's construction period.

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6. Because the lands in the watershed have been used for agricultural purposes since construction of the ditch in the 1970's, there are no domestic, recreational, or other public uses in the watershed.
7. This project as petitioned is for changing a private system into a public system. Any future maintenance costs will be born by the system instead of individual landowners.
8. No additional construction is proposed for this project with the exception of providing a 1 rod grass strip on each side of the project to help protect the ditch banks from erosion and siltation.
9. The project, as petitioned, will have no affect on the use of streams or water courses within the watershed district.

Comments to additional objectives:

- A. This project does not propose any new construction except for creation of the 1 rod grass strip; therefore, wildlife will not be affected.
- B. This project will not change the characteristics of the watershed. There are no lands being acquired for public interest.

#### **DAMAGES, BENEFITS, COST OF THE PROJECT**

The petitioners for establishment of this project have stated that the cost of construction for the open ditch, pump station, electrical service, overflow culvert and land required for open ditch construction have been borne by the petitioners and the petitioners are not requesting payment nor reimbursement for these costs. Therefore, in the matter of establishing these items of the drainage system, there is no cost assessed to the benefitted lands.

There will be a cost/damage incurred for taking land to create a permanent, one rod grass strip along both sides of the established drainage ditch system. This cost is shown elsewhere in this report. The petitioners have also stated that those landowners adjacent to the course of proposed H.I. #10 will each absorb the cost to prepare and seed the one rod grass strip next to the ditch bank and therefore, this will not be a cost for benefitted lands in the watershed area. There are other administrative, legal, engineering, and viewing costs which will be incurred; these costs are also shown elsewhere in this report.

The benefits aspect of this project involve a special approach for consideration and determination since there will be no actual construction taking place. Benefits must be considered based upon the drainage and outlet value of the inplace drainage system as compared to the natural drainage system and ponding areas existing prior to conversion of the land from its natural state to a constructed drainage system with pump station as described in this report.

The Engineer estimates that there are approximately 300 acres in the watershed which receive significant direct benefits from the drainage system; these benefits result from drainage of the lands, and improved outlet for private ditch or tile systems which would otherwise have submerged outlets or water ponded in these systems. The benefit to these lands is approximately \$1,100.00 per acre for a total benefit value of \$330,000.00.

300

There are other lands adjoining the directly benefitted lands that receive indirect benefits from the drainage system. It is estimated that there are approximately 300 acres receiving indirect benefits. These benefits result from drainage of the lands, furnishing or making available an improved outlet for surface and subsurface drainage, improved equipment access to lower and higher lands, increase capacity resulting from converted use of these lands, and costs related to increased maintenance expense in the system. The benefit to these lands is approximately \$700.00 per acre for a total benefit value of \$210,000.00.

300

There are some upland areas converted to farmed or developed lands which should be assessed benefits for the drainage system. These lands benefit from the system which serves to receive their storm water runoff, handle and control the runoff to the point of discharge, remove sediment or other debris which serves to improve water quality and reduce sediment deposition on the lands and private drainage systems, and benefits resulting from a need for the downstream drainage system to have greater capacity to handle or control the runoff from these lands as well as increased maintenance requirements related to sediment removal and other potential drainage system maintenance expenses. It is estimated there are approximately 800 acres of other benefitted areas receiving these types of benefits. The benefit to these lands is approximately \$20.00 per acre for a total benefit value of \$16,000.00.

800

1400 ac

The total dollar value to those lands expected to realize benefits from the drainage system is approximately \$556,000.00. In addition to the land benefits, there are also road benefits which would add to the amount of total benefit value.

**NECESSITY**

At the present time, only a few of the landowners pay for pumping and drainage system maintenance costs. There is a considerable amount of land that drains or outlets into the drainage system and is benefitted by the existing open ditch and pump station. These lands will be included in the public drainage system watershed.

**ESTIMATED COST**

Damages		
One Rod Grass Strip	5.5 Acres	\$6,600.00
Engineering Fees		15,000.00
Legal Fees		5,000.00
Administrative Costs		1,000.00
Viewing Fees		<u>5,000.00</u>
<b>TOTAL ESTIMATED COST</b>		<b>\$32,600.00</b>

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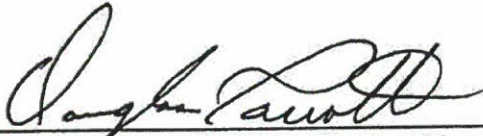
**CONCLUSIONS**

The project as petitioned and described in this report is practical and feasible and sufficient evidence for its establishment has been provided. The project will be a public benefit and continue contributing to the public health and welfare of the area. The existing open ditch channel and pumping system should be incorporated into a public drainage system. The estimated benefits exceed the estimated damages.

**RECOMMENDATION**

It is recommended that viewers be appointed and file a report on benefits and damages; the necessary hearings be held; the landowners adjacent to the ditch to be required to prepare and seed 1 rod of permanent grass strip adjacent to the ditch; and the system be established according to these plans and report from ditch Station 0-33 (south right-of-way line of County Road 64) to Station 72+00.

Respectfully submitted,



\_\_\_\_\_  
Douglas A. Parrott, P.E.; License #11632

\_\_\_\_\_  
February 22, 1999

Date

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AREA OF RIGHT-OF-WAY

<u>Description</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>1 Rod Grass Strip Area</u>
SW 1/4 of SE 1/4 ✓	33	114	26	1.0
NW 1/4 of SE 1/4	33	114	26	1.0
SE 1/4 of NE 1/4	33	114	26	0.3
SW 1/4 of NE 1/4	33	114	26	0.7
NE 1/4 of NE 1/4	33	114	26	0.7
NW 1/4 of NE 1/4	33	114	26	0.3
SW 1/4 of SW 1/4	27	114	26	0.1
SE 1/4 of SE 1/4	28	114	26	1.4

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**DESCRIPTION OF COURSES**

Beginning at a point 2 rods East and 70 rods North of the southwest corner of Section 27, Township 114, Range 26, Sibley County, Minnesota; thence Southwesterly through the Southeast Quarter of Southeast Quarter of Section 28, Township 114, Range 26 to a point 75 rods West of the southeast corner of said Section 28; thence Southerly through the Northeast Quarter of Section 33, Township 114, Range 26 to a point 85 rods West of the east quarter corner of said Section 33; thence continuing Southerly to and terminating at a point 95 rods West and 2 rods South of the northeast corner of Section 4, Township 113, Range 26.



LIST OF LANDOWNERS LIKELY TO BE AFFECTED BY PROJECT NO. 10

<u>Owner</u>	<u>Description</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>
Wm. J. & Joseph C. & Patrick McGuire Margaret A. Boyle	Part of Gov't. Lot 3	4	113	26
Brian & Roxanne Zeiher	Parcel in SW1/4 of NW1/4	27	114	26
Doris Zeiher	SW1/4 of NW1/4 Exc. Parcel	27	114	26
Donovan & Nelda Duenow	SW1/4	27	114	26
John Edward & Earl Louis Flynn	NW1/4 of SE1/4 & W1/2 of SW1/4 of SE1/4	27	114	26
Roger D. & Eldora L. Kroells	SE1/4 of NE1/4	28	114	26
Mark A. & Elaine A. Bates	E1/2 of SW1/4 & SW1/4 of SW1/4	28	114	26
Dennis K. & Elizabeth L. Tuchtenhagen	SE1/4	28	114	26
Gordon M. & Sherry B. Bates	E1/2 of NE1/4 & N1/2 of NE1/4 of SE1/4	32	114	26
Gordon M. & Sherry B. Bates	NW1/4	33	114	26
Walter H. & Beverly J. Fuller	NE1/4	33	114	26
Gerald Kreger	N1/2 of SE1/4, N1/2 of SW1/4 & W1/2 of SE1/4 of SW1/4	33	114	26
Wm. Joseph & Pat McGuire	S1/2 of SE1/4 & E1/2 of SE1/4 of SW1/4	33	114	26
Dennis K. & Elizabeth L. Tuchtenhagen	W1/2 of NW1/4 & N1/2 of NE1/4 of NW1/4	34	114	26
Doris Zeiher	NW1/4 of SW1/4	34	114	26

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Lee A. & Don R. Sauter	W1/2 of S1/2 of NE1/4 of NW1/4	34	114	26
Timothy E. & Mary J. Boelter	Parcel in S1/2 of NE1/4 of NW1/4	34	114	26
Karl H. & Rosemary Dieball	W1/2 of SE1/4 of NW1/4	34	114	26
Sibley County	County Roads			
Washington Lake Township	Township Roads			

## SECTION 02480

## TEMPORARY EROSION CONTROL AND SEEDING

## PART 1: PRODUCTS

## 1.00 SEED

- A. Seed shall be tagged to comply with the requirements of the seed mixture required herein, subject to the approval of the Engineer. Seed shall conform to MnDOT Specification 3876.
- B. The seed mixture shall be as follows:

<u>KIND OF SEED</u>	<u>PURITY MINIMUM PERCENT</u>	<u>GERMINATION MINIMUM PERCENT</u>	<u>WEED SEED MAXIMUM PERCENT</u>
Smooth Brome	90	85	0.50
Alfalfa	99	85	0.50
Oats	99	85	0.10
Rye	99	85	0.10

The alfalfa shall be certified seed. Alfalfa may be pre-inoculated or if not pre-inoculated, it will be inoculated by being mixed with an approved inoculant at the recommended rate. No more seed shall be inoculated at one time than will be sowed within five (5) hours. If such seed stands more than five (5) hours, it shall be reinoculated before being sown. If pre-inoculated seed is used, the preceding is not required unless a period of greater than six (6) months expires from the date of treatment.

- C. The seed shall be delivered to the site in tagged and labeled bags to show the percentage of purity and germination. The seed shall have been tested within six months prior to the date of seeding and shall conform to the latest seed laws of the United States and of the state.

## 1.01 FERTILIZER

- A. Commercial formula fertilizer containing minor trace elements shall conform to applicable state fertilizer laws. All areas requiring seeding shall be fertilized with 20-10-10 (N.P.K.), unless otherwise noted in the drawings or specifications. Animal manure shall not be substituted for commercial fertilizer.

**PART 2: EXECUTION**

**2.00 SEEDING BERMS, SPOIL BANKS, AND OTHER AREAS**

- A. Seeding shall be performed immediately after completion of the finished shaping, unless otherwise directed by the Engineer, except that no seeding will be permitted from September 15 through April 14 except at the Contractor's own risk. All berm and spoil bank leveling work completed during this dormant period shall be seeded at the earliest opportunity in the following spring seeding period.
- B. The seedbed shall be prepared with a springtooth field tiller, disk or similar equipment to a minimum depth of three (3) inches. If the area to be seeded has dried unusually hard, a heavy soil conditioner shall be used to loosen the surface. All clods, rocks, blacktop chunks, roots, brush and other undesirable materials that would interfere with seeding operations shall be removed and disposed of as directed by the Engineer. If weeds have been allowed to grow up on the finished berm and spoil banks, they shall be mowed and raked off the area to be seeded prior to spreading fertilizer and preparing the seedbed.
- C. Seed type and application rate shall be as follows:
- Smooth Brome (Lincoln, Achenback or Fischer) 8 pounds per acre. Alfalfa (Vernal of Ranger), inoculated, 10 pounds per acre. Oats, 1 1/2 bushel per acre or Rye, 1/2 bushel per acre. (Note: Oats shall be used as a nurse crop for spring seeding from April 15 through August 14 and Rye shall be used as a nurse crop for fall seeding, August 15 through September 15.)
- D. Seed shall be uniformly sown over the area with a machine-operated mechanical seeder at the rates specified. Hand seeding around inlets or pipes and for a distance of ten (10) feet back on the approach to the inlet of the pipe shall be required to insure adequate distribution of seed. The grass and legumes shall be seeded to a depth of not more than one-half (1/2) inch; the Oats or Rye shall be seeded to a depth of between one and one-half (1 1/2) and two (2) inches.
- E. Immediately after the seed has been sown, the entire area shall be raked, dragged or harrowed sufficiently to cover the seed unless a cultipacker seeder or press drill was used. Any undesirable materials described above which are uncovered or exposed during seeding operations or which may be present in the seeded area shall be removed and buried or otherwise disposed of at locations approved by the Engineer. All pipe inlets and pipe drop inlets shall be cleaned of any material which may have been deposited in the inlets during seeding operations.

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2.01 FERTILIZING

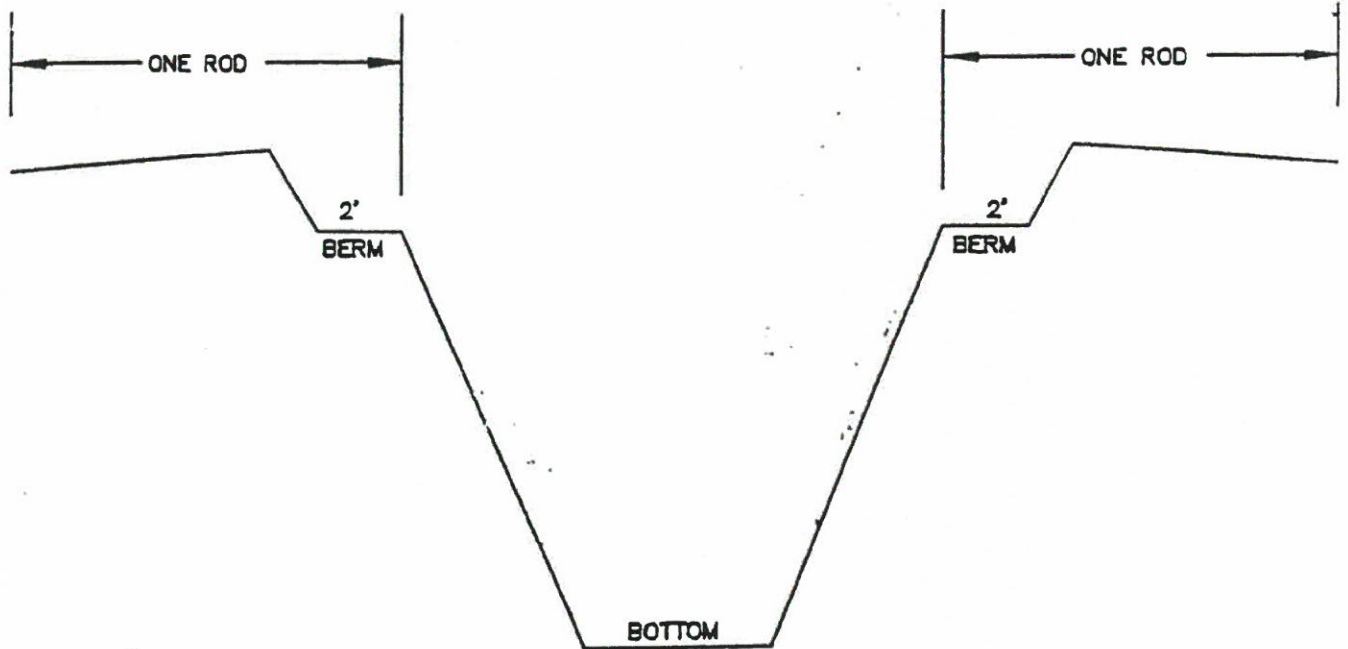
- A. Before the seeding operation, apply to all areas a 20-10-10 (N.P.K.) commercial fertilizer as specified at a rate of 400 pounds per acre. Fertilizer must be dry and free flowing when applied. Caked or deteriorated materials will not be permitted.
- B. On ditch bank slopes, apply fertilizer by hand or by hand operated cyclone applicator. Apply fertilizer in other areas with a mechanical spreader and thoroughly mix in. Seed and fertilizer shall NOT be applied in the same operation.

2.02 MAINTENANCE

- A. Maintenance of seeded areas shall commence immediately after planting. Contractor shall be responsible for maintenance of seeded areas until final acceptance by the Owner or until final stabilization has occurred. Final stabilization is defined as having a uniform perennial vegetative cover with a density of 70% vegetative area over the entire seeded area.
- B. Contractor shall be responsible for reseeding areas, which do not establish vegetative cover, in accordance with provisions for Risk described in the Summary of Work\Special Provisions. Additionally, Contractor shall be responsible for reseeding during those growing months/seasons where monthly average rainfall conditions are within 25% of SCS established monthly average rainfall conditions.
- C. For those events or seasons which exceed conditions described in paragraph B, Owner will pay Contractor for reseeding work.

**END OF SECTION 02480**

# SEEDING DETAIL



G:\DRAWINGS\MEHL\INSEED-01 5-3-95 2:58:49 pm EST

**RCM** rieke  
carroll  
muller  
associates, inc.

# Appendix B

## Comparison of Headwater Conditions Upstream of County Road 161

Comparison of Headwater Conditions at Peak Discharge Upstream of County Road 161

	Recurrence Interval Storm (years)			
	5	10	25	50
Existing Condition Headwater Elevation (ft)	986.1	986.5	987.1	987.6
Existing Condition Peak Flow (cfs)	48	57	63	85
Proposed Condition Headwater Elevation (ft)	986.1	986.6	987.1	987.6
Proposed Condition Peak Flow (cfs)	46	58	69	87



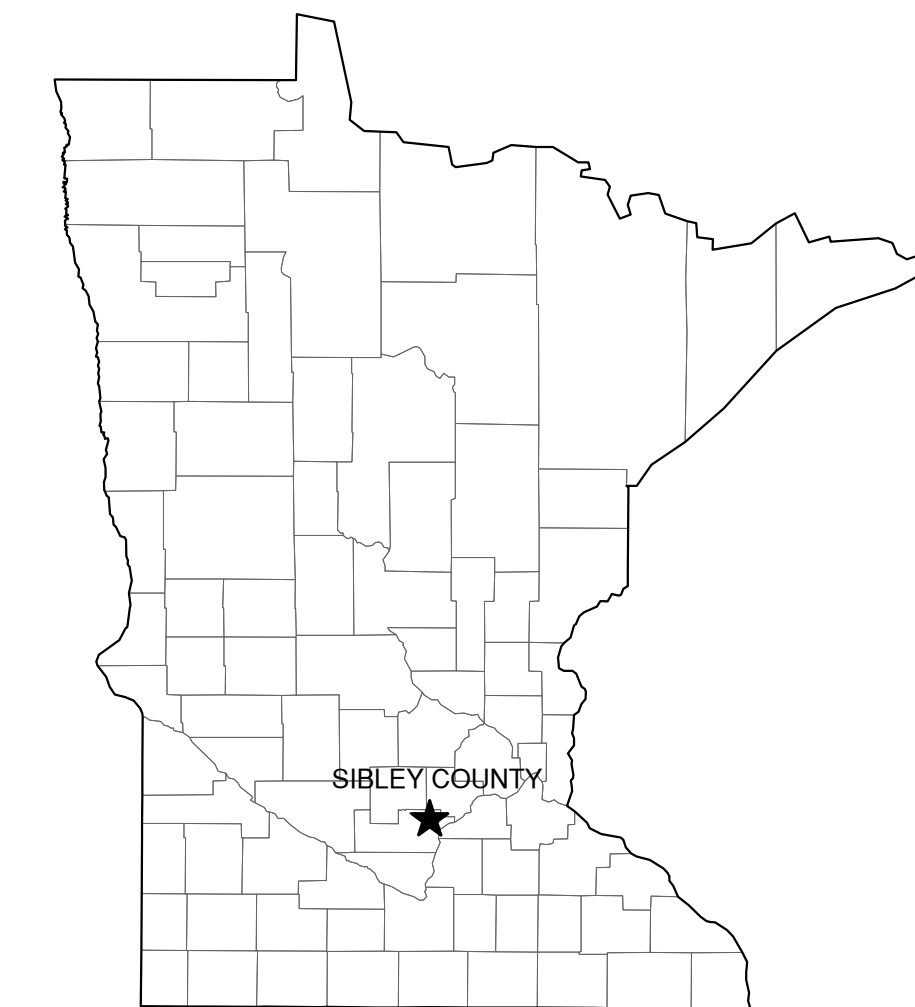
# Appendix C

## Plans and Specifications

# PRELIMINARY CONSTRUCTION DOCUMENTS FOR 2020 HIGH ISLAND CREEK WATERSHED DISTRICT PROJECT 10 IMPROVEMENTS SIBLEY COUNTY, MINNESOTA ULTEIG PROJECT NUMBER: 19.00929

**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

Rev.	Date	Description	By



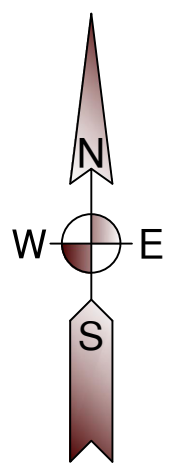
MINNESOTA STATE  
LOCATION MAP



LOCATION MAP

PROJECT  
LOCATION

DRAWING INDEX	
SHEET NO.	SHEET TITLE
001	TITLE SHEET
002	GENERAL NOTES
003	LEGEND & ESTIMATE OF QUANTITIES
004	EXISTING CONDITIONS
005	GRADING & UTILITY PLAN PUMP STATION
006	GRADING & UTILITY PLAN ROAD
007	GRADING PROFILE & SECTION
008	TYPICAL SECTION
009	EXISTING DRAINAGE PUMP STATION
010	EXISTING DRAINAGE ROAD
011	EROSION CONTROL PLAN
012	EROSION CONTROL DETAILS
013	DETAILS
014	DETAILS



Minnesota DOT: Sibley County,  
US Foot, NAD83

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.

Print Name: ROGER A. CLAY

Signed: \_\_\_\_\_

Date: 06-22-2020 License Number: 23452



4285 Lexington Ave. N.  
St. Paul, Minnesota 55126  
Phone: 651.415.3800  
Fax: 888.858.3440  
Web: www.ulteig.com

Design By: B. NIEMELA  
Drawn By: R. CLAY  
Approved By: R. CLAY  
Project Number: 19.00929

**BENCHMARK INFORMATION:**

BM #	NORTHING	EASTING	ELEV	DESCRIPTION
GSID STATION 64318	177576.699	683087.197	1001.734	CONCRETE MONUMENT SURVEY DISK

**NOTES:**

- RIGHT OF WAY, PARCEL LINES AND MONUMENTS REPRESENTED ON THIS PLAN ARE FOR INFORMATIONAL PURPOSES ONLY. THIS PLAN DOES NOT CONSTITUTE A LAND SURVEY AND DOES NOT INVOLVE THE ESTABLISHMENT OR RE-ESTABLISHMENT OF PROPERTY CORNERS OR PROPERTY LINES IN ACCORDANCE WITH MN STATUTE 326.02. NO WARRANTY OF ANY TYPE IS EXPRESSED OR IMPLIED REGARDING THIS INFORMATION.
- VISIBLE ABOVE GROUND UTILITIES HAVE BEEN FIELD LOCATED AS SHOWN. UNDERGROUND UTILITIES SHOWN HEREON ARE REPRESENTED BASED UPON INFORMATION PROVIDED BY GOPHER STATE ONE CALL THROUGH FIELD MARKING, OR MAPPING PROVIDED. THE UNDERGROUND UTILITIES HAVE NOT BEEN PHYSICALLY LOCATED AS A PART OF THIS SURVEY. PRIOR TO EXCAVATION OR DIGGING, CONTACT GOPHER STATE ONE CALL AT 811 OR 800-252-1166.

**PUBLIC UTILITIES CONTACTS**

UTILITY	CONTACT	PHONE	EMAIL
MVEC	Eric	612-247-2419	ekes@mvec.net
Frontier Communications		800-921-8104	

TITLE SHEET

SHEET NO.  
**001**

**GENERAL CONSTRUCTION NOTES**

1. THE 2018 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.
2. THE CONTRACTOR SHALL OBTAIN AND MAINTAIN A COPY OF ALL REQUIRED LOCAL, STATE, AND FEDERAL JURISDICTIONAL PERMITS REQUIRED FOR NEW CONSTRUCTION COMPLETE WITH ALL CONDITIONS, ATTACHMENTS, EXHIBITS AND PERMIT MODIFICATIONS IN GOOD CONDITION AT THE CONSTRUCTION SITE. THE COMPLETED PERMITS MUST BE AVAILABLE FOR REVIEW UPON REQUEST BY WATERSHED DISTRICT AND/OR JURISDICTIONAL REPRESENTATIVES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL AND LABOR TO CONSTRUCT THE FACILITY AS SHOWN AND DESCRIBED IN THE CONSTRUCTION DOCUMENTS IN ACCORDANCE WITH THE APPROPRIATE APPROVING AUTHORITIES, SPECIFICATIONS AND REQUIREMENTS. CONTRACTOR SHALL CLEAR AND GRUB ALL AREAS UNLESS OTHERWISE INDICATED, REMOVING TREES, STUMPS, ROOTS, MUCK, EXISTING PAVEMENT AND ALL OTHER DELETERIOUS MATERIAL.
4. EXISTING UTILITIES SHOWN ARE LOCATED ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER AT THE TIME OF THE TOPOGRAPHIC SURVEY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER. GUARANTEE IS NOT MADE THAT ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN OR THAT THE LOCATION OF THOSE SHOWN ARE ENTIRELY ACCURATE. FINDING THE LOCATION OF ANY EXISTING UTILITIES IS THE CONTRACTORS RESPONSIBILITY AND SHALL BE DONE BEFORE COMMENCING ANY WORK IN THE VICINITY. FURTHERMORE, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO THE CONTRACTORS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE OWNER OR ENGINEER WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, NOR FOR TEMPORARY BRACING AND SHORING OF SAME. IF IT IS NECESSARY TO SHORE, BRACE, SWING OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR OVERHEAD UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA BEFORE COMMENCING WORK. THE CONTRACTOR SHALL PROVIDE 48 HOURS MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION. MINNESOTA STATE STATUTE REQUIRES THE CONTRACTOR TO CONTACT GOPHER STATE ONE CALL AT 811 PRIOR TO ANY UNDERGROUND EXCAVATION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS AND BONDS IF REQUIRED PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES ONE COPY OF THE CONSTRUCTION DOCUMENTS INCLUDING PLANS AND GEOTECHNICAL REPORT AND COPIES OF ANY REQUIRED CONSTRUCTION PERMITS.
8. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR APPROVAL OF THE OWNER AND NOTIFICATION TO THE ENGINEER.
9. ALL COPIES OF REQUIRED TEST RESULTS ARE TO BE SENT TO THE OWNER DIRECTLY FROM THE TESTING AGENCY.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING AND MAINTAINING AS-BUILT INFORMATION WHICH SHALL BE RECORDED AS CONSTRUCTION PROGRESSES OR AT THE COMPLETION OF APPROPRIATE CONSTRUCTION INTERVALS AND SHALL BE RESPONSIBLE FOR PROVIDING AS-BUILT DRAWINGS TO THE OWNER FOR THE PURPOSE OF CERTIFICATION TO JURISDICTIONAL AGENCIES AS REQUIRED.
11. ANY WELLS DISCOVERED ON SITE DURING EARTH MOVING OR EXCAVATION SHALL BE REPORTED TO THE APPROPRIATE JURISDICTIONAL AGENCY AND OWNER AND ENGINEER WITHIN 24 HOURS OF DISCOVERY.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER PRIOR TO INSTALLATION OF ANY PORTION OF THE SITE WORK THAT WOULD BE AFFECTED. FAILURE TO NOTIFY OWNER OF AN IDENTIFIABLE CONFLICT PRIOR TO PROCEEDING WITH INSTALLATION RELIEVES OWNER OF ANY OBLIGATION TO PAY FOR A RELATED CHANGE ORDER.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF SAFETY INCLUDING, BUT NOT LIMITED TO, EXCAVATION, TRENCHING, SHORING, TRAFFIC CONTROL, AND SECURITY.

**DEMOLITION NOTES**

1. ALL MATERIAL REMOVED FROM THIS SITE BY THE CONTRACTOR SHALL BE DISPOSED OF BY THE CONTRACTOR IN A LEGAL MANNER.
2. REFER TO THE TOPOGRAPHIC SURVEY AND ENVIRONMENTAL DOCUMENTS FOR ADDITIONAL DETAILS OF EXISTING STRUCTURES, ETC. LOCATED WITHIN THE PROJECT SITE. UNLESS OTHERWISE NOTED, ALL EXISTING BUILDINGS, STRUCTURES SLABS, CONCRETE, ASPHALT, DEBRIS PILES, SIGNS AND ALL APPURTENANCES ENCOUNTERED ARE TO BE REMOVED FROM THE SITE BY THE CONTRACTOR AND PROPERLY DISPOSED OF IN A LEGAL MANNER AS PART OF THIS CONTRACT. SOME ITEMS TO BE REMOVED MAY NOT BE DEPICTED ON THE TOPOGRAPHIC SURVEY. IT IS THE CONTRACTORS RESPONSIBILITY TO VISIT THE SITE AND DETERMINE THE FULL EXTENT OF ITEMS TO BE REMOVED. IF ANY ITEMS ARE IN QUESTION, THE CONTRACTOR SHALL CONTACT THE OWNER PRIOR TO REMOVAL OF SAID ITEMS.

**PAVING, GRADING AND DRAINAGE NOTES**

1. ALL VEGETATION AND ORGANIC MATERIALS (TOPSOIL) SHALL BE STRIPPED FROM THE AREAS TO BE GRADED. IF THIS MATERIAL IS TO BE STOCKPILED ON THE SITE, TOPSOIL MAY BE PLACED TO A HEIGHT OF FIVE FEET. SILT FENCE SHALL BE PLACED AROUND THE BASE OF THE STOCKPILE AND THE STOCKPILE SHALL BE SEEDED WITH NATIVE MIX IMMEDIATELY AFTER STRIPPING OPERATIONS ARE COMPLETE.
2. TOPSOIL SHALL WITHIN GRADED AREAS SHALL BE COMPLETELY REMOVED AND STOCKPILED ON SITE FOR RESPREADING. ALL UNSURFACED AREAS DISTURBED BY GRADING OPERATION SHALL RECEIVE 6 INCHES MINIMUM OF TOPSOIL. CONTRACTOR SHALL APPLY STABILIZATION FABRIC TO ALL SLOPES 3H:1V OR STEEPER. IF MORE TOPSOIL IS REQUIRED, THE CONTRACTOR SHALL IMPORT IT. ALL COSTS TO BE INCLUDED IN UNCLASSIFIED EXCAVATION.
3. THE CONTRACTOR SHALL GRADE THE SITE TO THE ELEVATIONS INDICATED AND SHALL REGRADE WASHOUTS WHERE THEY OCCUR AFTER EVERY RAINFALL UNTIL A GRASS STAND IS WELL ESTABLISHED OR ADEQUATE STABILIZATION OCCURS. CONTOURS SHOWN ARE FOR FINISHED TOPSOIL. ADJUSTMENTS TO SUBGRADE IS THE CONTRACTORS RESPONSIBILITY.
4. THE CONTRACTOR SHALL INSTALL PROTECTION OVER ALL DRAINAGE STRUCTURES FOR THE DURATION OF CONSTRUCTION AND UNTIL ACCEPTANCE OF THE PROJECT BY THE OWNER. ALL DRAINAGE STRUCTURES SHALL BE CLEANED OF DEBRIS AS REQUIRED DURING AND AT THE END OF CONSTRUCTION TO PROVIDE POSITIVE DRAINAGE FLOWS.
5. IF DEWATERING IS REQUIRED, THE CONTRACTOR SHALL OBTAIN ANY APPLICABLE REQUIRED PERMITS. THE CONTRACTOR IS TO COORDINATE WITH THE OWNER AND THE DESIGN ENGINEER PRIOR TO ANY EXCAVATION.
6. FIELD DENSITY TESTS SHALL BE TAKEN AT INTERVALS IN ACCORDANCE WITH THE LOCAL JURISDICTIONAL AGENCY OR TO MNDOT STANDARDS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF DUST AND DIRT RISING AND SCATTERING IN THE AIR DURING CONSTRUCTION AND SHALL PROVIDE WATER SPRINKLING OR OTHER SUITABLE METHODS OF CONTROL. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
8. THE CONTRACTOR SHALL ENSURE THAT PLANTING AREAS ARE NOT COMPACTED AND DO NOT CONTAIN ROAD BASE MATERIALS. THE CONTRACTOR SHALL ALSO EXCAVATE AND REMOVE ALL UNDESIRABLE MATERIAL FROM ALL AREAS ON THE SITE TO BE PLANTED AND PROPERLY DISPOSED OF IN A LEGAL MANNER.
9. UNLESS OTHERWISE SHOWN, NO PROPOSED SLOPE SHALL EXCEED FOUR (4) HORIZONTAL TO ONE (1) VERTICAL. ALL SLOPED AREAS MUST BE PROTECTED FROM EROSION.
10. PRIOR TO PLACEMENT OF FILL MATERIAL, SCARIFY AND RECOMPACT 6" OF EXISTING MATERIAL.
11. SPOT ELEVATIONS SHALL TAKE PRECEDENCE OVER CONTOURS AND SLOPES SHOWN. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF SPOT ELEVATIONS THAT DO NOT APPEAR TO BE CONSISTENT WITH THE CONTOURS AND SLOPES.
12. THE CONTRACTOR SHALL ADHERE TO ALL TERMS & CONDITIONS AS OUTLINED IN THE GENERAL PERMIT FOR STORM WATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
13. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL UTILITIES AND NOTIFYING THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING CONSTRUCTION.

**FINISHED GRADING AND TURF ESTABLISHMENT NOTES**

1. ALL UNPAVED AREAS AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED AS PER PLANS. THE AREAS SHALL THEN BE SODDED OR SEEDED AS SPECIFIED IN THE PLANS, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL HARDY GRASS GROWTH IS ESTABLISHED IN ALL AREAS. ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE JOB SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. ALL EARTHEN AREAS WILL BE SODDED OR SEEDED AND MULCHED AS SHOWN ON THE LANDSCAPING PLAN.
2. SPOT ELEVATIONS SHALL TAKE PRECEDENCE OVER CONTOURS AND SLOPES SHOWN. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF SPOT ELEVATIONS THAT DO NOT APPEAR TO BE CONSISTENT WITH THE CONTOURS AND SLOPES. SPOT ELEVATIONS AND SPECIFIC PROFILE DESIGNS SHALL BE USED FOR SETTING ELEVATIONS OF CURB, GUTTER, AND UTILITIES.
3. TOPSOIL SHALL BE PLACED TO A MINIMUM DEPTH OF 6 INCHES IN AREAS BEING RESTORED.

**UTILITY NOTES**

1. UTILITY MATERIALS AND INSTALLATIONS SHALL COMPLY WITH ALL MINNESOTA STATE DOLI STANDARDS AND MEET THE STATE PLUMBING CODE.
2. CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER 72 HOURS PRIOR TO CONNECTING TO ANY EXISTING UTILITY.
3. THE CONTRACTOR SHALL CONSTRUCT PUMP STATION, RIP RAP, AND HIGHWAY CULVERT AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIALS, EQUIPMENT, MACHINERY, TOOLS, MEANS OF TRANSPORTATION AND LABOR NECESSARY TO COMPLETE THE WORK IN FULL.
4. ALL EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS FOR UTILITY LOCATION AND COORDINATION IN ACCORDANCE WITH THE NOTES CONTAINED IN THE GENERAL CONSTRUCTION SECTION OF THIS SHEET.
5. THE CONTRACTOR SHALL RESTORE ALL DISTURBED VEGETATION.
6. DEFLECTION OF PIPE JOINTS AND CURVATURE OF PIPE SHALL NOT EXCEED THE MANUFACTURER'S SPECIFICATIONS. SECURELY CLOSE ALL OPEN ENDS OF PIPE AND FITTINGS WITH A WATERTIGHT PLUG WHEN WORK IS NOT IN PROGRESS. THE INTERIOR OF ALL PIPES SHALL BE CLEAN AND JOINT SURFACES WIPED CLEAN AND DRY AFTER THE PIPE HAS BEEN LOWERED INTO THE TRENCH. VALVES SHALL BE PLUMB AND LOCATED ACCORDING TO THE PLANS.
7. ALL PIPE AND FITTINGS SHALL BE CAREFULLY STORED FOLLOWING MANUFACTURER'S RECOMMENDATIONS. CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE COATING OR LINING OF ANY D.I. PIPE FITTINGS. ANY PIPE OR FITTING WHICH IS DAMAGED OR WHICH HAS FLAWS OR IMPERFECTIONS WHICH, IN THE OPINION OF THE ENGINEER OR OWNER RENDERS IT UNFIT FOR USE, SHALL NOT BE USED. ANY PIPE NOT SATISFACTORY FOR USE SHALL BE CLEARLY MARKED AND IMMEDIATELY REMOVED FROM THE JOB SITE, AND SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.
8. WATER FOR FIRE FIGHTING SHALL BE MADE AVAILABLE FOR USE BY THE CONTRACTOR PRIOR TO COMBUSTIBLES BEING BROUGHT ON SITE.
9. THE CONTRACTOR SHALL KEEP ACCURATE RECORDS FOR ALL ITEMS INSTALLED (TYPE, SIZE, LENGTH, AND LOCATION ETC.) AND PROVIDE LEGIBLE DOCUMENTS TO THE OWNER WHEN REQUESTED OR AT THE END OF CONSTRUCTION.

**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

Rev.	Date	Description	By

Minnesota DOT: Sibley County,  
US Foot, NAD83

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Print Name: ROGER A. CLAY

Signed: \_\_\_\_\_

Date: 06-22-2020 License Number: 23452



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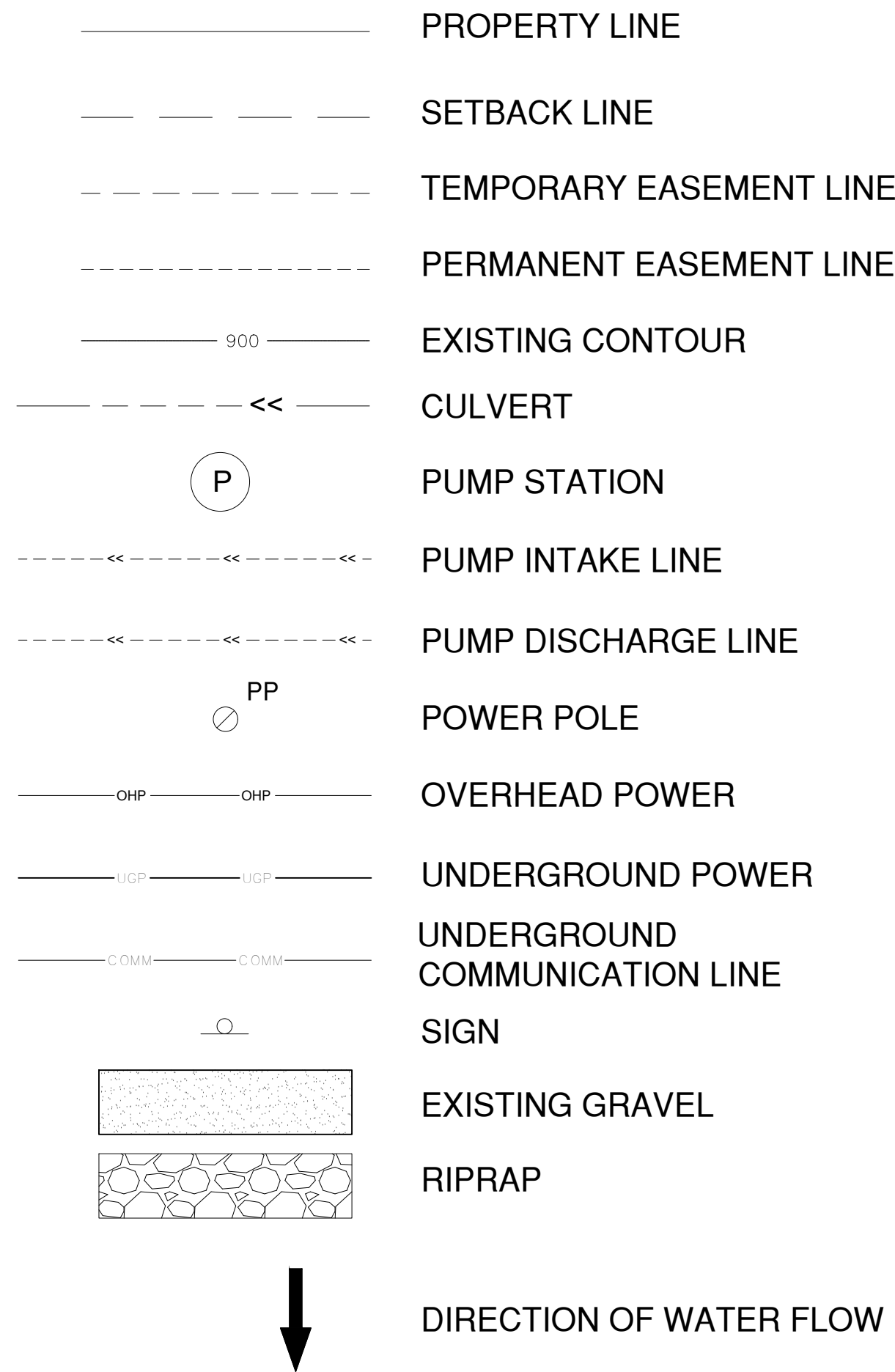
Design By: B. NIEMELA  
Drawn By: R. CLAY  
Approved By: R. CLAY  
Project Number: 19.00929

**GENERAL NOTES**

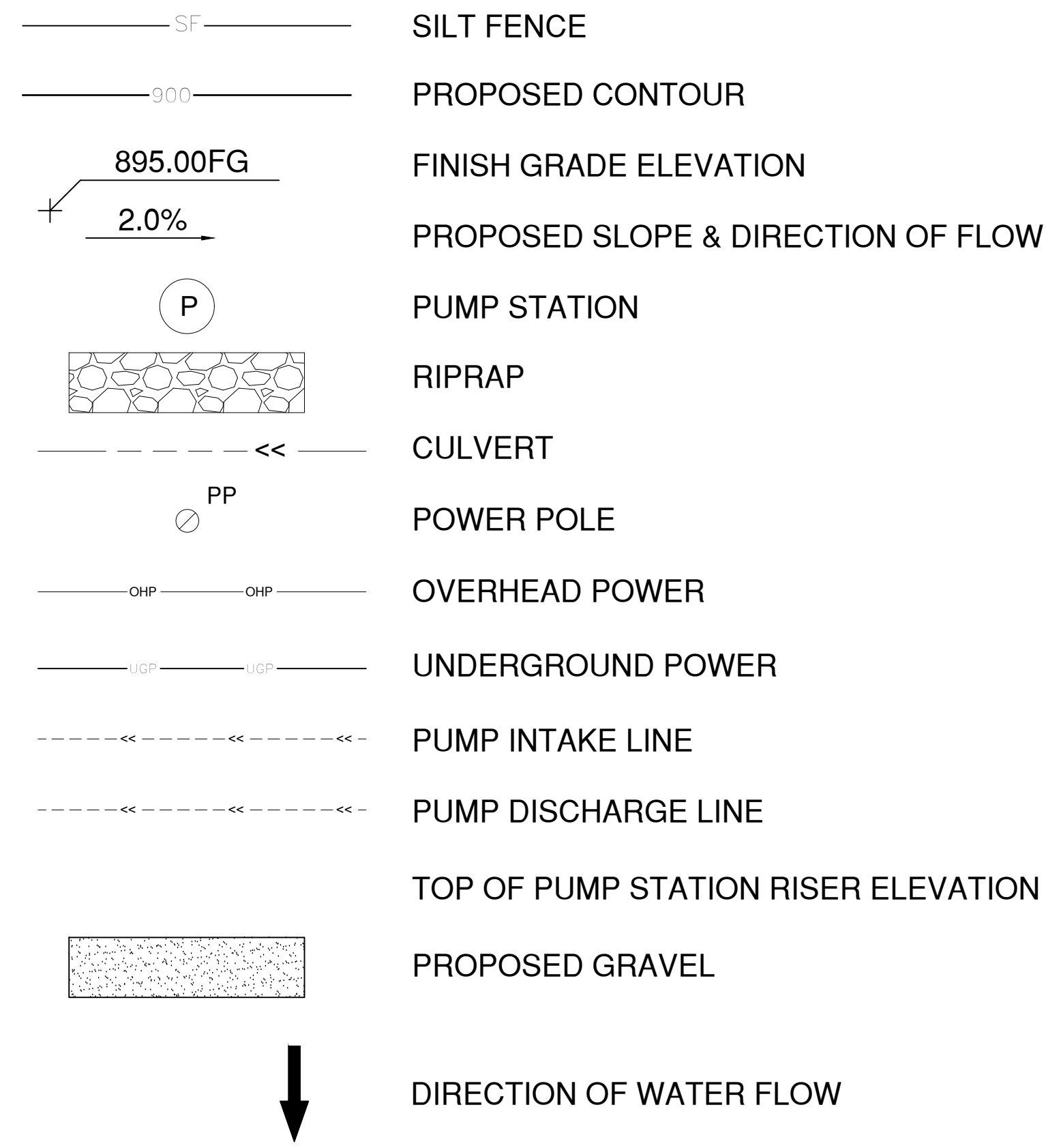
**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

Rev.	Date	Description	By

**EXISTING**



**PROPOSED**



**ESTIMATED QUANTITIES**

Item No.	Item	Quantity	Unit
1	Mobilization	1	LS
2	Topsoil Stripping	134	CY
3	Remove 48" RCP Culvert	85	LF
4	Common Borrow (LV)	155	CY
5	Aggregate Base Class 5	57	CY
6	60" RC Pipe Culvert Class 3	88	LF
7	60" RC Pipe Arons	2	EA
8	Remove and Reinstall 36" CPP Culvert	1	EA
9	Pipe Bedding Material	100	CY
10	Random Ripap (Class III)	174	CY
11	Traffic Control	1	LS
12	Filter Log Type Straw Bioll	100	LF
13	Turf Establishment	950	SY
14	Flotation Silt Curtain Type Moving Water	40	LF
15	Erosion Control Blanket Category 3	903	SY
16	Surface Water Pump Station	1	LS

PIPE CULVERT SCHEDULE				
STREET	STATION	SIZE	LENGTH	SLOPE
CO. RD. 164	1+43	60"	88'	-0.11%

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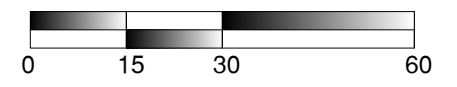
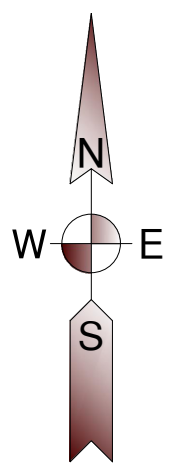
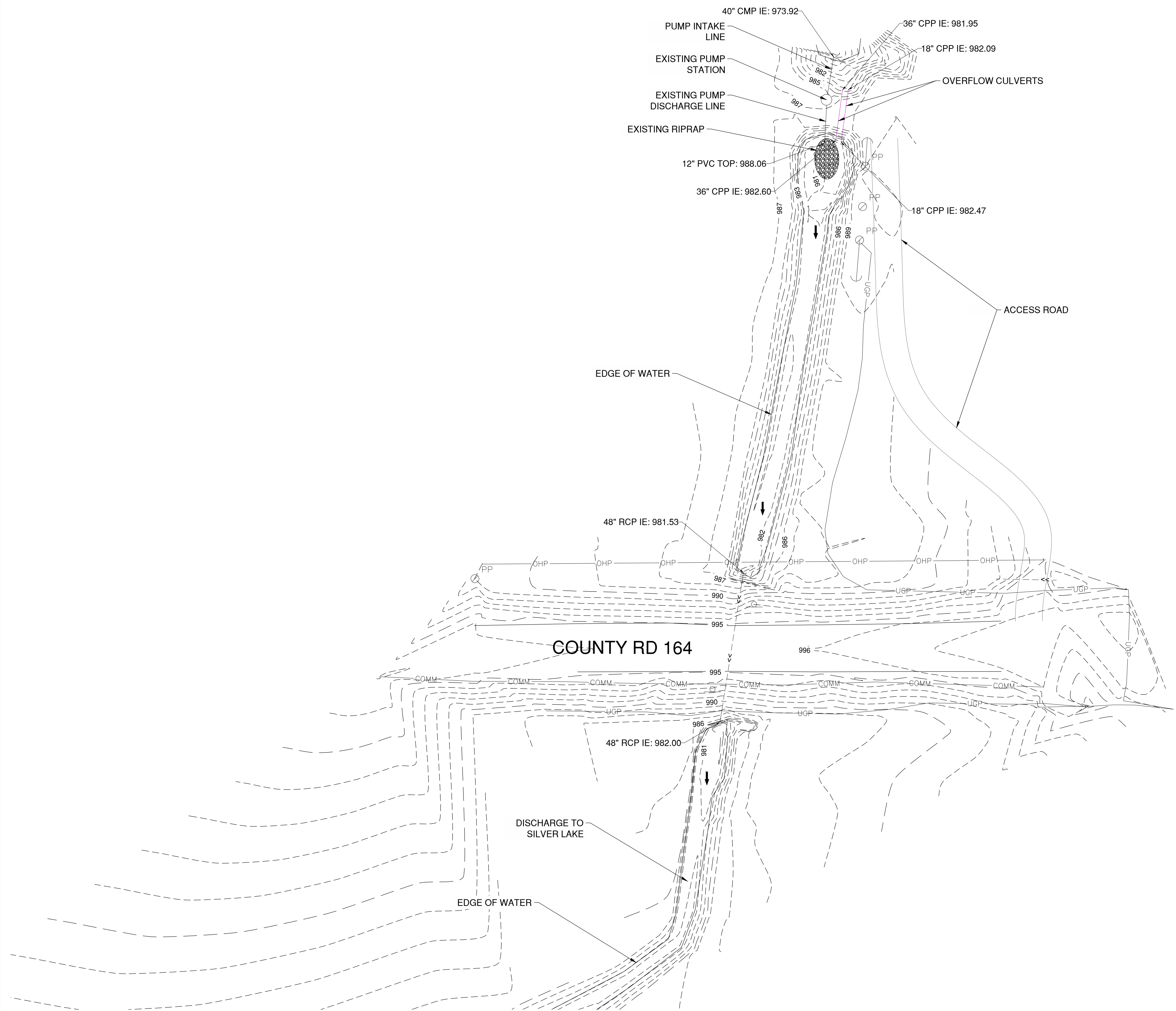
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**LEGEND & ESTIMATE  
OF QUANTITIES**

**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

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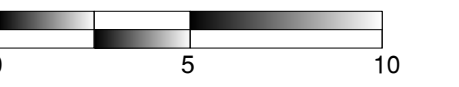
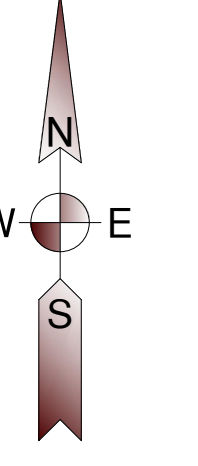
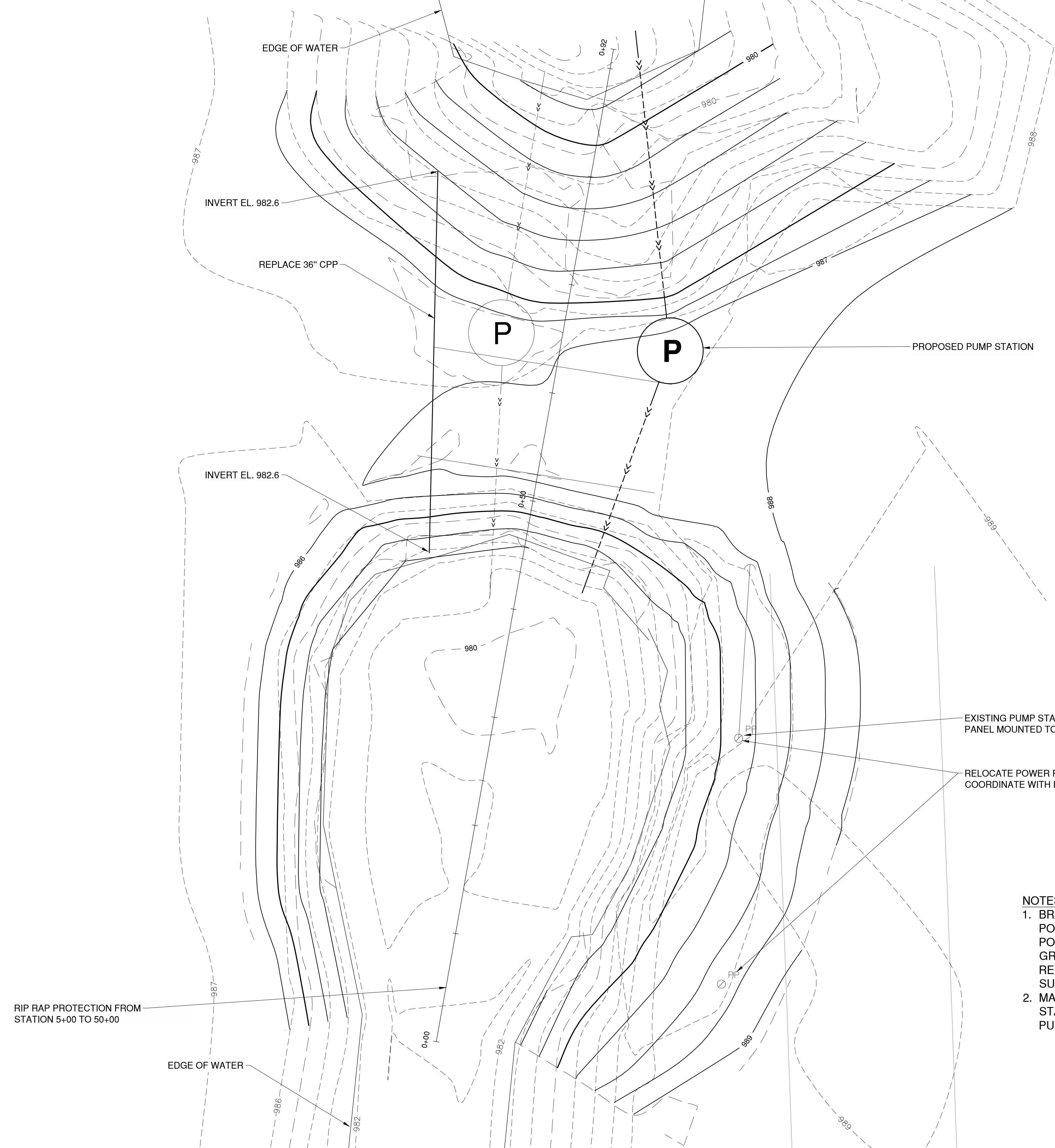
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**EXISTING CONDITIONS**

**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

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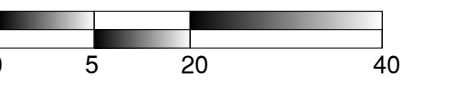
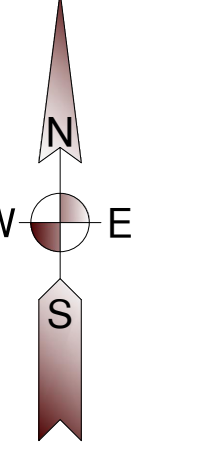
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- NOTES:**
- BRACE OR TEMPORARILY RELOCATE POWER POLES DURING GRADING ACTIVITIES. RESTORE POWER POLES TO IDENTIFIED LOCATION WHEN GRADING IS COMPLETE. BRACING AND RELOCATING POWER POLES IS INCIDENTAL TO SURFACE WATER PUMP STATION.
  - MAINTAINING OPERATION OF EXISTING PUMP STATION IS INCIDENTAL TO SURFACE WATER PUMP STATION.

**GRADING & UTILITY PLAN  
AT PUMP STATION**

**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

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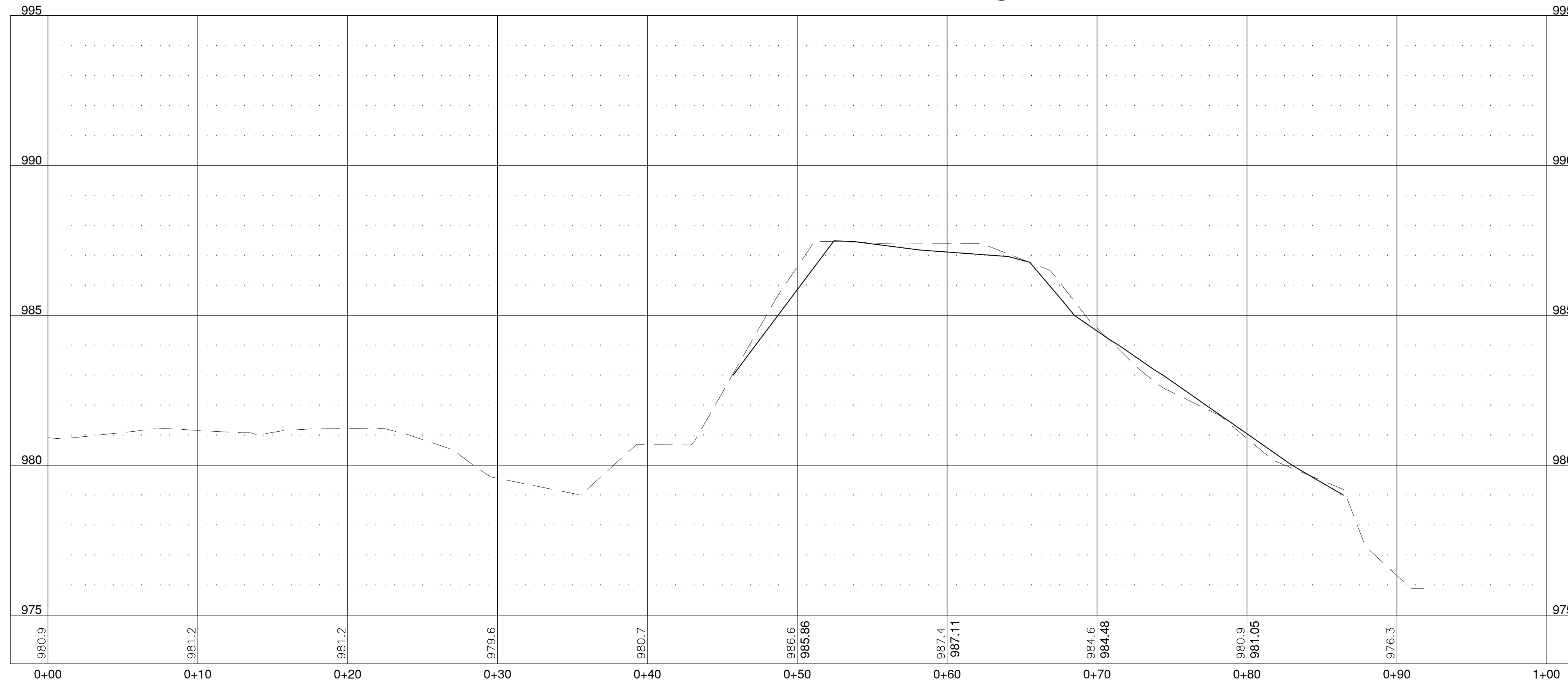
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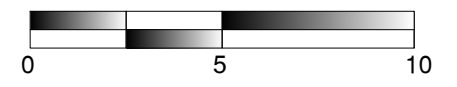
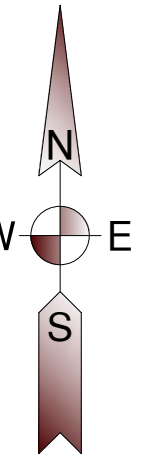
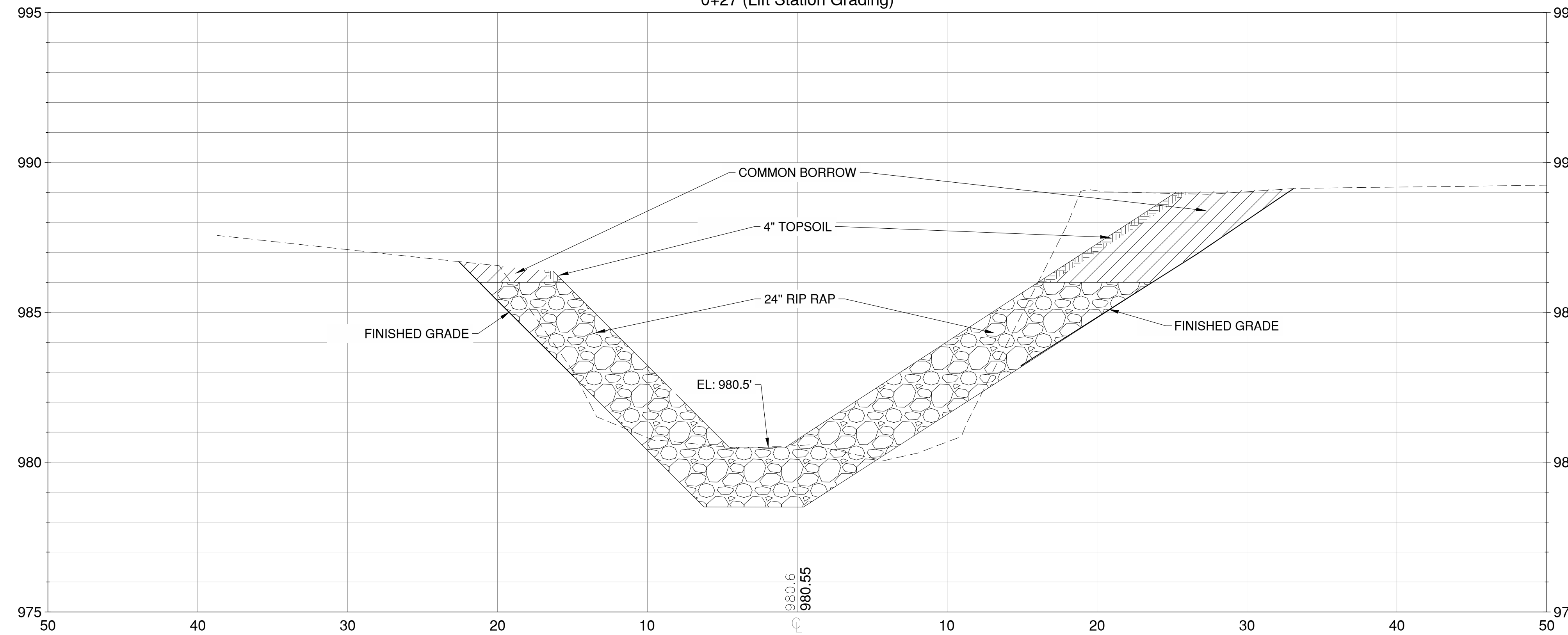
**GRADING & UTILITY  
PLAN**

Rev.	Date	Description	By

# Lift Station Grading



0+27 (Lift Station Grading)



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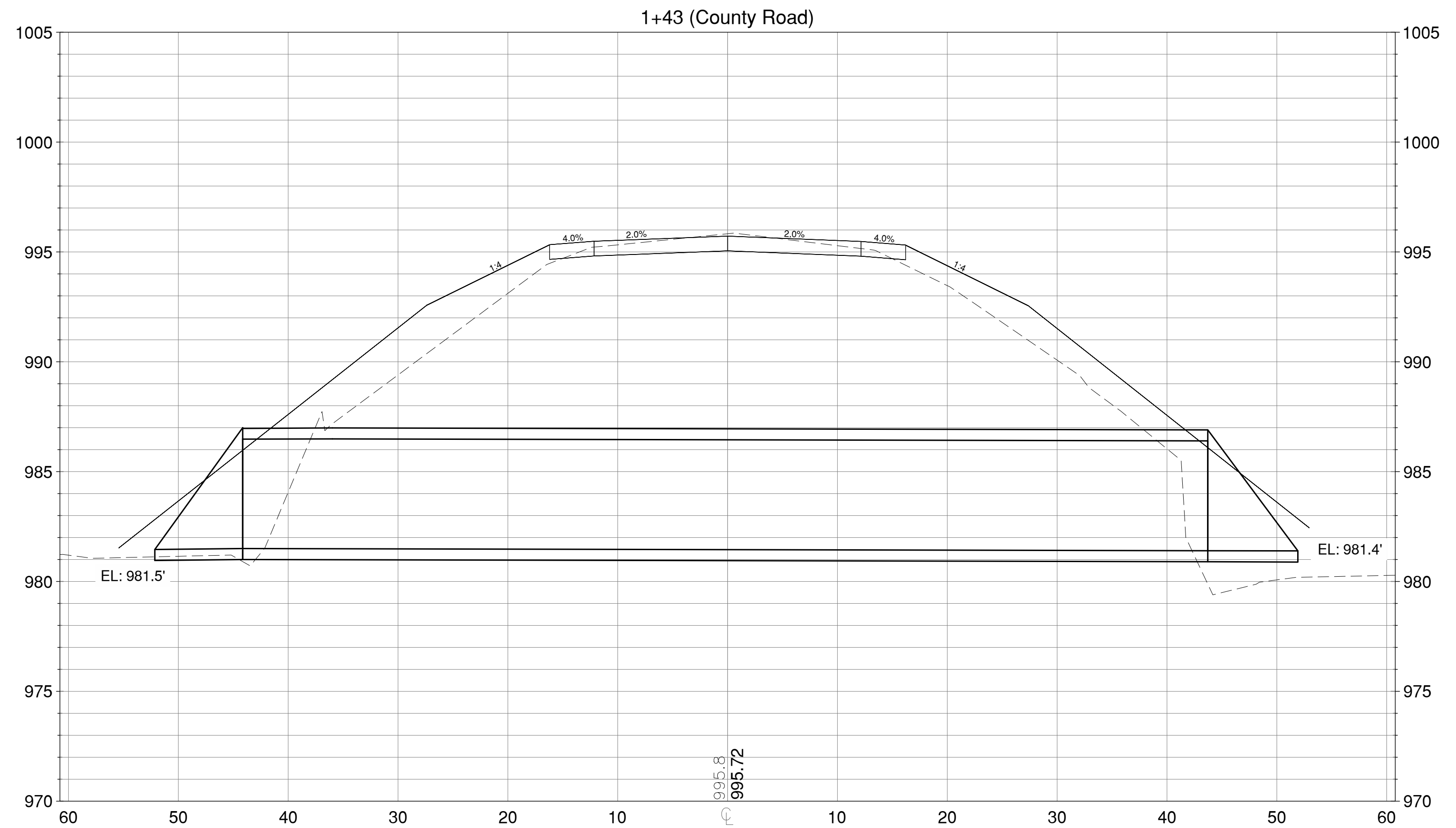
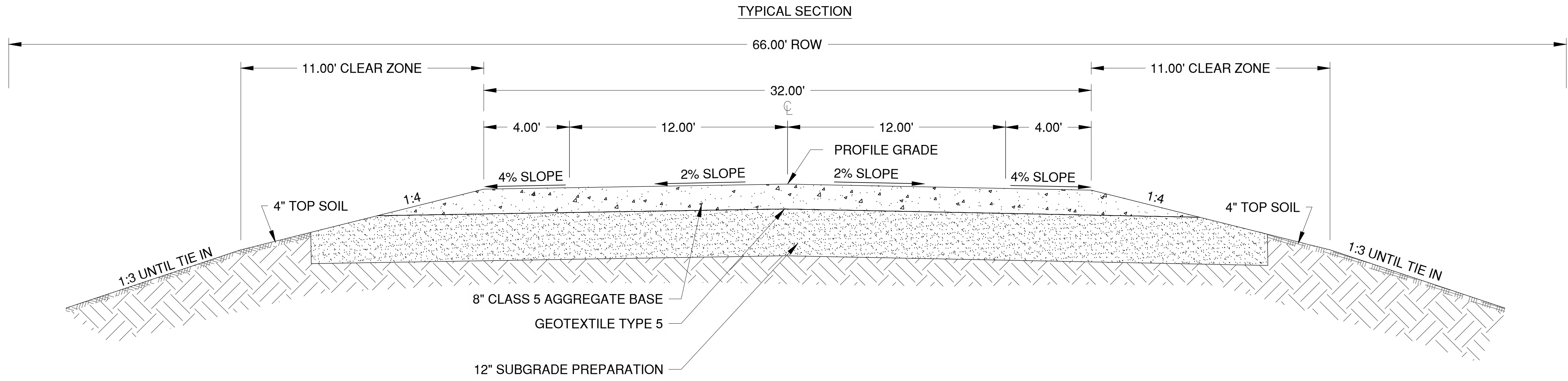
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**GRADING PROFILE  
AND CROSS SECTION  
LIFT STATION AREA**



**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

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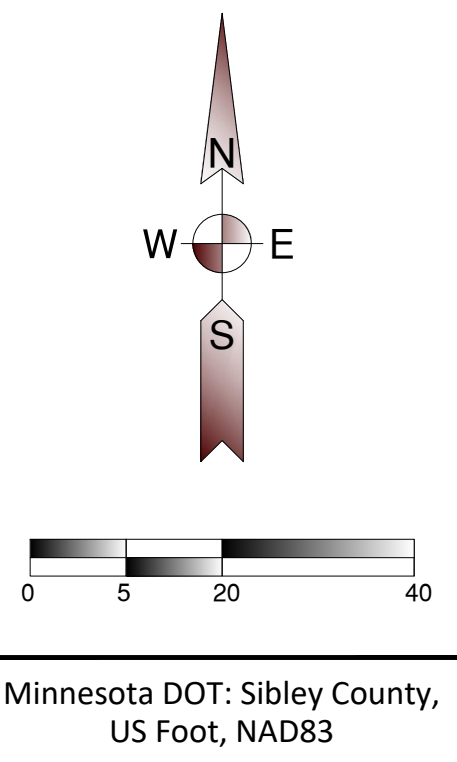
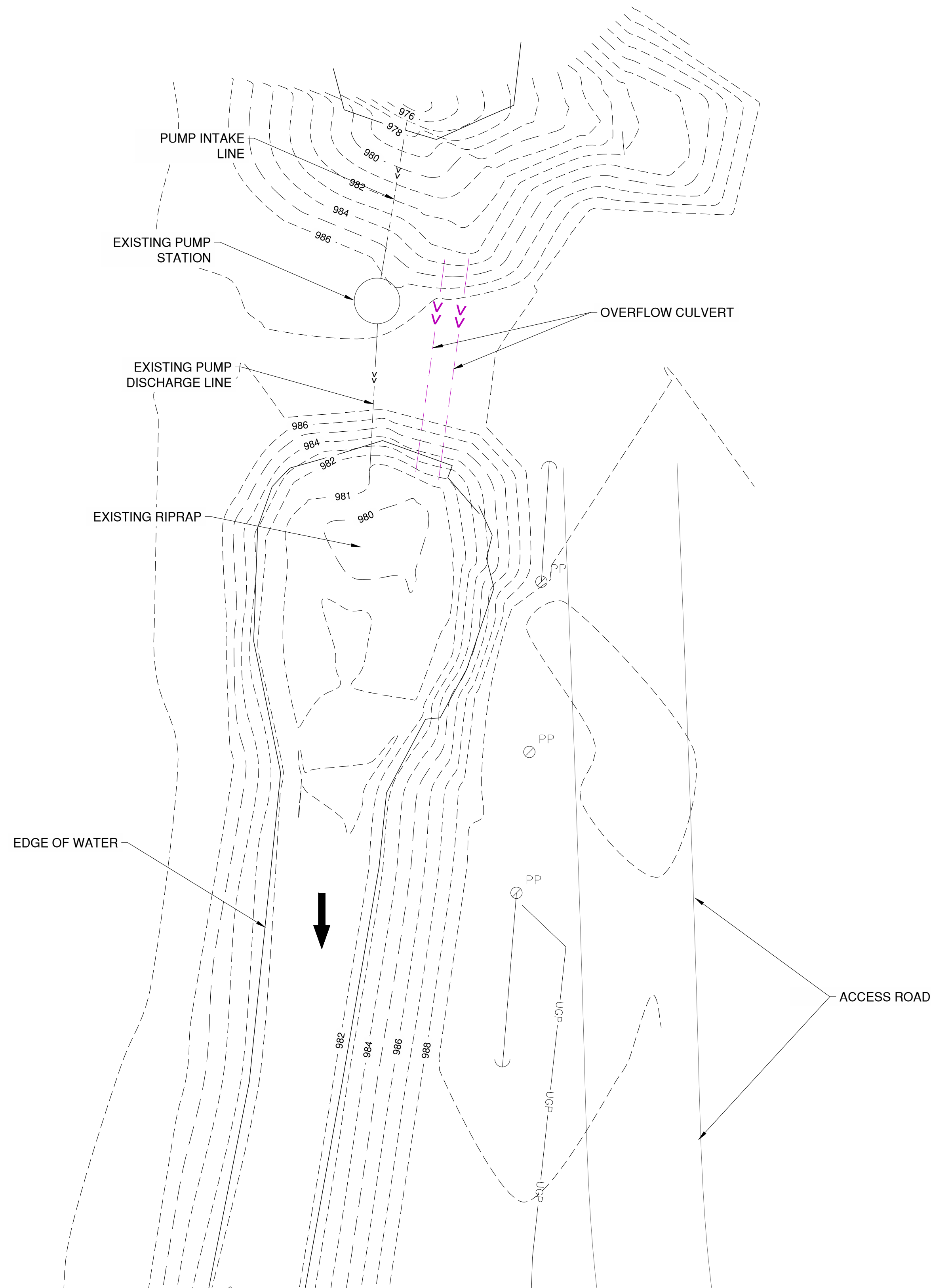
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**TYPICAL SECTION**

**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
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**EXISTING DRAINAGE-  
PUMP STATION AREA**

**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

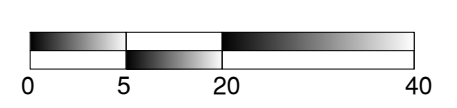
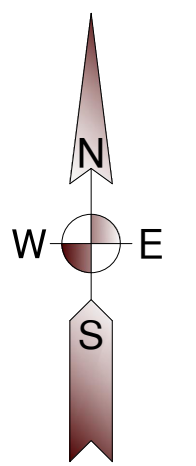
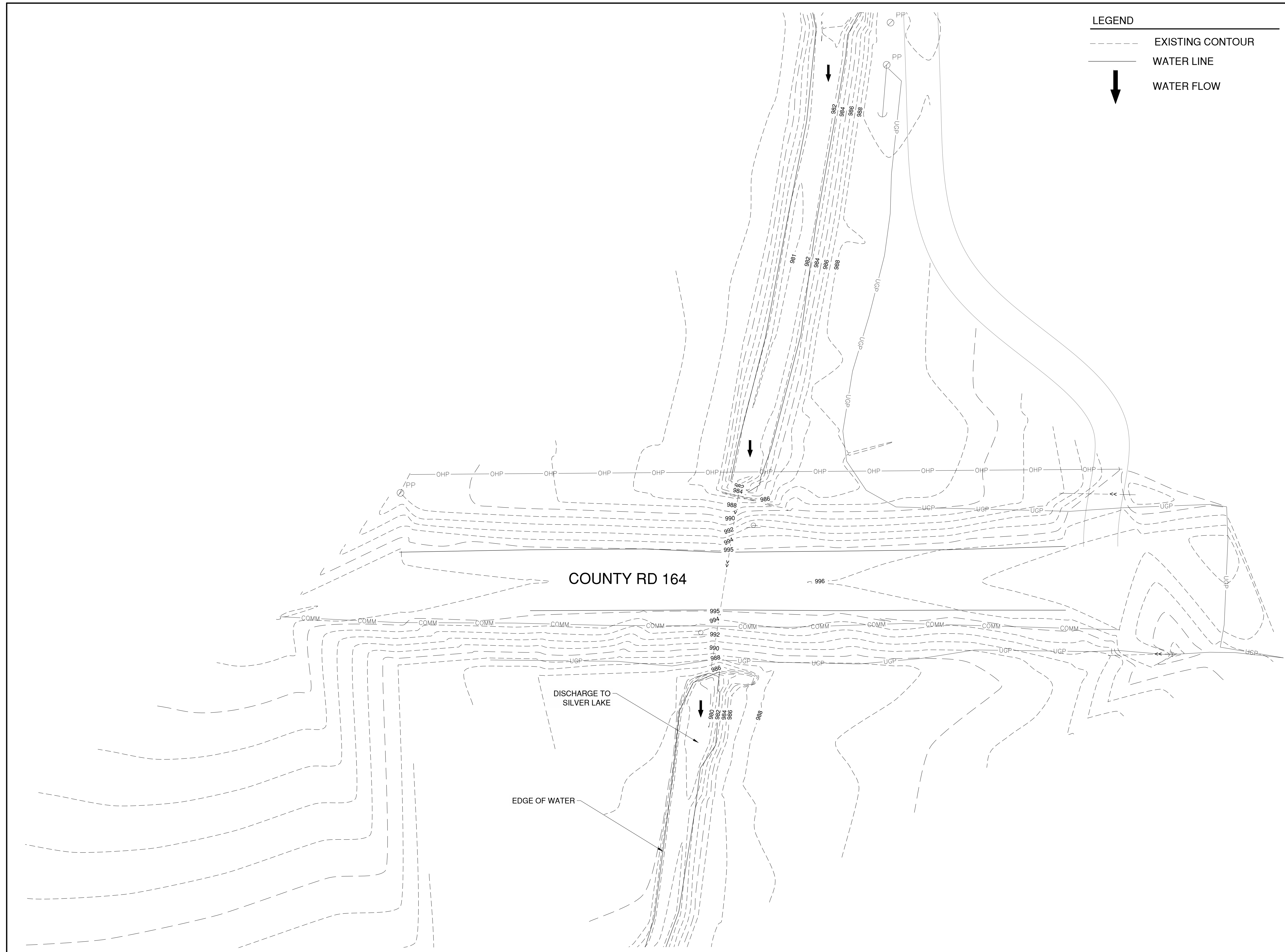
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**LEGEND**

--- EXISTING CONTOUR

— WATER LINE

↓ WATER FLOW



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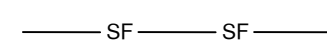



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**EXISTING DRAINAGE  
COUNTY ROAD 164 AREA**

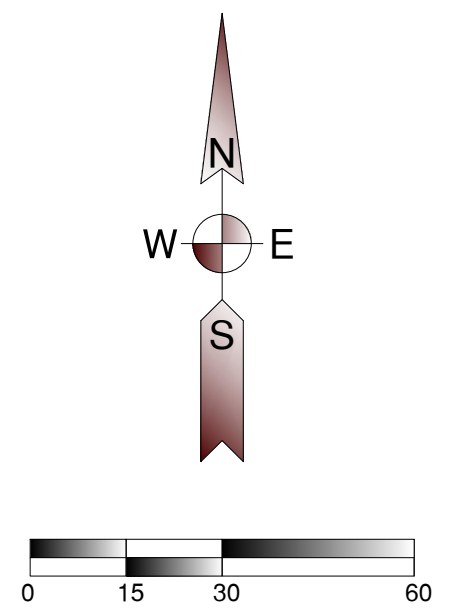
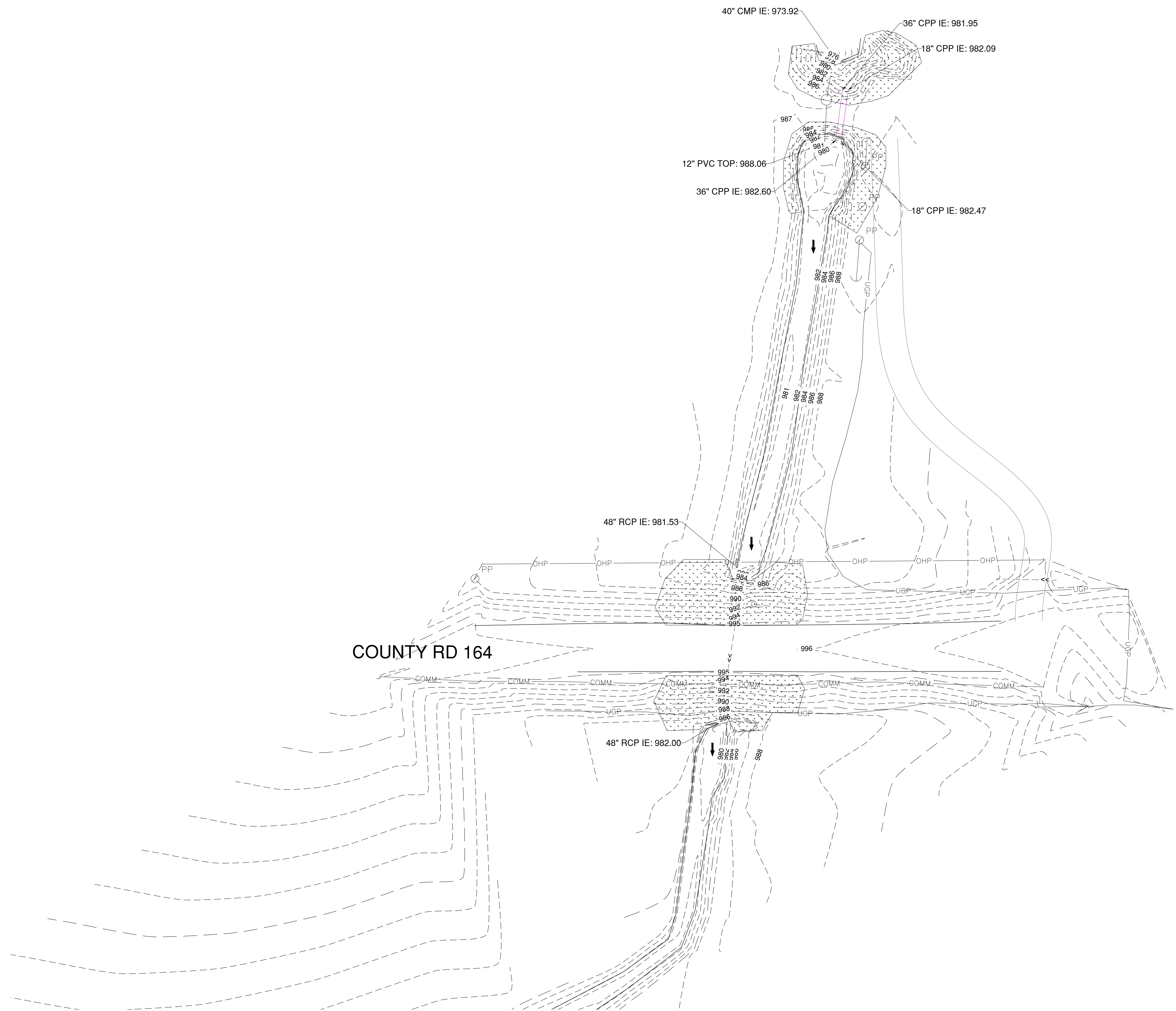
**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

Rev.	Date	Description	By

**LEGEND**

	SILT FENCE
	BIO-ROLL
	TURF ESTABLISHMENT
	INLET PROTECTION

- EROSION CONTROL NOTES:**
1. CONTRACTOR SHALL COMPLY WITH ALL SWPPP RELATED REQUIREMENTS AND GUIDELINES ON PAGE 006.
  2. CONTRACTOR SHALL ACCESS THE SITE FROM THE EXISTING CITY STREETS AND MAINTAIN THEM ACCORDINGLY. IF FURTHER SITE ACCESS IS NEEDED CONTRACTOR SHALL CONSTRUCT A TRACK OUT PAD PER THE DETAILS.
  3. CONTRACTOR SHALL INSTALL INLET PROTECTION MEASURES IN THE STREET IN COORDINATION WITH THE STREET CONTRACTOR.



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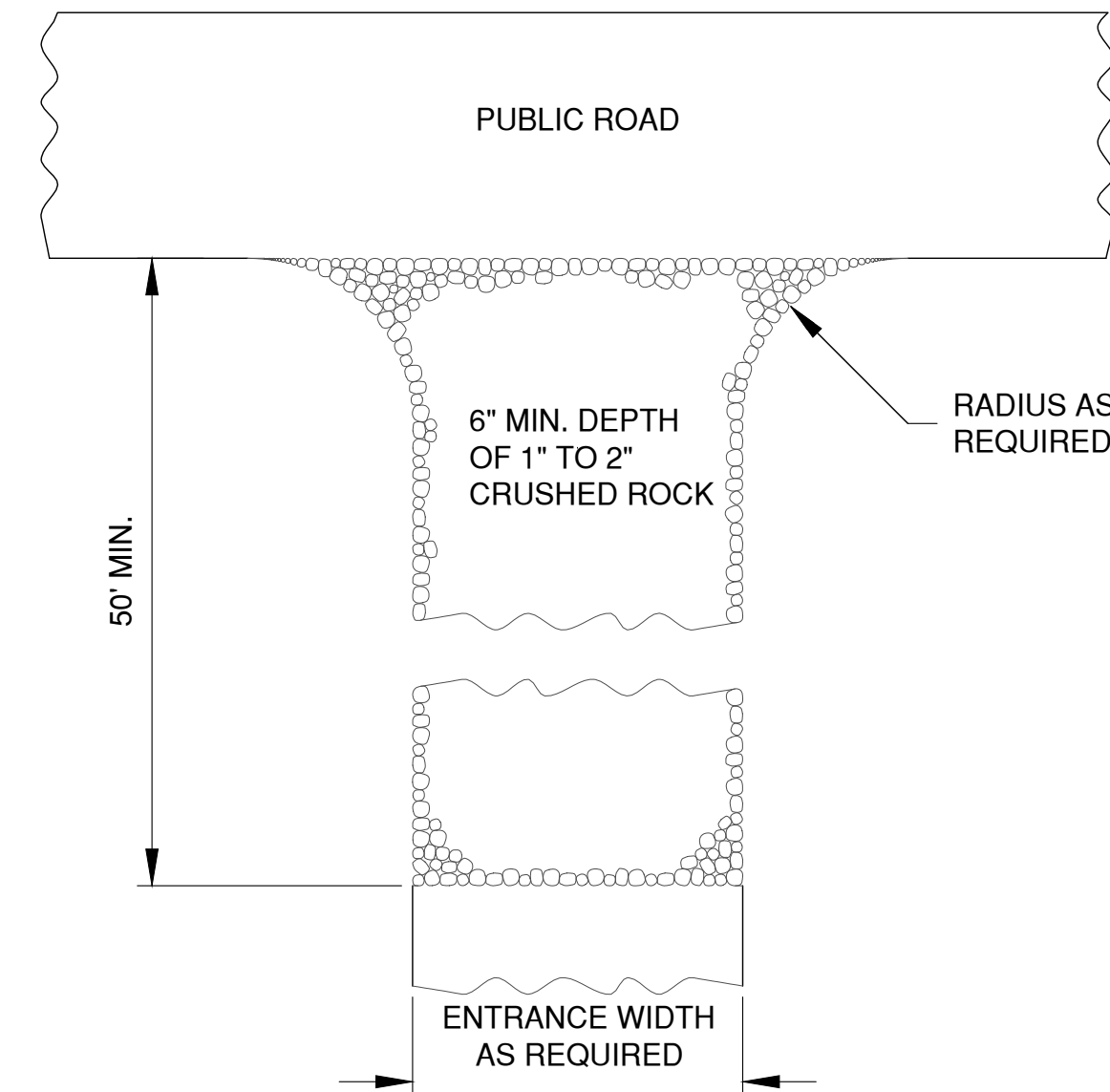
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**EROSION  
CONTROL PLAN**

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**EROSION CONTROL AND TURF ESTABLISHMENT NOTES**

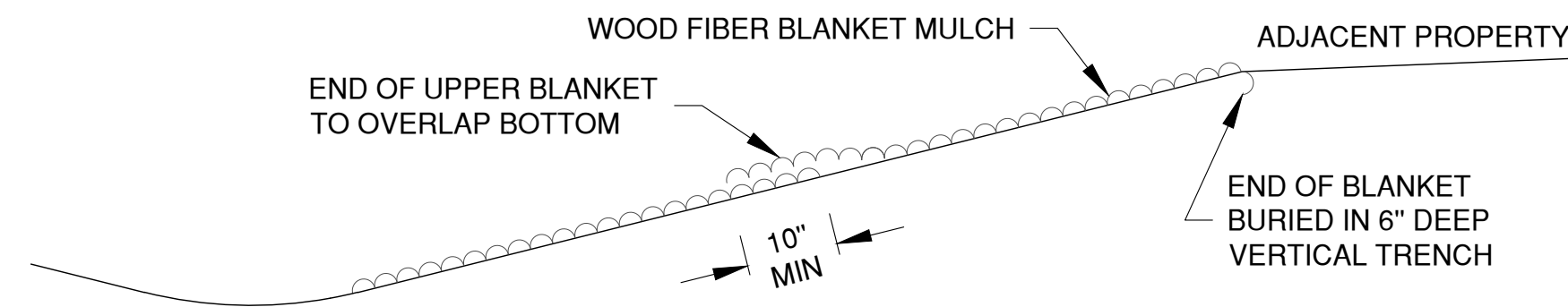
1. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITY SHALL BE RESTORED BY THE CONTRACTOR AS SOON AS PRACTICAL AND IN ACCORDANCE WITH THE NPDES PERMIT. MULTIPLE MOBILIZATIONS WILL BE REQUIRED. THERE WILL BE NO COMPENSATION FOR MULTIPLE MOBILIZATIONS .
2. IN THE EVENT PERMANENT RESTORATION CANNOT BE PERFORMED WITHIN THE PERMITTED TIME FRAMES THE CONTRACTOR WILL BE RESPONSIBLE FOR TEMPORARY STABILIZATION. TEMPORARY STABILIZATION SHALL BE INCIDENTAL.
3. ALL TEMPORARY STOCKPILES SHALL BE STABILIZED AT THE CONTRACTOR'S EXPENSE.
4. THE DEPICTED EROSION AND SEDIMENT CONTROL PLAN SHOULD BE USED AS A GENERAL GUIDELINE. THE CONTRACTORS CONSTRUCTION METHODS MAY REQUIRE ADDITIONAL EROSION AND SEDIMENT CONTROL DEVICES TO REMAIN WITHIN THE REQUIREMENTS OF THE NPDES GENERAL STORM WATER PERMIT.
5. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR MINIMIZING AREAS OF DISTURBANCE. ANY TURF AREAS DISTURBED OUTSIDE OF CONSTRUCTION (RIGHT OF WAY UNLESS CITY OBTAINS EASEMENTS) LIMITS SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTORS COST TO THE SATISFACTION OF THE ENGINEER.



**NOTES:**

1. SEE MnDOT SPECS. 2573, 3892, & 3894.
2. ROCKS AT ENTRANCE CLEAN WORK SITE MUD OFF OF TRUCK TIRES BEFORE TRUCKS ENTER MAIN ROAD. KEEPING MUD OFF THE ROAD WILL PREVENT AUTO DAMAGE AND KEEP CONSTRUCTION SEDIMENT OUT OF DRAINAGE SYSTEMS AND WETLANDS. GEOTEXTILE MAY BE PLACED UNDER THE ROCK TO KEEP ROCKS SEPARATE FROM SOIL.
3. INSTALLATION AND MAINTENANCE SHALL BE INCIDENTAL TO EROSION CONTROL BID PRICE.

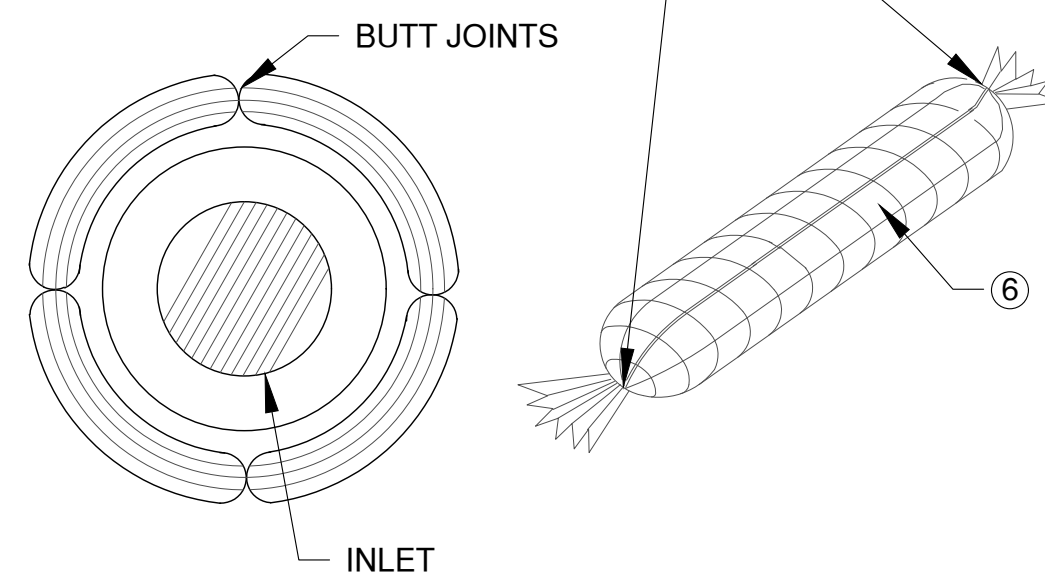
**ROCK CONSTRUCTION ENTRANCE**



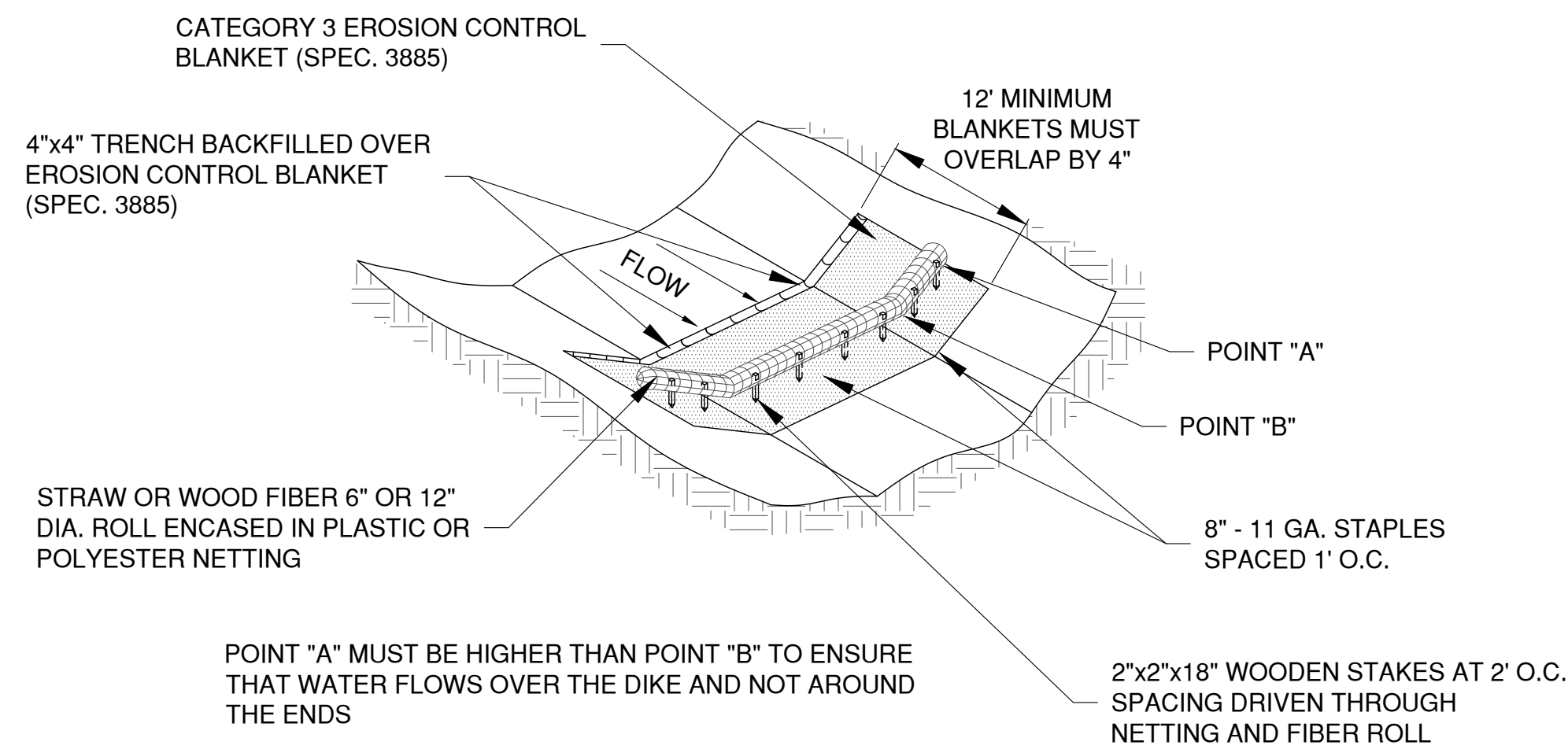
**NOTE:**  
BLANKET SHALL BE APPROPRIATELY SECURED BY STAPLES (INCIDENTAL).

**WOOD FIBER BLANKET  
INSTALLATION ON A CUT SLOPE**

ENDS SECURELY CLOSED TO PREVENT LOSS OF OPEN GRADED AGGREGATE FILL. SECURED WITH 50 PSI. ZIP TIE.



**ROCK LOG/COMPOST LOG**



POINT "A" MUST BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS

TYPE 3 SPEC. 3889

**BIOROLL BLANKET SYSTEM**

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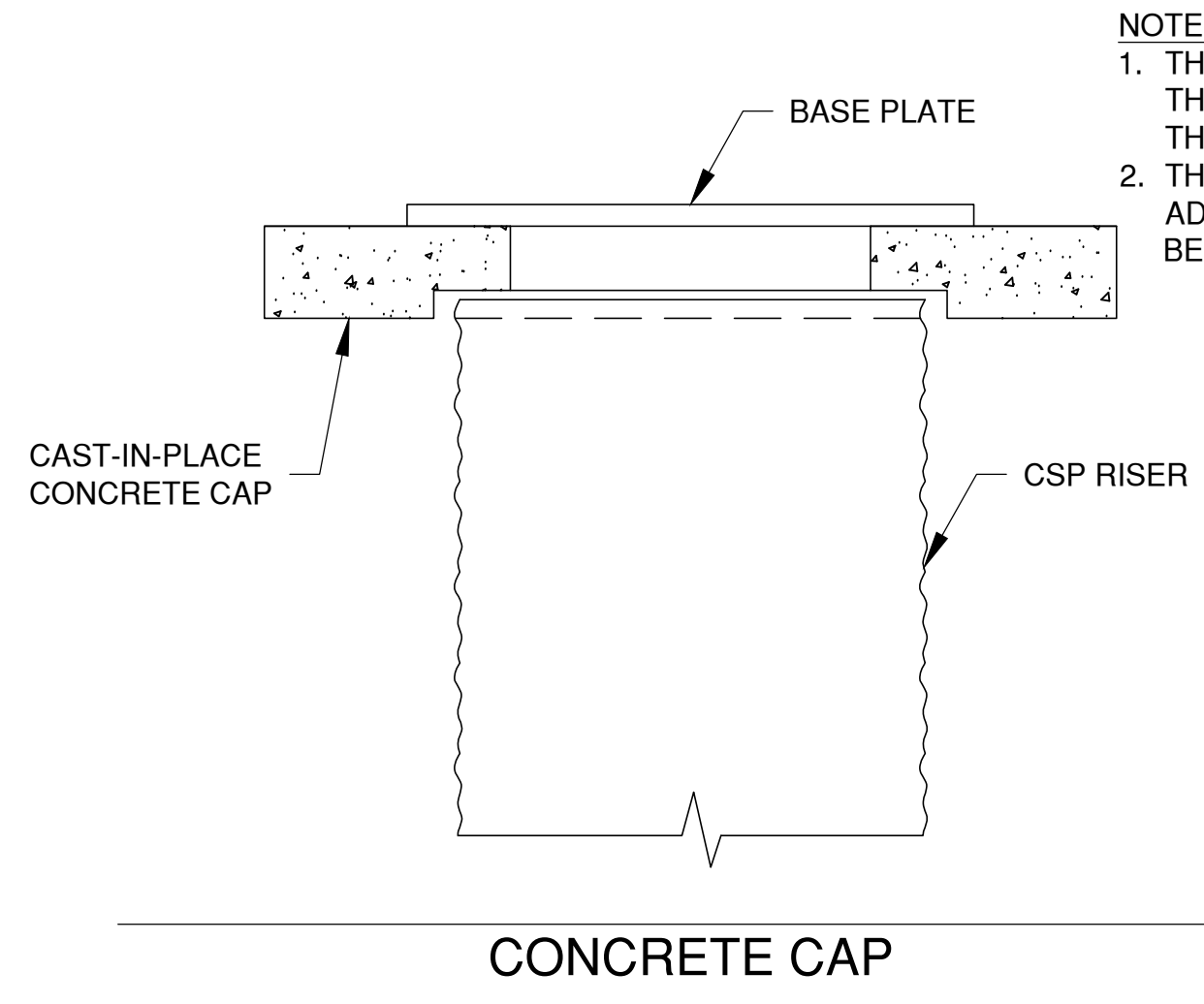
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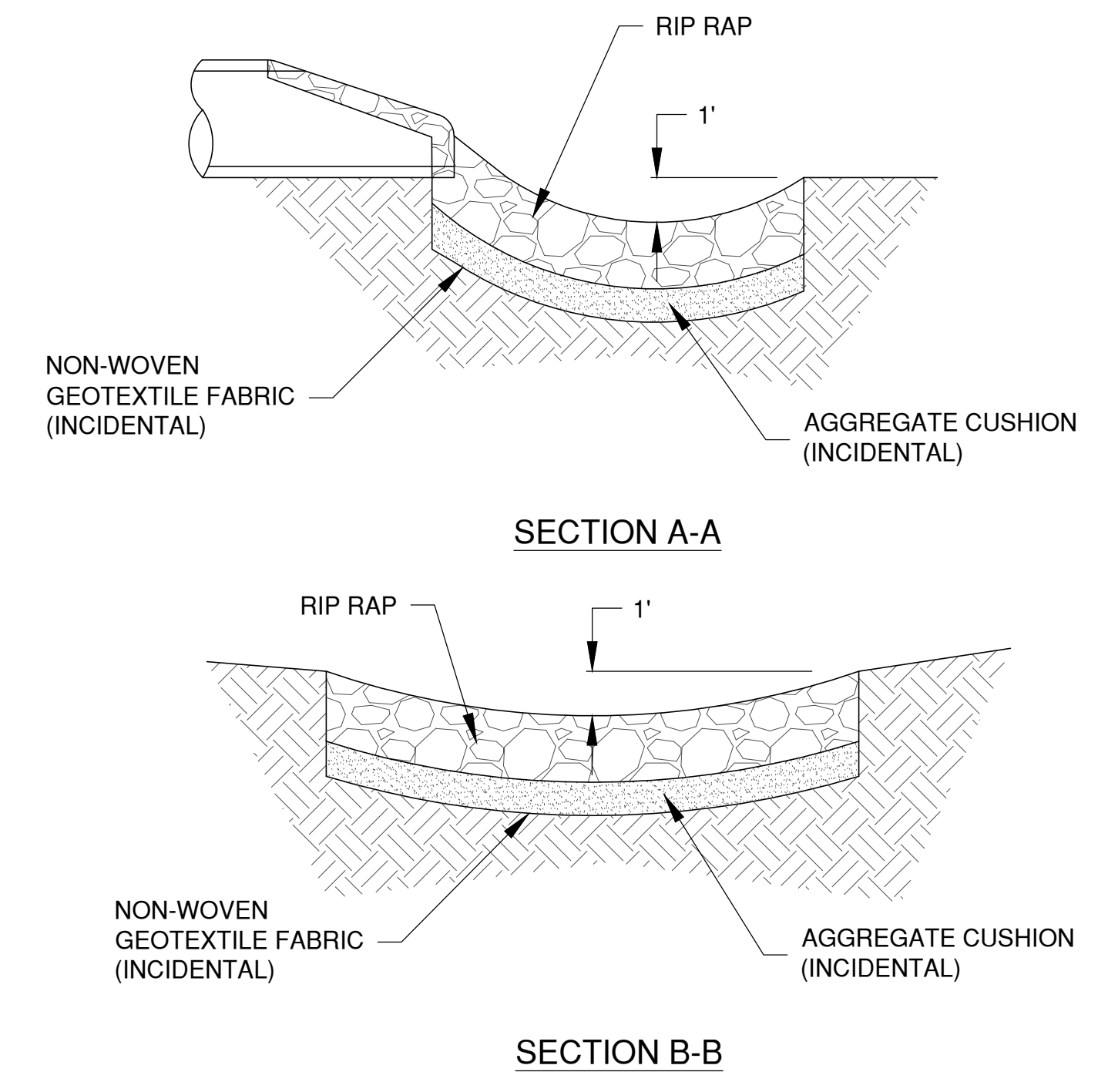
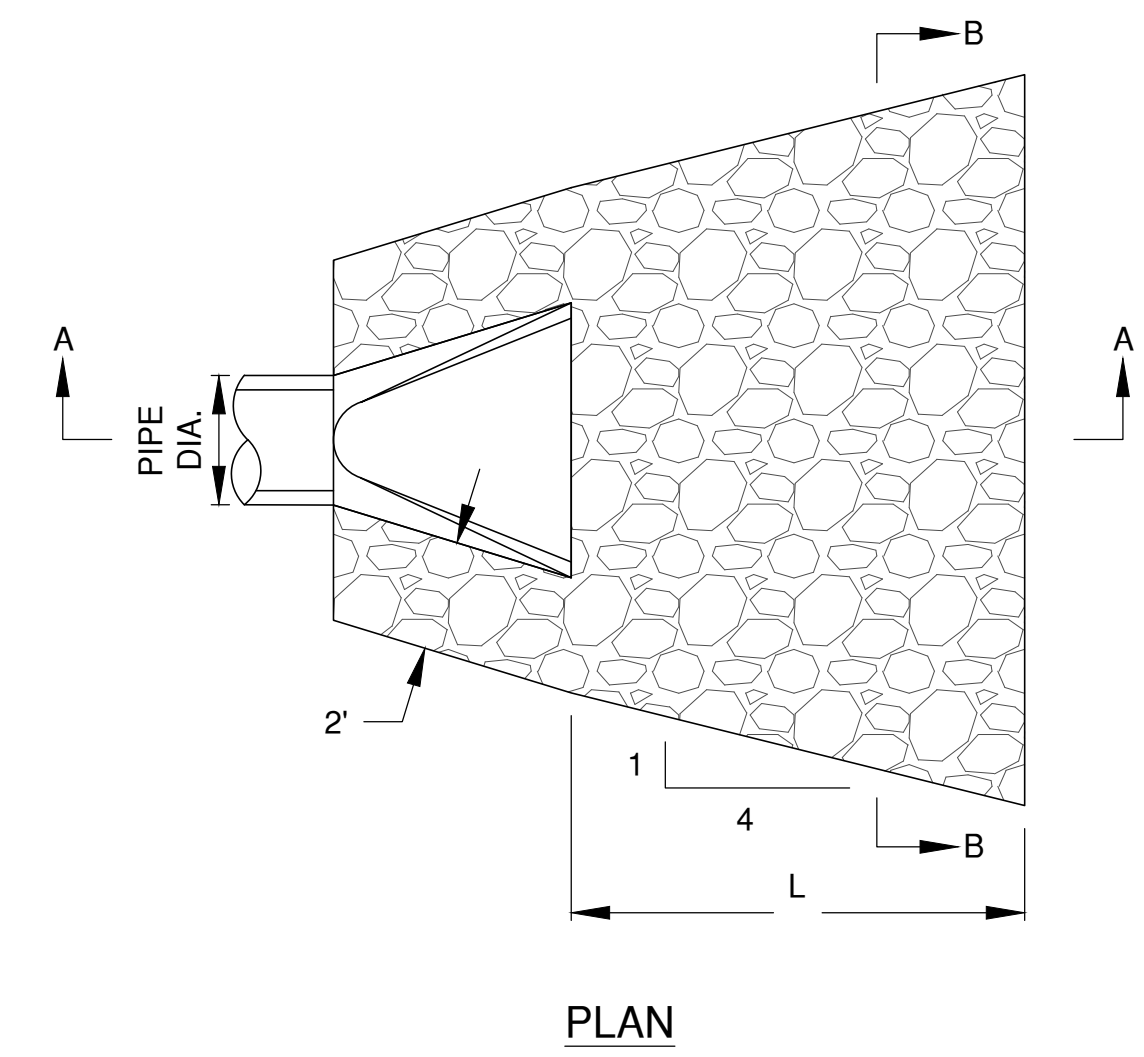
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**EROSION CONTROL  
DETAILS**

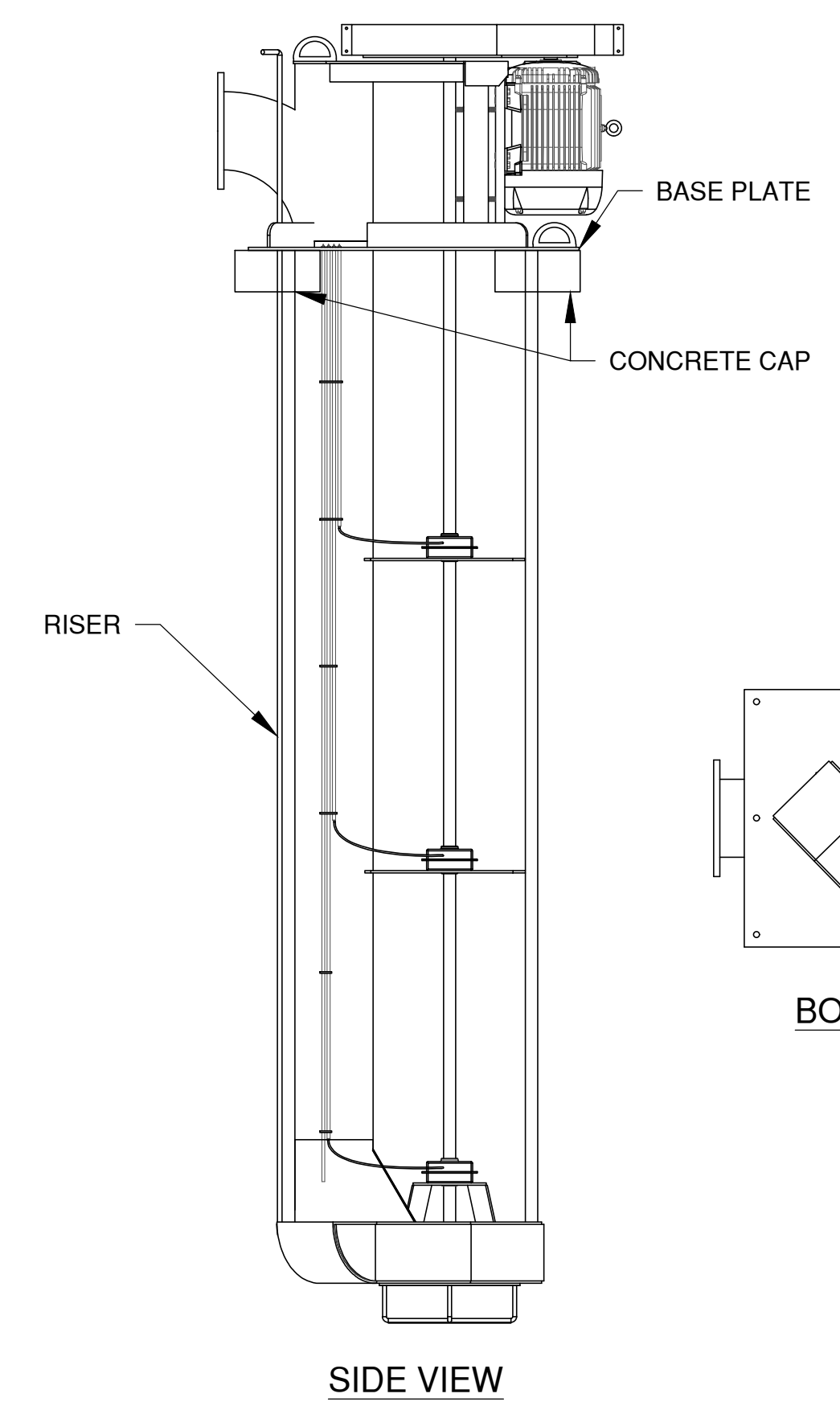
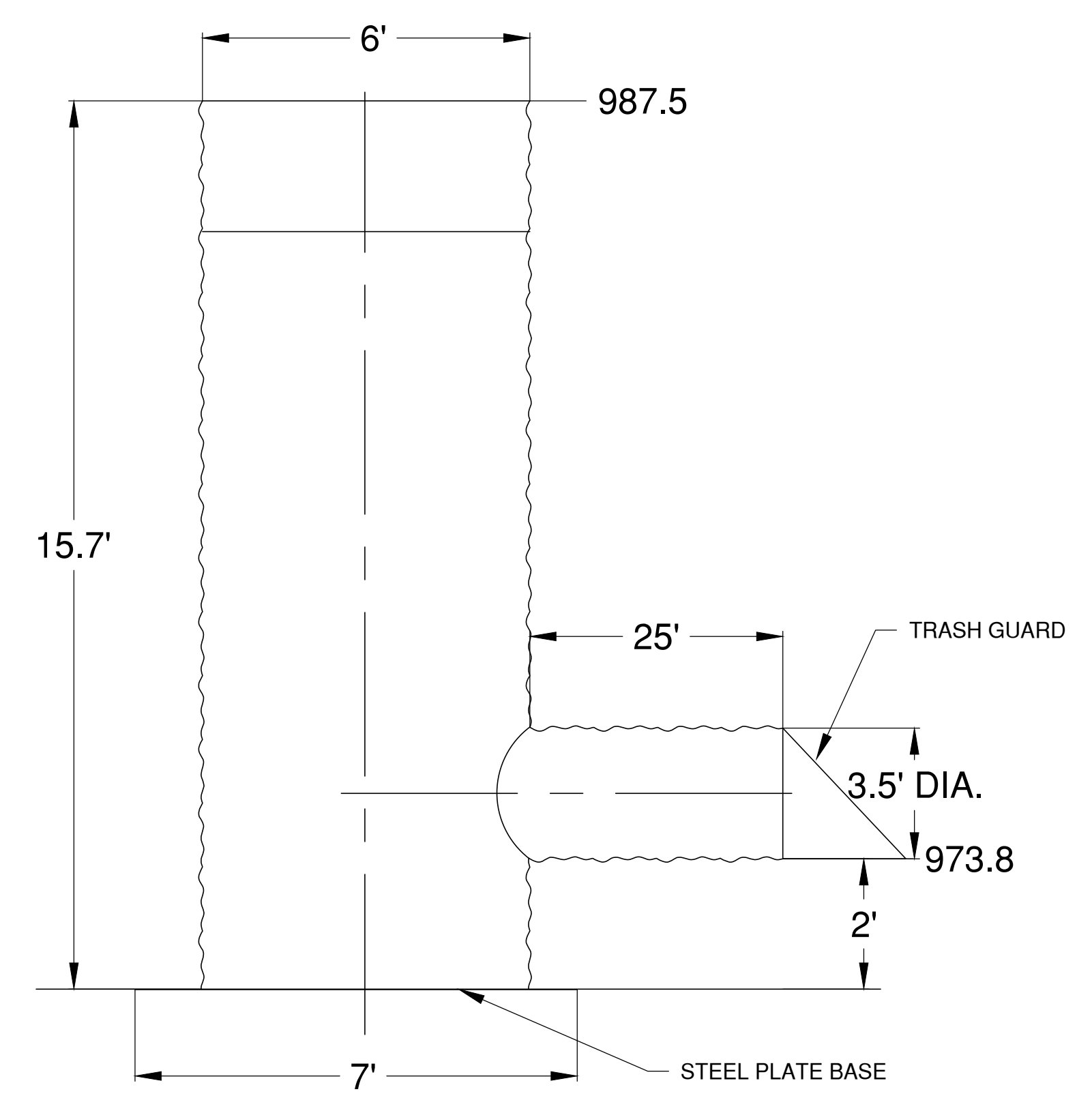
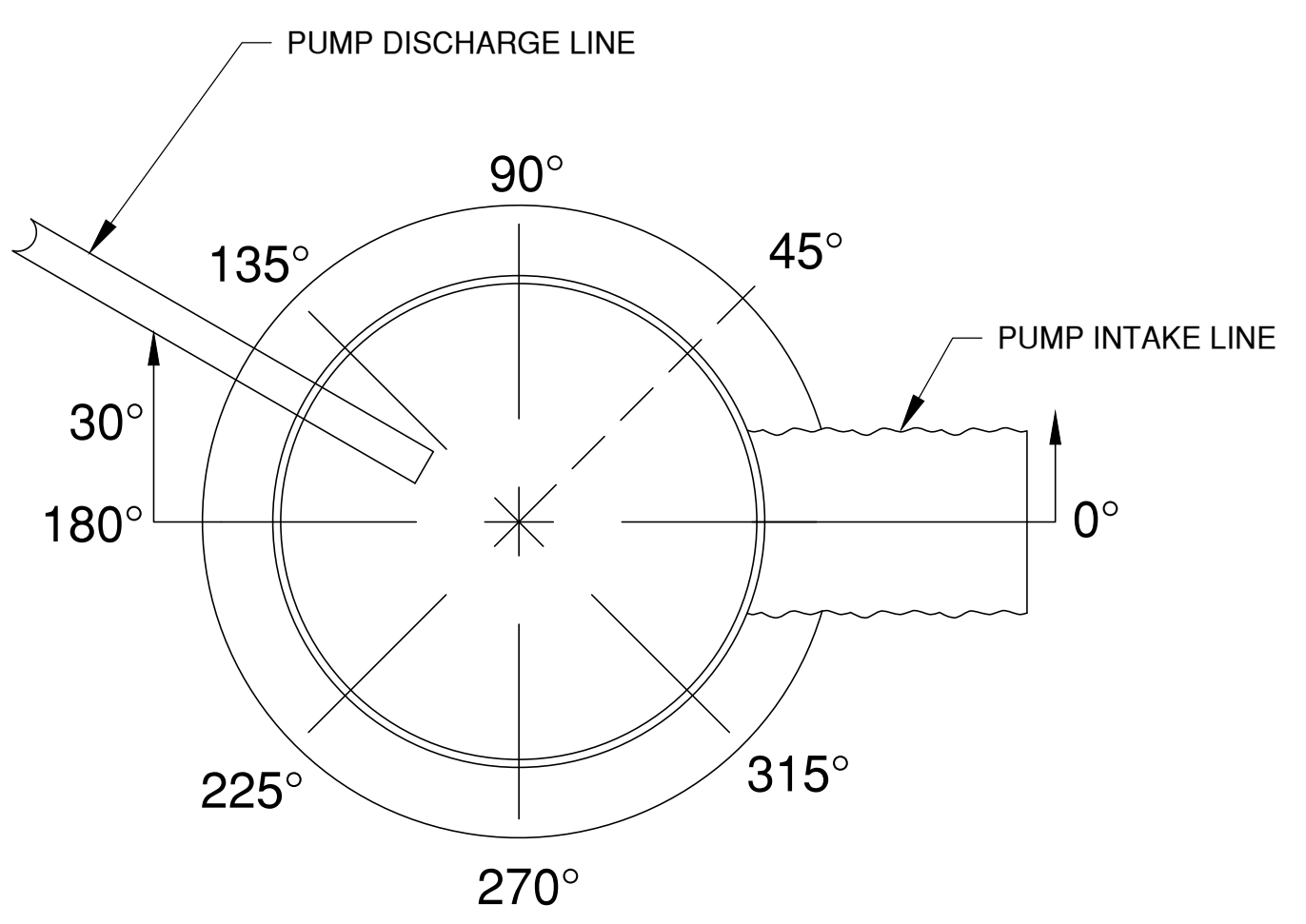
Rev.	Date	Description	By



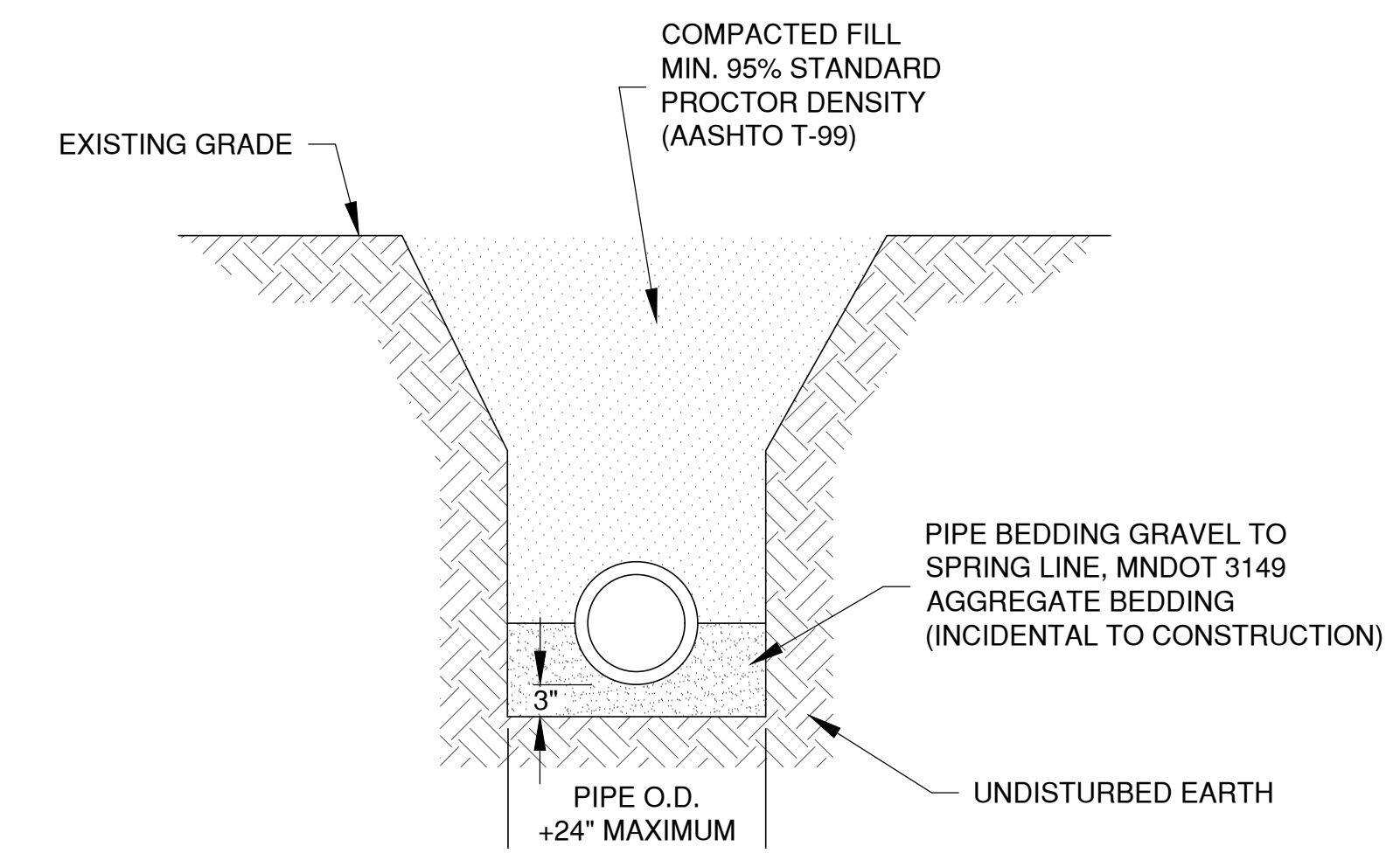
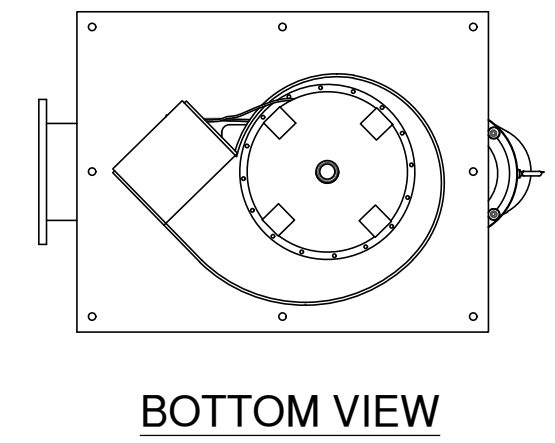
NOTE:  
1. THE CONCRETE CAP SHALL BE SIZED AND DESIGNED SO THAT LOADS ARE TRANSMITTED TO THE SOIL AND NOT TO THE RISER.  
2. THE CONCRETE CAP SHALL BE SIZED TO PROVIDE AN ADEQUATE BOTTOM AREA BASED ON THE ALLOWABLE BEARING CAPACITY OF THE SOIL.



PIPE DIA. (IN)	L (FT)	24" DEPTH RIP RAP (CY)	12" DEPTH AGG. CUSH. (CY)
12	8	5.5	2.8
15	8	5.8	2.9
18	10	7.8	3.9
21	10	8.4	4.2
24	12	11.0	5.5
27	12	11.6	5.8
30	14	14.5	7.3
33	16	16.4	7.8
36	16	18.3	9.2
42	18	21.7	10.9
48	20	25.8	12.9



NOTE:  
1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL EQUIPMENT AND COMPONENTS NECESSARY TO FORM A COMPLETE SURFACE WATER LIFT STATION, AS SPECIFIED AND AS SHOWN ON THE DRAWINGS. WORK INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING: PUMP, PUMP MOUNTING PEDESTAL WITH DISCHARGE ELBOWS, INTERNAL PIPING AND VALVES, A COMPLETE CONTROL PANEL WITH LEVEL CONTROL (FLOATS/TRANSDUCER), INLET AND DISCHARGE PIPING, CORRUGATED METAL PIPE WET WET, CAST-IN-PLACE CONCRETE CAP, SPLASH PAD, FLAP GATE, AND ALL OTHER ITEMS SHOWN ON THE DRAWINGS OR REQUIRED TO PROVIDE A COMPLETE SERVICEABLE UNIT.



Minnesota DOT: Sibley County, US Foot, NAD83

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.

Print Name: ROGER A. CLAY

Signed: \_\_\_\_\_

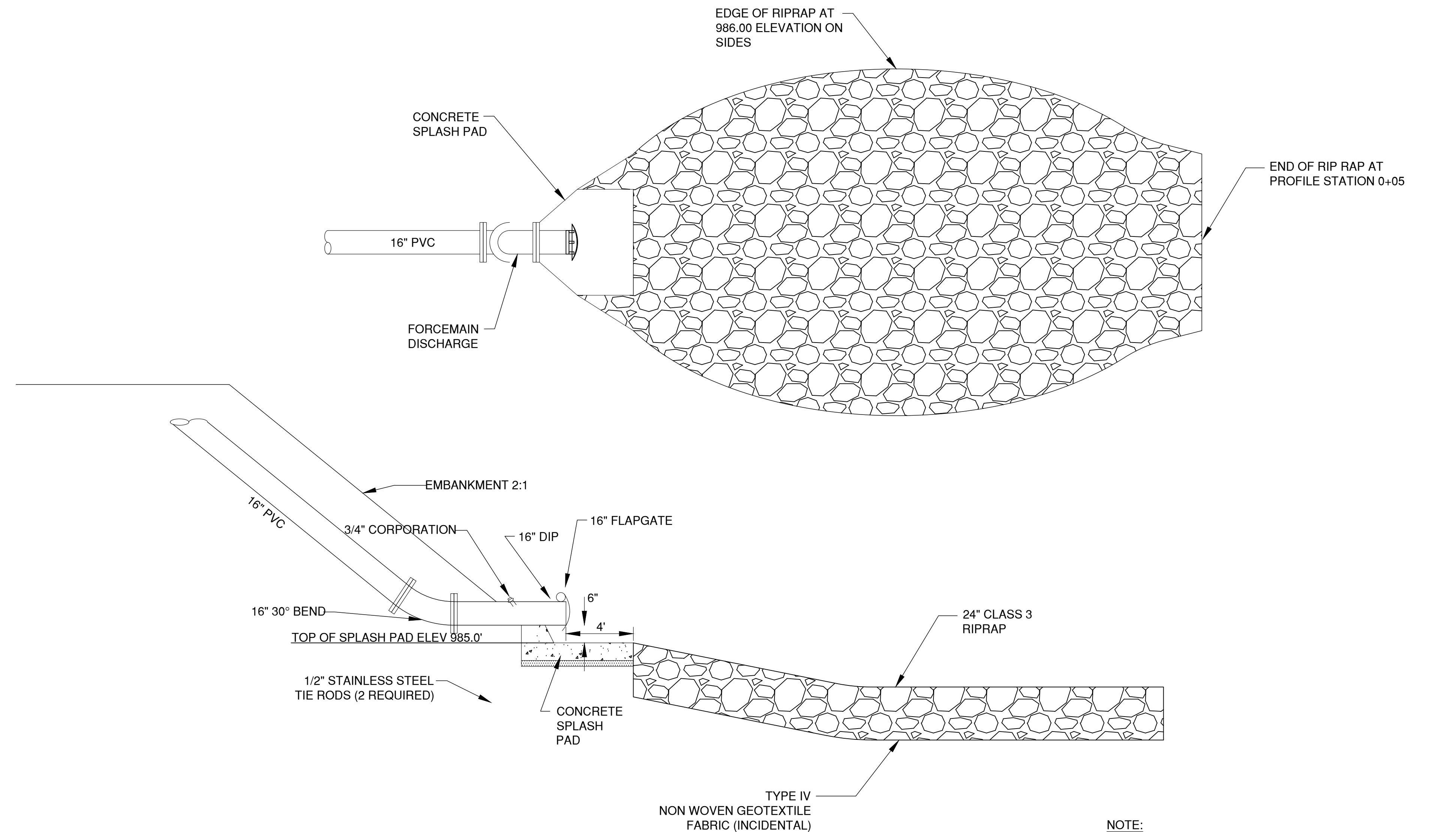
Date: 06-22-2020 License Number: 23452

Design By: B. NIEMELA  
Drawn By: R. CLAY  
Approved By: R. CLAY  
Project Number: 19.00929

DETAILS

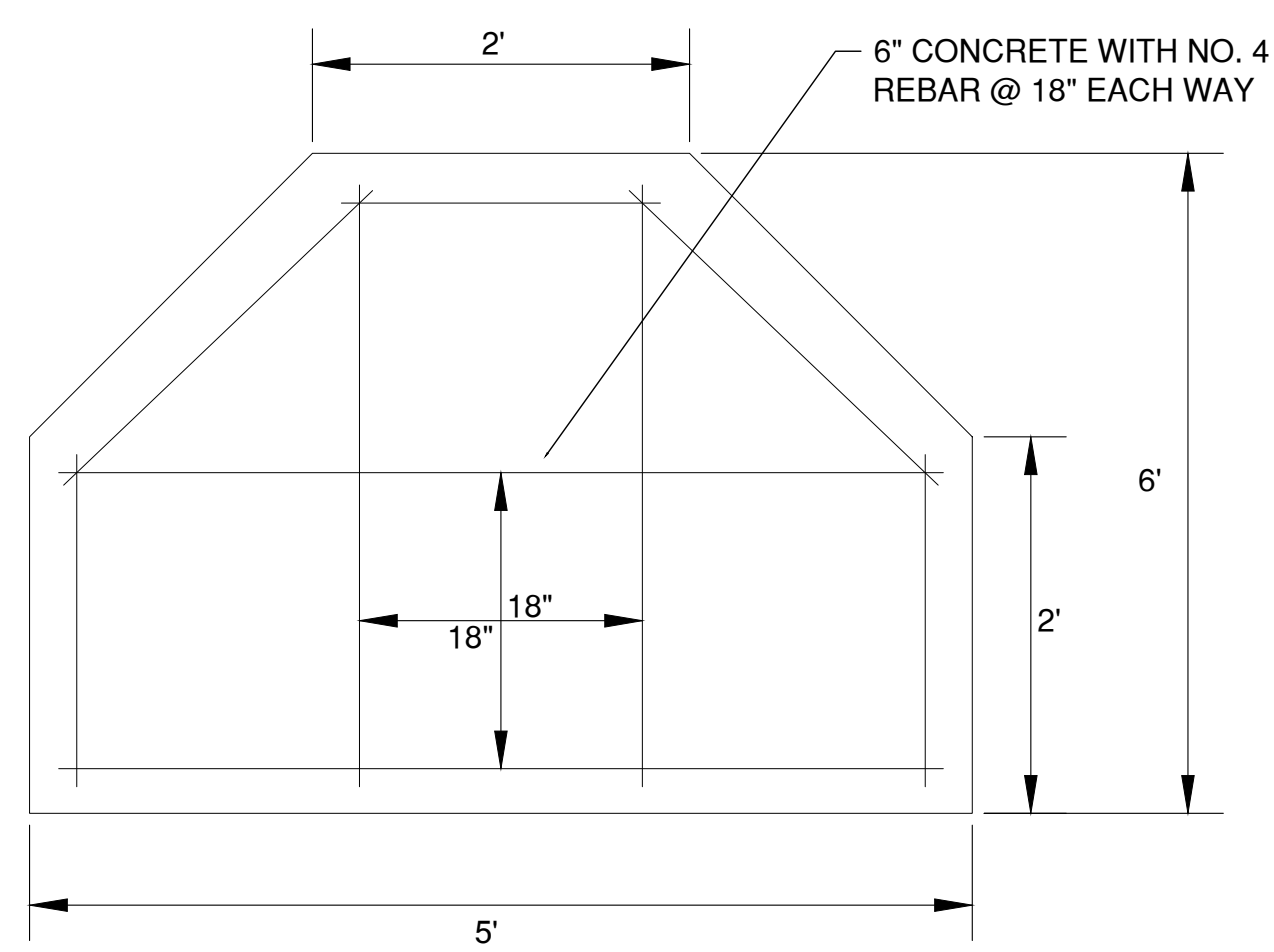
**HIGH ISLAND CREEK  
WATERSHED DISTRICT  
PROJECT 10  
SIBLEY COUNTY, MN**

Rev.	Date	Description	By

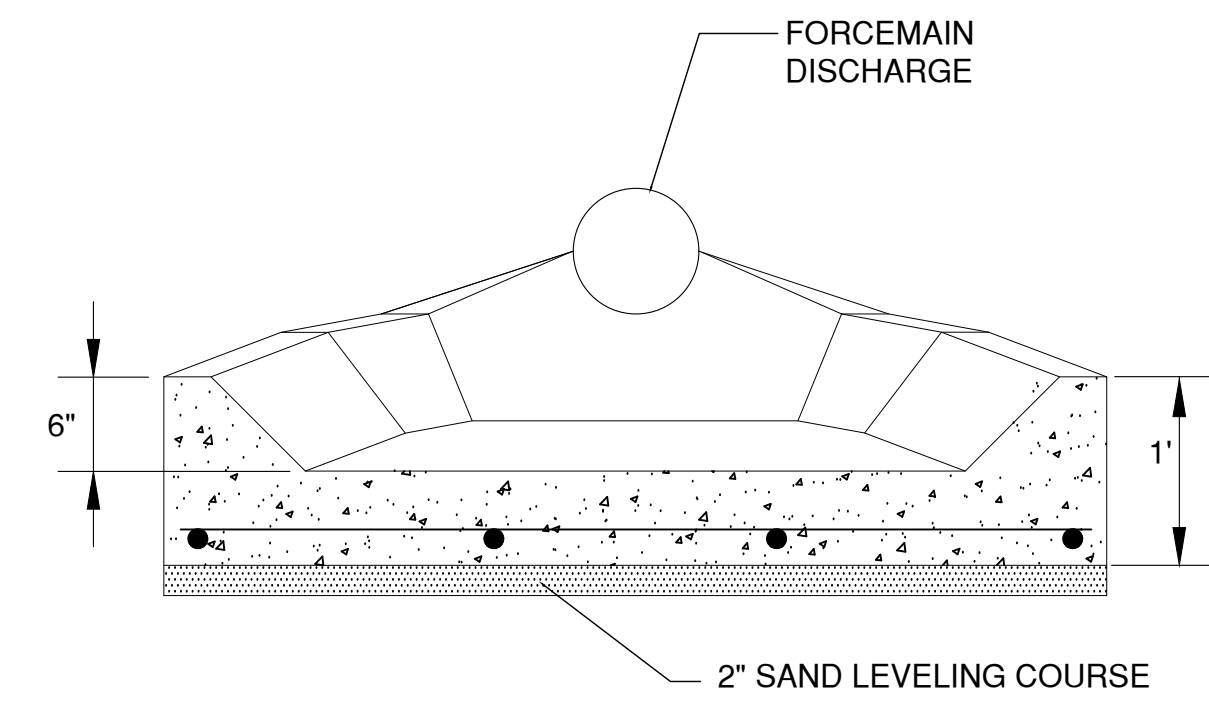


**NOTE:**  
1. ALL FITTINGS, PIPE AND CONCRETE SPLASH PAD TO BE INCLUDED IN SURFACE WATER PUMP STATION BID ITEM.

**FORCEMAIN DISCHARGE**



**REINFORCEMENT DETAIL**



**CONCRETE SPLASH PAD**

Minnesota DOT: Sibley County,  
US Foot, NAD83

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.

Print Name: ROGER A. CLAY

Signed: \_\_\_\_\_

Date: 06-22-2020 License Number: 23452

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Design By: B. NIEMELA  
Drawn By: R. CLAY  
Approved By: R. CLAY  
Project Number: 19.00929

**DETAILS**



We listen. We solve.™

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**Project 10 Improvements**  
**High Island Creek Watershed District**  
**Sibley County, Minnesota**  
**UEI Project number R19.00929**

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

\_\_\_\_\_  
Signature

\_\_\_\_\_  
July 24, 2020  
Date

\_\_\_\_\_  
Roger A. Clay  
Typed or Printed Name

\_\_\_\_\_  
23452  
Reg. No.

**Ulteig Engineers, Inc.**

**Bismarck • Cedar Rapids • Denver • Detroit Lakes**  
**Fargo • Sioux Falls • St. Paul • Williston**

**June, 2020**



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02246	Geotextile Fabric
02271	Erosion and Sediment Control
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02720	Storm Sewer System
02940	Seeding and Sodding

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16883	Surface Water Pump Control Panel

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Temporary modification of structures, equipment, appurtenances and utilities as necessary to allow for operation of facilities during construction.
- B. Removal of existing piping and other equipment as shown on Drawings.
- C. Removal of structures as shown on Drawings.
- D. Distribution of salvageable and excess unacceptable material as specified below.
- E. Disposal of excess and unacceptable materials.

1.2 RELATED SECTIONS

- A. Division 15 – Mechanical.
- B. Division 16 – Electrical.

1.3 SUBMITTALS

- A. Provide sequence of demolition and removal work to ensure operation of existing lift station is not interrupted.

1.4 DISPOSAL OF MATERIAL

- A. All materials, unless identified by the Owner, shall become property of Contractor and must be removed from site and disposed of by approved method.
- B. The owner has first right of refusal on all salvageable culverts, equipment and components scheduled for removal.

1.5 EXISTING CONDITIONS

- A. Owner and Engineer assume no responsibility for condition of equipment and appurtenances to be modified or demolished.

**PART 2 PRODUCTS (Not Used)**

**PART 3 EXECUTION**

3.1 EXAMINATION

- A. Verify existing utilities to remain in service and protect against damage.

3.2 PREPARATION

- A. Take measures to minimize dust and noise during demolition.
- B. Exercise precautions for fire prevention. Burning of demolition debris is not permitted on site.
- C. Exercise precautions to maintain operation of existing lift station.

- D. Exercise precautions to minimize falling debris on adjacent structures, facilities and persons.
- E. Provide shoring and bracing to adjacent structures on utility poles where required.
- F. Coordinate with owners to shut off utilities as required.

### 3.3 DEMOLITION

- A. Demolition shall be performed to remove all items associated with the item to be removed.
- B. Wet down work during demolition operations to prevent dust from arising.
- C. All demolition debris shall become property of Contractor and shall be removed from site and disposed of. Demolition debris shall not be used for fill or backfill.
- D. Blasting or the use of explosives will not be allowed for demolition work.

### 3.4 DAMAGE

- A. Repair damages caused to adjacent structures and facilities to condition equal to that prior to construction. At no extra cost to the Owner.

### 3.5 RESTORATION

- A. Following demolition, disturbed areas not included in new structures shall be restored with topsoil, seed and hydromulch.

**END OF SECTION**

## SECTION 02200 - EARTHWORK

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Excavation for structures, footings and preparation of subgrade for footings, foundations and other construction.
- B. Removal and disposal of all debris.
- C. Handling, storage, transportation and disposal of all excavated material.
- D. All necessary sheeting, shoring and grade protection work.
- E. Preparation of subgrades, dewatering and pumping of seepage if required.
- F. Providing of compacted (engineered) fill.
- G. Backfill, compaction and consolidation.
- H. Rough and finish grading of the site.

#### 1.2 RELATED SECTIONS

- A. Section 01400 – Quality Control.
- B. Section 02050 – Demolition.
- C. Section 02110 – Clearing and Grubbing.
- D. Section 02221 – Trenching, Backfilling and Compacting.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Backfill and fill materials shall conform to the following except as specifically indicated otherwise on the Drawings.
  - 1. Backfill Outside Foundation Walls and Subgrading: Earth which is free of debris, roots, wood or other deleterious material. Clean, excavated material may be used.
  - 2. Compacted Fill (Also Noted as "Engineered Fill"): Pit run, clean and free from dirt, clay, etc., and conforming to Unified Soil Classification System Class SP-SM (less than 12 percent of particles passing #200 sieve).
  - 3. Sand and Gravel Fill: Clean, pit run gravel ranging from approximately 5 percent fines up to pearock size (not more than 5 percent passing #200 sieve).
    - a. 100 percent passing size 3/4 inch.
    - b. Maximum 35 percent passing #40 sieve.
    - c. Maximum 5 percent passing #200 sieve.

4. Coarse Gravel Fill: Gravel shall be clean and free from dirt, clay, etc., and range in size from 1/4 inch to 3/4 inch diameter.
5. Finish Grading: 4 inches black dirt free of debris, roots, wood or other deleterious materials.

B. All fill material shall be subject to the approval of the Engineer.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

A. Verify location of existing underground utilities.

#### **3.2 PREPARATION**

A. Establish lines, grades and levels.

B. Protect, shore, brace, support and maintain underground and aboveground facilities and utilities.

#### **3.3 EXCAVATION FOR STRUCTURES**

A. Excavate to lines and elevations shown on Drawings.

B. Strip topsoil to 12 inch depth and store for reuse.

C. Excavations for footings shall be of adequate dimension to allow for construction and removal of formwork.

D. Divert surface water from excavations. Keep excavations dry. Remove wet or saturated material.

E. Excavations for concrete structures which extend down to static groundwater or below shall be dewatered. This shall be incidental.

F. Excavation by blasting will not be allowed.

G. Protect bottom of excavation from freezing.

H. Brace and sheet all excavations where necessary to prevent caving or sliding and to provide protection to workmen.

#### **3.4 BACKFILL**

A. Compaction Requirements (Densities According to Standard Proctor ASTM D698).

1. Engineered fill; up to pad footing: 98 percent.
2. Exterior backfill adjacent to perimeter footings: 95 percent.
3. Interior fill; below finished floor slab: 98 percent.
4. Fill below walks, drives and paved areas: 100 percent.
5. Remaining areas not otherwise specified: 95 percent.

B. Placement and Compaction of Fill.

1. After subgrade compaction has been approved, spread approved fill material in layers not exceeding 6 inches in uncompacted thickness.
2. Do not place fill on frozen surface.
3. Do not place fill on snow or ice covered surface.
4. Water or aerate fill material as necessary and thoroughly mix to obtain moisture content which will permit proper compaction.
5. Compact each soil layer to specified density. Repeat compaction process until desired grade obtained.
6. Laterally brace foundation walls before placing any backfill.

### 3.5 DISPOSAL OF SURPLUS MATERIAL

- A. Do not remove excavated materials from site without Engineer's approval.
- B. Suitable excavated material can be used for fill embankments or backfill.
- C. Surplus fill, organic matter or other objectionable material shall become the property of the Contractor and disposed of off site.

### 3.6 GRADING

- A. Bring areas to grade at elevations, slopes and contours shown on Drawings.
- B. Remove from top 6 inches rocks or rock fragments or other objectionable material 6 inches or larger.
- C. Uniformly dress slopes to maintain drainage.

**END OF SECTION**

## SECTION 02221 - TRENCHING, BACKFILLING, AND COMPACTING

### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- A. This work shall consist of construction procedures and requirements for trenching, backfilling, and compacting for underground utilities.

#### 1.2 SUBMITTALS

- A. Granular Pipe Bedding: submit sample to the Engineer five (5) days, prior to use

#### 1.3 SCHEDULE

- A. The contractor shall perform and organize work in a manner that results in a minimum length of open trench. No trench may remain open overnight, when not actively being worked in, or without the prior consent of the Engineer.

#### 1.4 PROTECTION OF UNDERGROUND UTILITIES AND STRUCTURES

- A. The contractor shall be responsible for the protection of all underground utilities and all existing above ground facilities and structures. The contractor shall contact Gopher State One Call, prior to any excavation activity.
- B. The contractor shall provide for a minimum of interference with vehicular and pedestrian traffic and provide suitable temporary measures to accommodate public and private traffic.

### PART 2 – MATERIALS (Not Used)

### PART 3 – CONSTRUCTION REQUIREMENTS

#### 3.1 GENERAL

- A. All installations shall be accomplished by open trench construction, except for short tunnel sections approved by the Engineer, and except that boring, jacking, or tunnel construction methods shall be employed, where specifically required by the drawings or Special Provisions. Installation of pipe through tunnel excavations will be allowed only where the surface structure can be properly supported and the backfill restored to the satisfaction of the Engineer.
- B. Excavation operations shall proceed only so far in advance of pipe laying as will satisfy the need for coordination of work and permit advance verification of unobstructed line and grade, as planned.
- C. Where interference with existing structures is possible or in any way indicated and where necessary to establish elevation or direction for connections to in-place structures, the excavating shall be done at those locations in advance of the main operation so actual conditions will be exposed in sufficient time to make adjustments without resorting to extra work or unnecessary delay.
- D. The excavating operations shall be conducted so as to carefully expose all in-place

underground structures without damage. Wherever the excavation extends under or approaches so close to an existing structure as to endanger it in any way, precautions and protective measures shall be taken, as necessary, to preserve the structure and provide temporary support. Hand methods of excavating shall be utilized to probe for and expose such critical or hazardous installations such as gas; water and sewer mains and services; and power, telephone, street lighting, and traffic signal cables and conduits.

3.2 TRENCH WIDTH

- A. Where the cover over the top of the pipe will be fifteen (15) feet or more, that portion of the required excavation, which is below an elevation one (1) foot above the top of the pipe, shall have side slopes as nearly vertical as practical and at a point one (1) foot above the top of the pipe, the width of the trench shall be no wider than the widths given in the following tabulation:

<b>Pipe Diameter</b>	<b>Trench Width (1' Above Pipe)</b>
36" or less .....	Outside diameter plus 24"
42" to 54" .....	1.5 times outside diameter
60" or over.....	Outside diameter plus 36"

- B. If the trench is excavated to a greater width than authorized according to the above tabulation, the Engineer may direct the contractor to provide a higher class of bedding, a higher strength of pipe, or both than that required by the contract without additional compensation therefore, as the Engineer deems necessary, to satisfy the design requirements.
- C. The contractor shall thoroughly familiarize himself with all State and Federal regulations governing excavation. The sides of the trench shall be sloped and/or braced, as necessary, to ensure the safety of the workmen. The trench side slopes and the trench width at the top of the excavation will vary depending upon the depth of the trench, the size of the pipe, and the nature of the material encountered. However, the width of the trench shall be kept at a minimum to prevent excess removal or destruction of the existing surface.
- D. The equipment used for surfacing removal, excavation, and pipe placement shall be of such size and type as to adequately perform the intended operations. However, such equipment shall not be so operated or of a size or type as to itself cause a greater trench width than minimally required for safe operation. If, at any time, the trench becomes wider than what is required for a reasonable and safe operation, the Engineer, in his judgment, may direct the contractor to change his equipment or method of operation in order to narrow the trench to a reasonable width at the top of the excavation.

3.3 PIPE FOUNDATION IN GOOD SOIL

- A. The trench shall have a bottom conforming to the grade to which the pipe is to be laid. The pipe shall be laid upon sound soil, cut true and even, so that the barrel of the pipe will have a bearing for its full length. Bell holes shall be excavated to ensure the pipe resting for its entire length upon the bottom of the trench and to permit jointing to be made properly.
- B. Care must be taken to avoid over excavation at pipe grade. Where the existing material at pipe grade is loose or where material is placed due to over excavation, mechanical compaction of such material will be required in order to achieve a density of ninety-five (95) percent, as determined by the Standard Proctor Density (ASTM D698). The finished pipe grade shall be prepared accurately, in every instance, by shaping with hand tools, as required, to provide the class of bedding specified.





### 3.4 PIPE FOUNDATION IN POOR SOIL

- A. If the soil at the pipe zone is inadequate to support the pipe, a further depth and/or width shall be excavated and refilled to pipe foundation grade with approved material, which shall be thoroughly compacted.
- B. The Engineer may direct that "granular" or "aggregate" foundation material be hauled in and placed. Granular foundation material shall meet the requirements of MnDOT Specification 3149 Granular Borrow and aggregate foundation material shall meet the requirements of MnDOT Specification 3137 Class B.
- C. Placement of the foundation backfill shall be in relatively uniform layers not exceeding eight (8) inches in loose thickness. Each layer of backfill shall be compacted thoroughly by means of approved mechanical compaction equipment as will produce uniform pipe support throughout the full pipe length and facilitate proper shaping of the pipe bed.
- D. Where other unclassified material encountered at pipe grade is, in the Engineer's judgment, unsuitable for pipe foundation, the subgrade shall be excavated below the pipe, as directed by the Engineer. Excavation and disposal of such unsuitable, unclassified materials shall be measured and paid for under the, "Pipe Subgrade Excavation" bid item.
- E. The contractor shall be fully responsible to keep the trenches free of water by such means as will preserve the structural stability of the trench bottom and sides and provide a dry trench for the installation of the pipe.

### 3.5 BRACED AND SHEETED TRENCHES

- A. Sheet piling, bracing, etc. shall be put in place and maintained, as may be required, to support the sides of the excavation and to prevent any movement, which may in any way endanger personnel, or injure or delay the work, or endanger adjacent buildings or other structures. Where sheet piling and bracing are used, the trench width shall be increased accordingly. Trench sheet piling shall remain in place until pipe has been laid; tested for defects and repaired, if necessary; and the earth around it compacted to a depth of one (1) foot over the top of the pipe. It shall be the contractor's responsibility and duty to be familiar with Local, State, and Federal laws and ordinances relating to this type of work and he shall assume the responsibility for compliance therewith.
- B. All work must be confined to within the limits of the construction easements or public rights-of-way indicated on the drawings. To comply with this requirement in the various pipe depth-location-soil condition combinations, the contractor shall install any necessary sheet piling, bracing, or trench boxing at his own expense.

### 3.6 BACKFILL PROCEDURE AT PIPE ZONE

- A. Selected backfill material free from rock, boulders, or other unsuitable substances shall be deposited in the trench simultaneously on both sides of the pipe for the full width of the trench and to an elevation of at least six (6) inches above the top of the barrels or pipes eight (8) inches or less in diameter and not less than six (6) inches above the horizontal centerline of pipes with a diameter of twelve (12) inches or larger.
- B. The backfill material shall be moistened or dried, if necessary; tamped in thin (about four [4] inch) layers; and thoroughly compacted under and on each side of the pipe to provide solid backing against the external surface of the pipe.

### 3.7 BACKFILL WITH EXCAVATED MATERIALS

- A. Backfill shall be free of stone, concrete, and clay lumps larger than one-third ( $\frac{1}{3}$ ) cubic foot (CF); roots; stumps; and rubbish.
- B. Remove and dispose of unsuitable material in backfill.

### 3.8 BACKFILL COMPACTION

- A. This method of backfill within right-of-way and beneath all public roadways, including placement and compaction of material in the trench from the top of the bedding to the bottom of the street surfacing, shall be specified density. Backfill density of ninety-five (95) percent of the maximum density, as determined by the Standard Proctor Method, shall be achieved except for the upper three (3) feet of the trench backfill (meaning the three (3) feet of material directly beneath the granular base material for the street or road), which shall be compacted to a density of one hundred (100) percent, as also determined by the Standard Proctor Density (ASTM D-698) Method.
- B. Backfill procedures for easements beyond public right-of-way shall be quality compaction methods, in accordance with MnDOT 2105.
- C. The methods and equipment used by the contractor for backfilling and compacting shall be such as to cause no damage to any of the sewers, watermains, utility installations, structures, etc. in the street or to any building or structure along the street.
- D. Special attention shall be given to work around utility installations, watermains, manholes, and in areas of faulty basement foundations etc. to ensure adequate compaction of the fill under and adjacent to these installations, in order to maintain their stability and that of the street surface. The Engineer may require the contractor to change his method of or equipment used for compaction if, in his opinion, there is a possibility of damage to any installation in the street or to nearby structures.
- E. Suitable backfill material shall be defined as a mineral soil free of foreign materials (rubbish, debris, etc.); frozen clumps; oversized stone, rock, concrete, or bituminous chunks; and other unsuitable materials whose presence in the backfill, in the opinion of the Engineer, may damage the pipe installation, prevent thorough compaction, or increase the risks of after settlement unnecessarily.
- F. Backfill materials shall be carefully placed in relatively uniform depth layers and spread over the full width and length of the trench section, as will provide simultaneous support on both sides of the pipe line. The use of heavy roller type compaction equipment shall be limited to safe pipe loading.
- G. The maximum loose thickness of each backfill layer shall be twelve (12) inches, except that in consideration of the demonstrated capabilities of special type vibrating compactors, the maximum depth may be increased at the Engineer's discretion.
- H. Until final acceptance of the project, the contractor shall assume full responsibility and expense for all backfill settlement and shall refill and restore the work, as directed, to maintain an acceptable surface condition.

### 3.9 TESTING

- A. The Engineer may require sampling and testing of the soils that are to be used for bedding and backfill to determine the maximum density. The Engineer may also require density tests on the compacted bedding and backfill. Any excavation required to facilitate

soil sampling or testing shall be done by and at the expense of the contractor, as directed by the Engineer. It will be the contractor's responsibility to compact or re-compact the backfill until specified requirements are met.

- B. The contractor shall provide equipment and personnel as required to assist in locating and uncovering test sites.

#### **PART 4 – MEASUREMENT AND PAYMENT**

##### **4.1 PAYMENT**

- A. Trenching: incidental to underground utility work and not paid for directly
- B. Backfilling
  - 1) Backfill with excavated material: incidental to underground utility work and not paid for directly
  - 2) Compacting: incidental to underground utility work and not paid for directly
  - 3) In the event the contractor leaves a trench open overnight without the prior consent of the Engineer, \$2,500.00 will be deducted from the contract. This deduction will be made for every occurrence.
- C. Granular Pipe Bedding: granular material for pipe bedding shall be considered incidental to the installation of the pipe.

**END OF SECTION**

## SECTION 02235 - AGGREGATE BASE

### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- A. This work shall include the furnishing and placement of aggregate base courses in accordance with the provisions of MnDOT 2211, except as modified herein in these Special Provisions.

#### 1.2 SCHEDULE

- A. Aggregate base placement shall be started within ten (10) working days of the completion of the common excavation. All aggregate base placed on the road must be spread and compacted during daylight hours. No overnight windrows will be allowed.

#### 1.3 SUBMITTALS

- A. Aggregate stockpiles shall be approved prior to construction using MnDOT Form G&B 104 (TP 24346). Samples for the gradation test will be taken at a time when the material has been mixed and is ready for compaction, although windrow samples will also be acceptable. Gradations will be according to the random sampling method.

### PART 2 - MATERIALS

#### 2.1 AGGREGATE BASE

- A. The aggregate base materials shall conform to the requirements of MnDOT 3138 and the following gradation requirements for a Class 5 Modified Aggregate:

Sieve Size	% Passing
1"	100
3/4"	90 – 100
3/8"	50 - 85
#4	40 – 70
#10	20 – 60
#40	10 – 35
#200	5 – 10

- B. Class 7: with prior approval of the Engineer, the contractor may utilize a Class 7 aggregate base in place of Class 5. Class 7 is subject to the specified Class 5 gradation.
- C. If prior approval is granted by the Engineer and requirements stated in 3.1.A of this Section 02235 of these Special Provisions are met to ensure that Class 7 is in accordance with the specified Class 5 gradation, the contractor does not have to produce the Class 7 material as specified in MnDOT 3138.2.C.

### PART 3 – CONSTRUCTION REQUIREMENTS

#### 3.1 RANDOM SAMPLING AND GRADATION ACCEPTANCE METHOD

- A. The contractor and/or aggregate producer shall be responsible for maintaining a gradation control program in accordance with the random sampling acceptance method

described in Section 5-692.100 of the MnDOT Grading and Base Manual. The contractor will be permitted to proceed with and complete the base construction on the basis of the contractor's Certification on MnDOT Form G&B 104 (TP 24346) that the material supplied and used conforms to the appropriate specification requirements. The contractor shall assume full responsibility for the production and placement of uniform and acceptable materials. All payments for aggregate base materials shall be withheld until the Project Engineer receives and accepts the contractor's Certification and quality control testing results.

### 3.2 ACCEPTANCE TESTING

- A. Samples for gradation testing will be taken randomly, by the Engineer, prior to compaction, in accordance with the random sampling method described in the MnDOT Grading and Base Manual. All gradation tests will be reported to the nearest one-tenth (1/10) of one (1) percent for the specified sieves.

### 3.3 STAKING

- A. The contractor shall notify the Engineer no less than forty-eight (48) hours in advance of needing staking, blue tops, or other control.

### 3.4 WATERING

- A. Water shall be applied according to the provisions of 2130. Water will be required as a dust control measure on the project and all gravel haul roads, at no cost to the Owner. Payment for water will be included in the unit bid price for 2211 Aggregate Base.

### 3.5 COMPACTION

- A. Aggregate base compaction shall be achieved by the Specified Density Method or by the Penetration Index Method in accordance with procedures described in MnDOT 2211.D.2.
- B. The base shall be constructed in layers not more than three (3) inches in compacted thickness, except that each layer compacted with approved types of special compacting equipment may be increased to a maximum of six (6) inches.
- C. Class 7 materials shall be constructed in layers not more than three (3) inches in compacted thickness, unless approved by the Engineer.

## **PART 4 – MEASUREMENT AND PAYMENT**

### 4.1 MEASUREMENT

- A. Class 5 shall be measured by the cubic yard (CY) of compacted volume (CV) placed.

### 4.2 PAYMENT

- A. Payment for Class 5, in driveways, approaches, parking areas, highways, and other areas, shall be paid by the cubic yard (CY) and include all placement, subgrade preparation, excavation, and compaction.

**END OF SECTION**

## SECTION 02246 - GEOTEXTILE FABRIC

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

- A. Furnish and install geotextile for use as a permeable separator to prevent the intermixing of subgrade soils and selected fill materials.

#### 1.2 GOVERNING SPECIFICATIONS

- A. All work and materials associated with the work described above shall be in accordance with MnDOT 3733 and these Special Provisions.

#### 1.3 SUBMITTALS

- A. Submit product data, samples, manufacturer's instructions, and manufacturer's certificates in accordance with Section 01300 - Submittals.
- B. Submit letter from manufacturer certifying geotextiles meet the requirements of this specification.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Geotextile rolls shall be labeled per ASTM D 4873; ©Guide for Identification, Storage, and Handling of Geotextiles.
- B. Rolls shall be furnished with wrapping suitable for protection against moisture and extended ultraviolet exposure.
- C. Store rolls in a manner that protects them from the elements.
- D. If outdoor storage, elevate and protect rolls with waterproof cover.
- E. Geotextile rolls shall not be exposed to sunlight for a period exceeding thirty (30) days.
- F. Replace damaged textiles.

### PART 2 - MATERIALS

#### 2.1 MATERIALS

- A. Geotextile shall be Type V, in accordance with MnDOT 3733.
- B. Material shall be ProPex 2002 or approved equal.

### PART 3 – CONSTRUCTION REQUIREMENTS

#### 3.1 PREPARATION

- A. Clear installation area of all obstructions, native vegetation, roots, and other debris which may damage geotextile.

### 3.2 GEOTEXTILE PLACEMENT

- A. Unroll smoothly on subgrade in direction of construction traffic.
- B. Overlap in direction of subbase placement.
- C. Minimum overlap is twelve (12) inches or as recommended by the manufacturer.
- D. Do not drag geotextile across subgrade.
- E. Replace damaged geotextile with a minimum patch size of damaged area plus three (3) feet.
- F. Sew seams as recommended by the manufacturer.

### 3.3 AGGREGATE PLACEMENT

- A. Place by end dumping adjacent to geotextile or over previously placed aggregate.
- B. Dumping on geotextile is not permitted.
- C. Spread aggregate from dumped pile onto fabric using tracked equipment.
- D. Traffic directly on geotextile is not permitted.
- E. Use smooth drum roller to achieve specified aggregate density.
- F. Vibratory compaction shall not be used on initial lift over geotextile.
- G. Fill any ruts with additional aggregate and compact to specified density.

## **PART 4 – MEASUREMENT AND PAYMENT**

### 4.1 GEOTEXTILE FABRIC

- A. No Measurement will be made by the in-place materials. Payment will be incidental to riprap and aggregate placement.

**END OF SECTION**



## SECTION 02271 - EROSION AND SEDIMENT CONTROL

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

- A. Erosion and sediment control measures to be taken during construction

#### 1.2 RELATED SECTIONS

- A. Section 02110 - Clearing and Grubbing
- B. Section 02221 - Trenching, Backfilling, and Compacting
- C. Section 02223 - Excavating, Embankment, and Compaction
- D. Section 02275 - Riprap
- E. Section 02940 – Seeding and Sodding

#### 1.3 REFERENCES (Not Used)

### PART 2 – MATERIALS (Not Used)

### PART 3 – CONSTRUCTION REQUIREMENTS

#### 3.1 PREVENT AND CORRECT PROBLEMS ASSOCIATED WITH EROSION AND RUNOFF

- A. Keep excavation and grading to a minimum.
- B. Remove and stockpile topsoil prior to grading.
- C. Minimize area and time of land exposure.
- D. Retain natural vegetation where possible.
- E. Control runoff and sedimentation with appropriate structural and agronomic practices.

### PART 4 – MEASUREMENT AND PAYMENT (Not Used)

**END OF SECTION**

**PART 1 - GENERAL**

1.1 SECTION INCLUDES:

- A. This work shall consist of furnishing and placing stone riprap, with or without grouting, as specified, and filter materials at the locations designated on the drawings or as specified by the Engineer. Work shall be performed in accordance with MnDOT 2511 and these Special Provisions.

**PART 2 - MATERIALS**

2.1 GENERAL

- A. Riprap materials shall comply with MnDOT 3601.
- B. Filter materials may consist of geotextile fabric or granular material, as specified, and shall comply with MnDOT 3733 and 3601, respectively.
- C. The contractor shall supply the size and class of riprap and filter materials as indicated on the drawings and as listed in the Schedule of Prices.

**PART 3 – CONSTRUCTION REQUIREMENTS**

3.1 PREPARATION

- A. Excavate, shape, and complete slope to required cross section and elevation, as indicated on the drawings, unless otherwise indicated by the Engineer.
- B. All loose foundation material shall be thoroughly compacted before placement.
- C. Place filter material, granular or geotextile as specified, prior to placement of riprap.

3.2 FILTER MATERIAL

- A. Filter material shall always be placed beneath riprap, unless specified otherwise.
- B. Cover entire area to be covered by riprap.
- C. Filter material shall be geotextile, unless specified otherwise, and should be the type specified in the drawings and Schedule of Prices.
- D. Contractor shall ensure that the foundation surface is relatively smooth and free of stones and other debris that may puncture fabric. Contractor shall also ensure that placement of riprap does not puncture fabric.
- E. Fabric shall be placed in a manner that the longest seam runs parallel with the direction of water flow and all seams are overlapped a minimum of eighteen (18) inches.
- F. Upgrade edges of the fabric shall be buried sufficiently to prevent the undermining of water flow.

### 3.3 PLACEMENT OF RIPRAP

- A. Stones should be placed starting at the bottom of a slope working upwards.
- B. Stones should not be dropped onto the fabric from a height greater than three (3) feet.
- C. Random riprap shall be placed in a manner that will provide uniform distribution of the various sizes of stone and produce a dense, well keyed layer with the least practical quantity of void space.
- D. Hand placed riprap, if specified, will require the placement of stones without the use of machinery.

### 3.4 TESTING

- A. Owner shall employ the services of an Independent Testing Laboratory (ITL) to determine that the specified gradations have been met.
- B. Materials not meeting the specified gradations shall be removed and replaced at the contractor's expense.

## **PART 4 – MEASUREMENT AND PAYMENT**

### 4.1 MEASUREMENT

- A. Riprap of each type and class, measured by volume, will be computed on the basis of actual surface dimensions, as staked, and the specified thickness.
- B. Geotextile filter materials will be measured based on the actual surface dimensions, as staked or indicated in the drawings, with no allowance for overlap of seams and buried portions.

### 4.2 PAYMENT

- A. Riprap will be paid for each type and class at the contract unit prices indicated on the Schedule of Prices. Payment will be full compensation for furnishing materials, excavating, preparing foundations, and placing the stone.
- B. Filter materials will be paid separately only when the contract contains the appropriate pay items in the Schedule of Prices. In the event that no contract item is available, the filter materials shall be considered incidental to riprap and no direct compensation will be made.

**END OF SECTION**

## SECTION 02606 – MANHOLES AND CATCH BASINS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

- A. This work shall consist of the construction or reconstruction of brick or concrete block masonry, cast-in-place concrete, precast sectional concrete, or pipe structures built for the purpose of providing access to underground drainage or other systems for the ingress of surface water. All construction and materials shall be in accordance with MnDOT 2506 and these Special Provisions.
- B. Cast Iron Castings
- C. Protective Coatings
- D. Chimney Seals
- E. External Joint Seals
- F. Lampholes

#### 1.2 SUBMITTALS

- A. The contractor shall submit shop drawings for all manholes, catch basins, and castings, chimney seals, and external joint seals.

### PART 2 - MATERIALS

#### 2.1 MANHOLE AND CATCH BASIN RING AND COVER

- A. Cast iron for both manhole and catch basin frames and covers shall be of the best grade cast iron free from all injurious defects and flaws and shall conform with AASHTO M105 for class specified.
- B. Unless otherwise specified, Class 35B or better shall be furnished for all drainage castings. For all drainage castings, the metal shall have a Brinell Hardness number within the range of 190 to 265.
- C. The lid-to-frame surfaces on all round casting assemblies shall be machine milled to provide true bearing around the entire circumference.
- D. The manhole and catch basin castings shall be in accordance with the schedule on the drawings.

#### 2.2 STRUCTURE OPENING

- A. Unless otherwise stated in the contract documents, a minimum twenty-seven (27) inch round access opening shall be provided for all manholes and catch basins.

#### 2.3 PLASTIC REINFORCED STEEL STEPS

- A. All manhole steps shall be integral to the concrete structure.

#### 2.4 PRECAST CONCRETE MANHOLE AND CATCH BASIN

- A. Cones shall be eccentric. Manholes shall conform to AASHTO M199, MnDOT 3622, and the details on the drawings.

#### 2.5 CONCRETE

- A. Concrete cast in place for the construction of manholes and catch basins shall conform with the requirements of MnDOT Section 2461 - Structural Concrete and Section 2506 - Manholes and Catch Basins. See Section 2506 for mortar requirements.

#### 2.6 PROTECTIVE COATING

- A. Manufacturer shall apply coal-tar epoxy coating to all exposed concrete surfaces of sanitary sewer manholes. Apply coating to inside of monolithic base, riser section(s), and cone or cover. Apply an eight (8) mil primer and two (2) - eight (8) mil finish coats.
- B. Coal-tar shall be Bitumastic 300-M, Shertar, Devtar, or approved equal.
- C. Coating shall be factory applied, unless otherwise specified.
- D. Coating shall be considered incidental to the concrete structure.

#### 2.7 CHIMNEY SEALING SYSTEMS

- A. External chimney sealing systems for manholes and catch basins shall be the Classic External Chimney Seal by Cretex Specialty Products, Infi-Shield Uni-Band by Sealing Systems, Inc., or an approved equal.
- B. Internal chimney sealing systems for manholes and catch basins shall be the Classic Internal Chimney Seal by Cretex Specialty Products, Flex-Seal Utility Sealant by Sealing Systems, Inc., or an approved equal.
- C. Chimney sealing systems shall be installed in accordance with manufacturer's instructions.
- D. Manhole and catch basin sealing systems shall be in accordance with manhole and catch basin schedules on the drawings.

#### 2.8 EXTERNAL JOINT SEALS

- A. External joint seals shall be Cretexwrap by Cretex Specialty Products, MacWrap by Mar Mac Construction Products Co., Inc., or approved equal and shall conform to ASTM C-877.
- B. External joint seals shall be installed in accordance with manufacturer's instructions.
- C. Manhole and catch basin sealing systems shall be in accordance with manhole and catch basin schedules on the drawings.

#### 2.9 LAMPHOLES

- A. Lampholes shall be installed in accordance with the Plans.

### **PART 3 – CONSTRUCTION REQUIREMENTS (Not Used)**

## **PART 4 – MEASUREMENT AND PAYMENT**

### **4.1 CASTINGS AND COVERS**

- A. Furnishing and installation of castings for manhole, catch basin, and other similar structures shall be considered incidental to the structure that they are installed on.

### **4.2 CHIMNEY SEALING SYSTEMS**

- A. The furnishing and installing of chimney sealing systems on new structures, including extensions if needed, shall be considered incidental to the structure they are installed on.

### **4.3 EXTERNAL JOINT SEAL**

- A. The furnishing and installing of external joint seals on new structures shall be considered incidental to the structure they are installed on.

### **4.4 CONSTRUCT MANHOLE**

- A. Payment for constructing manholes of each diameter and type, at the appropriate contract price, shall be compensation in full for all costs of furnishing and installing the structure in the ground complete, as specified. Manholes will be paid per each unit installed, complete with casting. No measurement of length (depth) will be made. A maximum of four (4) adjusting rings shall be considered incidental to the manhole structure.

### **4.5 CONSTRUCT CATCH BASIN**

- A. Catch basins will be paid at the contract unit price per each unit furnished and installed as specified, complete with casting. Payment shall be compensation in full for all costs of furnishing and installing the structure in the ground complete, as specified. A maximum of four (4) adjusting rings shall be considered incidental to the inlet structure.

### **4.6 CONSTRUCT OUTSIDE DROP**

- A. Payment for constructing outside drop shall be at the contract unit price for each complete unit as shown in the Plans. A complete unit includes drop pipe, fittings, concrete horse shoes and concrete fill.

### **4.7 CONSTRUCT DRAINAGE STRUCTURE SPECIAL (LAMPHOLE)**

- A. Payment for constructing lamphole shall be at the contract unit price for each complete unit as shown in the Plans. A complete unit includes PVC fittings, PVC riser pipe, casting, and concrete encasement.

### **4.8 CONSTRUCT JUNCTION BOX**

- A. Payment for constructing a junction box at the appropriate contract price, shall be compensation in full for all costs of furnishing and installing the structure in the ground complete, as shown in the plan details. Junction boxes will be paid per each unit installed, complete with casting. No measurement of length (depth) will be made. A maximum of four (4) adjusting rings shall be considered incidental to the structure.

**END OF SECTION**

## SECTION 02720 – STORM SEWER SYSTEM

### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- A. This work shall consist of the construction of storm sewer systems and culverts, using plant fabricated pipe and other appurtenant materials, for the conveyance of stormwater. All construction and materials shall be in accordance with MnDOT 2501 Pipe Culverts, MnDOT 2503 Pipe Sewers, and these Special Provisions.

#### 1.2 RELATED SECTIONS

- A. Section 02221 – Trenching, Backfilling, and Compacting
- B. Section 02606 – Manholes and Catch Basins

#### 1.3 SUBMITTALS

- A. Submit names of pipe manufacturer and supplier
- B. Submit shop drawings of pipe and joint material

#### 1.4 DELIVERY, HANDLING, AND STORAGE

- A. Avoid damage during delivery, handling, and storage, in accordance with manufacturer's recommendations.
- B. All material found during the progress of work to have cracks, flaws, or defects will be rejected by the Engineer. The contractor shall promptly remove all such material from the project site.
- C. The contractor shall be responsible for the safe storage of material furnished by or to him, accepted by him, and intended for the work, until it has been incorporated into the completed project.

### PART 2 - MATERIALS

#### 2.1 GOVERNING DOCUMENTS

- A. The materials used in this work shall conform to the requirements for class, kind, and size of material specified below, or as altered, or as more specifically described in the Contract Documents. Where the American Society of Testing and Materials (ASTM), American Standards Association (ASA), American Water Works Association (AWWA), Federal Specifications, or Minnesota Department of Transportation (MnDOT) Standard Specifications for Construction are referred to or cited, the latest published revisions shall apply.

#### 2.2 MATERIAL ACCEPTANCE

- A. All materials, whether furnished by the Owner or by the contractor, are subject, at the discretion of the Owner, to inspection and approval at the plant of the manufacturer.



- B. During the process of unloading, all pipe and accessories shall be inspected by the contractor for loss or damage in transit. No shipment of material shall be accepted by the contractor until or unless notation of any lost or damaged material shall have been made on the bill of lading by the agent of the carrier.

## 2.3 PIPE MATERIALS

### A. High Density Polyethylene Pipe (HDPE)

- 1) HDPE pipe and fittings shall be Type S (corrugated exterior wall and smooth interior liner) and shall conform to AASHTO M 294 for twelve (12) inch to forty-eight (48) inch diameter pipe or to AASHTO MP7 for sixty (60) inch diameter pipe. The design of the joints shall be bell and spigot ends with gasket meeting ASTM F 477.
- 2) Pipe shall be ADS N-12 or approved equal. All HDPE pipe material furnished shall conform to the current edition requirements of AASHTO M294, be certified through the Plastic Pipe Institute (PPI) Third Party Certification program, and bear the Third Party Administered PPI seal.
- 3) HDPE shall only be allowed when specified in the drawings and/or Schedule of Prices.

### B. Reinforced Concrete Pipe (RCP)

- 1) RCP shall conform to the latest requirements of ASTM Specification C-76, C-506 or C-507, and AASHTO M 170 (Circular Pipe) and AASHTO M 206 (Pipe Arch) for the appropriate type and class of pipe, as noted in the drawings and in the Schedule of Prices.
- 2) All RCP shall conform to MnDOT Standard Plate No. 3006G. The pipe joints shall be clean and dry and shall be lubricated and joined in accordance with the manufacturer's instructions.
- 3) The date of manufacture shall be marked on all pipe sections.
- 4) When tie rods are required, "Polk County" style tie rods, as manufactured by Haala Industries, shall be furnished.

### C. Corrugated Steel Pipe

- 1) The pipe shall be sixteen (16) gauge. The pipe shall conform to the requirements of MnDOT Specification 3226 and AASHTO M36.

### D. Polypropylene Pipe (PP)

- 1) Polypropylene compound for pipe and fitting production shall be impact modified copolymer meeting the material requirements of ASTM F2736, Section 4, ASTM F2881, Section 5 and AASHTO M330, Section 6.1, for the respective diameters, as noted in the drawings and in the Schedule of Prices.
- 2) Pipe shall be joined with a gasketed integral bell & spigot joint meeting the requirements of ASTM F2736 or F2881, for the respective diameters. 12- through 60-inch (300 to 1500 mm) shall be watertight according to the requirements of ASTM D3212. Spigots shall have gaskets meeting the requirements of ASTM F477. Gasket shall be installed by the pipe manufacturer and covered with a

removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly. Pipe shall also have a reinforced bell with a polymer composite band installed by the manufacturer.

- 3) 12- through 30-inch pipe shall have a smooth interior and annular exterior corrugations and meet or exceed ASTM F2736 and AASHTOM330.
- 4) 36- through 60-inch pipe shall have a smooth interior and annular exterior corrugations and meet or exceed ASTM F2881 and AASHTOM330

### **PART 3 – CONSTRUCTION REQUIREMENTS**

#### **3.1 GENERAL**

- A. All installations shall be made according to the requirements of MnDOT 2451 and Section 02221 of this Project Manual, as they relate to the excavation, foundation construction, and backfilling of prefabricated structures and shall apply together with the additional requirements or modifications contained herein.

#### **3.2 LAYING PIPE**

##### **A. General**

All pipe shall be laid and maintained to the required lines and grades with manholes at the required locations and with joints centered and spigots home. Pipe laying shall proceed upstream at the line and grade, as noted on the drawings. Bell or grooved ends shall be laid facing upgrade. The grade board method or laser beam method shall be used for line and grade on all mainline sewer. Holes shall be excavated for bells, so that the barrel of the pipe seats firmly against the bottom of the trench. While the centerline of the sewer has been determined with reasonable accuracy, the Engineer reserves the right to make minor adjustments in sewer and manhole locations. No deviation shall be made from the required line or grade, except with the written consent of the Engineer.

##### **B. Pipe Kept Clean**

All foreign matter or dirt shall be removed from the inside of the pipe before it is lowered into its position in the trench and it shall be kept clean by approved means during and after laying.

##### **C. Preventing Trench Water from Entering Pipe**

All openings along the line of sewer shall be securely closed, as directed, and at the suspension of work at any time, suitable stoppers shall be placed to prevent earth or other substances from entering the sewer.

##### **D. Unsuitable Conditions for Laying Pipe**

No pipe shall be laid in water or when the trench conditions are unsuitable for such work, except by permission of the Engineer.

In some instances, natural, suitable bedding material may not be encountered during the normal excavation of the trench. When the material encountered is determined, by the Engineer, as unsuitable, the contractor shall provide and place approved available bedding from surplus material stockpiled from previous excavation or other excavation then in

progress on the project, at no additional compensation.

E. Protecting Underground and Surface Utilities

Temporary support, adequate protection, and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of the work shall be furnished by the contractor, at his own expense, under the direction of the Engineer.

F. Deviations Occasioned by Other Utility Structures

Wherever existing utility structures or branch connections leading to main sewers or to main drains, or other conduits, ducts, pipes, or structures present obstructions to the grade and alignment of the pipe, they shall be permanently supported, removed, relocated, or reconstructed by the contractor through cooperation with the owner of the utility, structure, or obstruction involved. In those instances where their relocation or reconstruction is impractical, a deviation from line and grade will be ordered and the change will be made in the manner directed.

3.3 PIPE TIES

A. Pipe tie back rods shall be, at a minimum, installed between the last four (4) segments (three [3] sets of rods) of RCP pipe which daylight to exposed grades.

B. Install additional tie rods as indicated in the drawings.

3.4 BACKFILLING

A. General

Backfill will include placement and compaction of material in the trench from the top of the bedding to the bottom of the street surfacing or finished grade. All backfilling shall be performed in accordance with MnDOT 2451 and Section 02221 of these Special Provisions.

3.5 CLEANING

A. Clean debris from all pipe, manholes, and inlets upon completion of grading and/or paving operations.

3.6 DEWATERING FOR CONSTRUCTION

A. The contractor shall provide all equipment and personnel necessary to conduct dewatering operations, which are required for the proper completion of the work. The contractor shall prepare a dewatering plan and submit it to the Owner for review prior to starting dewatering operations. The plan shall include a description of the proposed dewatering methods and maps or drawings indicating the locations of dewatering facilities and the points of surface discharge of the water. Review of the dewatering plan does not relieve the contractor of the dewatering requirements stated in these Special Provisions.

B. The contractor will be responsible for obtaining a water appropriation permit from the Department of Natural Resources (DNR) and complying with all requirements contained in said permit. The contractor shall forward a copy of the approved permit to the Engineer prior to beginning dewatering activities.

C. Dewatering shall be done in a manner, which ensures safe working conditions and provides

stable trench side slopes and trench bottom for adequate support of the pipe and appurtenances. The contractor must dewater sufficiently to minimize or eliminate groundwater pressures below the proposed trench bottom, which otherwise may tend to cause a boiling or "quick" condition at the trench bottom. Where silty sands or other impervious soils are encountered at and/or below the pipe zone, the dewatering equipment must be adequate to relieve the groundwater pressure below the impervious soil layer and accomplish sufficient drainage of the impervious soils to provide a stable trench bottom.

- D. All dewatering shall comply with the requirements of the project's Stormwater Pollution Prevention Plan (SWPPP).
- E. The contractor shall notify the Engineer at least three (3) days in advance of any proposed changes in his dewatering plan.
- F. If the trench bottom is otherwise suitable firm material but becomes soft and muddy due to the presence of water, through the fault or negligence of the contractor, the soft material shall be removed to firm natural soil or as the Engineer directs. Such excavation and disposal of soft material and subsequent replacement with granular material to stabilize the trench bottom shall be classed as incidental work.
- G. All dewatering shall be considered incidental to the sewer construction and no direct payment will be made therefore.

#### **PART 4 – MEASUREMENT AND PAYMENT**

##### **4.1 EXCAVATION AND BACKFILL**

- A. All sewer trench excavation and backfill shall be classed as incidental work, except when identified as unit bid items.

##### **4.2 STORM SEWER PIPE**

- A. Removal and reinstallation of 1- 36" CPP. No measurement will be made for this item. Payment will be lump sum per the bid price.

##### **4.3 INCIDENTAL ITEMS**

- A. Incidental work for which no direct compensation shall be made consists of, but is not limited to, the following items:
  - 1) Dewatering
  - 2) Connection to existing storm sewer systems and manholes
  - 3) Tie rods
  - 4) Granular bedding material

**END OF SECTION**

## SECTION 02940 – SEEDING AND SODDING

### PART 1 - GENERAL

#### 1.1 WORK INCLUDES:

- A. Topsoiling
- B. Fertilizing
- C. Seeding
- D. Mulching
- E. Bonded Fiber Matrix
- F. Watering

#### 1.2 UNIT PRICES

- A. Seeding: paid at unit price per acre
- B. Bonded Fiber Matrix: paid at unit price per acre
- C. Topsoil, fertilizing, and watering: incidental to work and not paid for directly

#### 1.3 ENVIRONMENTAL CONDITIONS

- A. Seeding: do not seed when wind exceeds fifteen (15) miles per hour (mph), on standing water or frozen ground, or when soil is excessively wet.

### PART 2 - MATERIALS

#### 2.1 MATERIALS

- A. Topsoil: shall be natural soil; loose; friable loamy; free of subsoil, toxic substances, objectionable weeds, debris larger than one (1) inch in diameter; and has produced healthy crops or grasses.
- B. Fertilizer: shall be 5-10-5
- C. Seed: shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act. Wet, moldy, or otherwise damaged seed will not be accepted. Weed seed not to exceed 0.5 percent of total mixture. Mixture and minimum purity requirements as follows:

#### Mix 2 (Parks, Boulevards, Lawns)

Grass Species	% By Weight	Purity	% Pure Live Seed
Glade Kentucky Blue	25	90	80
Park Kentucky Blue	25	90	80
Creeping Red Fescue	25	90	80
Perennial Rye Grass	25	95	90

Rate of Seeding = 220 pounds per acre

**Mix 3 (Ditch Mix)**

<b>Grass Species</b>	<b>% By Weight</b>	<b>Purity</b>	<b>% Pure Live Seed</b>
Brome Grass	25	85	85
Western Wheat	10	90	75
Crested Wheat	10	90	85
Rye Grass	55	99	90

Rate of seeding = 90 pounds per acre

- D. Mulch
  - 1) Hydromulch: hydromulch shall be a wood cellulose fiber (not sawdust). The mulch shall have an approved tacking and bonding agent to ensure long lasting stabilization and reduce erosion potential. The tackifier shall be installed per the manufacturer's recommendation.
- E. Bonded Fiber Matrix (BFM): BFM shall be commercially available matrix for use in spray applications. BFM shall be "Soil Guard," manufactured by Weyerhaeuser or an approved equal.
- F. Watering: seeding shall be watered daily until a good stand of grass is obtained. Sodding shall be watered daily for a minimum of two (2) weeks and until roots are sufficiently attached to topsoil. Watering shall be considered incidental to the seeding quantity.

**PART 3 – CONSTRUCTION REQUIREMENTS**

**3.1 EXAMINATION**

- A. Verify locations to be seeded or sodded free of stones, sticks, roots, and other debris. Any debris shall be disposed of by the contractor at no additional cost to the Owner.

**3.2 PREPARATION**

- A. Topsoiling: shape area to required cross section and contour and place topsoil to an average minimum depth of six (6) inches.
- B. Included in the price of the sod shall be all work, materials, labor, and equipment necessary to bring all yards and boulevards to an elevation and grade such that there is continuous positive grade towards the roadway throughout the affected areas. Contractor to expect that fill, in the form of topsoil, will need to be hauled in. This is expected in areas where the curb or sidewalk is being mudjacked or replaced.
- C. Fertilizing: fertilizer shall be applied prior to seeding. Apply fertilizer uniformly and at a rate of ten (10) pounds per 1,000 square feet (SF) and work into topsoil.
- D. Seeding: soil shall be moist when seeding. Seed shall be mechanically sown with a drill or Brillion type seeder. Seed may be broadcast sown in small areas and covered one-half (½) inch by a harrow or approved device. Apply seed uniformly at the specified rate for the mix.
- E. Mulch
  - 1) Hydromulch: shall be spray applied to the seeded soil to provide uniform coverage while allowing percolation of water to the seedbed. Hydromulch shall be applied at a rate of 2,000 pounds/acre (based on the dry weight of mulch).



- 2) Straw Mulching: shall be applied by a mechanical blower that provides uniform coverage of the seedbed. Straw mulching shall be applied at a rate of 4,000 pounds/acre. Straw mulching shall be anchored by punching with a mulch tiller that anchors the mulch three (3) inches into the ground. Anchoring the mulch shall be considered incidental to the price bid for mulching.
- F. Bonded Fiber Matrix: BFM shall be spray applied to the seeded soil to provide uniform coverage and stabilization of the seedbed. BFM shall be applied in two (2) equal lifts perpendicular to each other. The total application rate of the two (2) lifts shall be 3,500 pound/acre for slopes (based on dry weight of matrix).
- G. Watering: seeding shall be watered daily until a good stand of grass is obtained. Sodding shall be watered daily for a minimum of two (2) weeks and until roots are sufficiently attached to topsoil.

### 3.3 PROTECTION

- A. Damaged or dead seeded or sodded areas shall be replaced, at no expense to the Owner, for a period of sixty (60) days after final acceptance has been made.

## PART 4 – MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No measurement will be made as to the area or quantity of turf establishment.
- B. The contractor is responsible for estimating the area, prior to submission of a bid, which will require turf establishment based on intended construction techniques, proposed contract work, and other construction related factors.

### 4.2 PAYMENT

- A. Turf Establishment
  - 1) Payment for turf establishment, including all seed, seeding, mulch, fertilizer, maintenance, topsoil placement, and preparation shall be paid under the Lump Sum (LS) bid item "Turf Establishment." Payment includes the restoration of all areas disturbed by the project, including borrow and stockpile areas and stormwater retention areas. Payment for erosion control blanket will be paid separately.
  - 2) The Engineer may withhold up to twenty-five (25) percent of the Lump Sum (LS) payment for Turf Establishment until acceptance of the turf has been made.
- B. Erosion Control Blanket: will be paid on a square yard (SY) basis at the contract unit price. Measurement and resulting payment will not include overlapped or buried portions as required for proper installation.
- C. In the event that additional turf establishment is required, due to the change in project scope, the additional materials will be paid at contract unit prices. Deductions will be made for a reduction in turf establishment requirements at the same prices. Additional payment will only be paid for significant changes to the project scope from the original bidding documents. The contractor shall obtain written approval from the Engineer prior to beginning any work for which a claim will be made for additional turf establishment.



**END OF SECTION**

## SECTION 11213 – SURFACE WATER PUMP

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. One (1) axial flow pump and driver.

#### 1.2 RELATED SECTIONS

- A. Division 3 - Concrete.
- B. Division 16 - Electrical.

#### 1.3 UNIT PRICES

- A. Incidental to Surface Water Pump Station and not paid for directly.

#### 1.4 DESIGN REQUIREMENTS

- A. Pump capacity is 7500 gpm at 15' TDH. The pump shall be capable of smooth operation from 5' to 17' TDH.
- B. The pump manufacturer shall determine and add the internal pump losses to the total head at the best efficiency point to determine the actual pump TDH.
- C. 60 HP minimum, 460V, 3 phase, 500 rpm minimum, 1.15 service factor.
- D. Pump discharge shall be located below the baseplate.
- E. Plain end discharge connection with two tie rod brackets, 180 degrees apart, to prevent separation. Connection to discharge line shall be made with a cast coupling.
- F. Pump shaft and line shaft shall be of sufficient diameter to transmit the required horsepower.
- G. Automatic, oil lubricated, with oiler controlled by a solenoid valve.
- H. Component parts shall be interchangeable with parts of like equipment.
- I. The complete unit shall operate free of excessive vibration, cavitation, and noise.
- J. The pump driver shall be a high efficiency electric motor, capable of driving the pumps through the full operating range without overloading at any point on the pump curve.
- K. All pumps must be equipped with non-reverse ratchets to prevent damage to the pump and driver in event of reverse flow.

#### 1.5 SUBMITTALS

- A. In accordance with Section 01300.
- B. Shop drawings.
- C. Manufacturer's factory certified test curve of actual pump being supplied.
- D. Manufacturer's operation and maintenance manuals.

## 1.6 QUALITY ASSURANCE

- A. The pumps shall be in accordance with Hydraulic Institute Standards. Manufacturer shall be a member of the Hydraulic Institute. Suitably designed for the specified service with successful installations for over five years.
  - 1. If requested, the manufacturer shall provide a list of similar installations and references.
- B. The pump and motor shall be new and the standard product of a reputable manufacturer with all components furnished by the pump manufacturer.
- C. The local authorized representative shall have full maintenance capabilities available on 24-hour call. Component parts required to maintain satisfactory operation shall be available if needed without undue delay.

## PART 2 PRODUCTS

### 2.1 PUMPS

- A. Approved manufacturers:
  - 1. Cascade, Model 24P
  - 2. Prime, Model P-16A
  - 3. Crisafulli, Model L16-C
- B. Bowl assembly.
  - 1. Flared inlet design with sufficient number of vanes to support the bearing housing.
  - 2. Sleeve type bronze bearings.
  - 3. Furnished with an oil seal such that shaft enclosing tube is flooded with oil at all times.
  - 4. Grease packed suction ball bearing protected by a sand collar.
  - 5. Bronze impeller, trimmed to the duty point.
  - 6. Stainless steel pump shaft.
  - 7. Equipped with a drain port to allow drainage of water through pump bowl bearing.
  - 8. Stainless steel lined suction bell to improve wearability.
- C. Column assembly.
  - 1. Horizontal underground discharge pipe, location as shown on the Drawings.
  - 2. Capable of supporting the driver.
  - 3. Fabricated mild steel (1/4-inch minimum thickness) discharge elbow and column.

- a. Length of column pipe as shown on the Drawings.
    - b. Long radius discharge elbow.
  - 4. Carbon steel line shaft, ground and polished.
    - a. Bronze alloy, machine threaded and grooved line shaft bearings for proper lubrication. Line shaft bearings shall serve as couplings for the shaft tubing, spaced as required to shaft alignment.
    - b. The shaft enclosing tube shall be of sufficient diameter to provide adequate lubrication under any operating condition.
    - c. Shaft couplings shall have left handed threads to tighten during pump operation.
- D. Pump driver.
  - 1. High efficiency, electric motors, conforming to NEMA specifications and bearing the nameplate of the manufacturer.
  - 2. Quiet operation under all conditions, guaranteed to operate continuously at full-rated load and speed.
  - 3. Totally enclosed, fan cooled, weatherproof with grease lubricated ball bearings.
- E. Pump lubrication.
  - 1. Equipped with a two quart oiler, attached to the motor base.
    - a. Solenoid controlled to provide automatic lubrication when the pump starts operating.
  - 2. Suction ball bearing shall be equipped with a grease line and Alemite fitting at the baseplate.
- F. Painting.
  - 1. Pump and motor.
    - a. Manufacturer's standard surface preparation and high solids epoxy finish and color.
    - b. Provide one quart of touch-up paint - each color.

## 2.2 LIQUID LEVEL FLOAT SENSORS

- A. See Division 16 - Electrical.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Install pumps as shown on the Drawings and in accordance with manufacturer's instructions and recommendations.

- B. The solenoid controls and pump motor shall be wired according to the pump manufacturer's wiring diagrams.
- C. Identify and report any deficiencies immediately as they are noted to the Owner's project representative.

### 3.2 TESTING

- A. Prior to shipping, provide certified performance curves of each pump in accordance with the Hydraulic Institute Standards, latest edition. Curves shall be submitted for approval 20 working days prior to shipping.
- B. Each pump shall be field tested on site with water after installation at the Contractor's expense before acceptance.

### 3.3 START-UP

- A. A factory-trained representative shall be present at the time when the station is put into service and turned over to the Owner.
  - 1. Instruction shall be provided in the proper operation and maintenance of equipment.
  - 2. Representative shall prepare and submit a written report of start-up services to the Owner.
  - 3. Factory representative shall return to the job site at least once after official start-up to review instructions previously given at a time to be determined by the Owner.

**END OF SECTION**

## SECTION 16883 – SURFACE WATER PUMP CONTROL PANEL

### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- A. The Contractor shall provide a complete and properly operating lift station pump control panel to control the surface water lift station pumps, including associated field instrumentation, as described by this specification and as detailed on the drawings. Equipment shall be furnished as required and shall include all incidental items necessary to provide these requirements, even though not detailed herein. Materials and services of this section shall be provided by one (1) manufacturer who must accept full responsibility for this section in writing. This manufacturer shall provide evidence of recognition by Underwriters Laboratories, Inc. under File UL 698A, Industrial Control Panels Relating to Hazardous (Classified) Locations and be capable of providing a UL label on the completed assemblies. For the purpose of this section, “manufacturer” is defined as a company with an engineering department, production, fabrication, and testing facilities suited for the work specified. Equipment shall meet the requirements of the latest edition of the National Electrical Code, where applicable.

#### 1.2 RELATED SECTIONS

- A. Section 02221 – Trenching, Backfilling, and Compacting
- B. Section 11213– Surface Water Pump Station

#### 1.3 REFERENCE STANDARDS

- A. NECA 1 – Standard for Good Workmanship in Electrical Construction; latest edition.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); latest edition.
- C. UL 698A - Standard for Industrial Control Panels Relating to Hazardous (Classified) Locations; latest edition.
- D. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions; latest edition.
- E. NFPA 70 - National Electrical Code; Most Recent Edition adopted by Authority Having Jurisdiction, which is the ND state electrical board; latest edition.
- F. NFPA 70E – Standards for Electrical Safety in the Workplace; latest edition.
- G. State Code – Minnesota State Electrical Board Laws, Rules, and Wiring Standards of Minnesota; latest edition.

#### 1.4 SUBMITTALS

- A. The Contractor shall submit an electronic set of Shop Drawings, in “.pdf” format, to the Engineer for review and approval. The drawings shall include:
  - 1) Clearly indicate control and power connection points. Provide ladder type control drawings.
  - 2) Dimensioned drawings, wiring diagrams, and piping drawings for all field mounted equipment.

- 3) Control panel fabrication and nameplate legend drawings, internal panel wiring diagrams, and schematic drawings.
- 4) Complete system schematic drawings illustrating all components being supplied, complete with electrical interconnections.
- 5) Control panel layout, component location, and dimensional drawings, including panel outer doors, inner doors, and back panels.
- 6) Specification details of each component and field device with manufacturer and complete model or part number.
- 7) Provide reference list in bill of materials form. Any devices without listing a manufacturer and part/model number will not be acceptable and are determined to be proprietary or lacking manufacturer's service and support.
- 8) The Contractor shall submit software configuration information to the Engineer for review and approval. The information shall include:
  - 10) A detailed description of the control system of the main system, all subsystems, and their interactions.
  - 11) Drawings and/or screen prints of proposed SCADA and/or operator interface screens including indication on flashing icons, color of icon during normal and alarm conditions, etc.

#### 1.5 APPROVED MANUFACTURERS

- A. The manufacturer of the control panel shall be Lindsay Corporation (FieldNET), Omaha, Nebraska [402-829-6800]; SJE Rhombus, Detroit Lakes, Minnesota [1-888-342-5753]; Sweeney Controls, Fargo, North Dakota [701-232-3644]; Integrated Process Solutions, Inc., Fosston, Minnesota [218-435-1703], Quality Control & Integration Inc., New Prague, MN [952-758-9445].

#### 1.6 WARRANTY

- A. The manufacturer of the control panel shall furnish a limited warranty on the complete control panel, field equipment, and accessories for a period of eighteen (18) months from the date of shipment or twelve (12) months from startup (whichever occurs first), that all equipment shall be free from defects in design, materials, and workmanship. The manufacturer shall correct deficiencies for any component proven defective, whether of his or other manufacture during the warranty period, excepting only those items which are normally consumed in service, such as (but not limited to) light bulbs, oil, grease, packing, etc. Such corrections will be made at no cost to the Owner.

#### 1.7 OPERATION AND MAINTENANCE MANUALS

- A. The Contractor shall submit detailed installation and user instructions for its product, submit evidence of an established service program including complete parts and service manuals for operation and maintenance. The data shall include:
  - 1) Individual operations, maintenance instruction bulletins, and parts lists for each piece of equipment.
  - 2) "As built" system schematics/drawings illustrating all components being supplied,

complete with hydraulic, pneumatic, and electrical interconnections.

- 3) A detailed description of the control system of the main system, all subsystems, and their interactions.
  - 4) Electronic copies of all configurations, programs, and other such information required for the system to properly operate.
  - 5) Tabular information indicating all network addresses for any communication protocols which are utilized by the system.
  - 6) All other information that the system manufacturers feels will assist the Owner.
- B. Furnish three (3) copies of the Operation and Maintenance (O&M) Manuals to the Owner and one (1) copy to the Engineer.

#### 1.8 SPARE PARTS

- A. Provide two (2) spare fuses of each type and amperage utilized in the control panel.
- B. Provide one (1) spare LED bulb of each color utilized in the control panel.
- C. Provide one (1) spare float with cable equal to that specified in this section.

#### 1.9 PACKAGING AND MARKING

- A. Installation instructions shall be furnished with the station.

#### 1.10 CALIBRATION, ADJUSTMENT, QUALITY ASSURANCE, AND TESTING

- A. Devices requiring field calibration shall be calibrated in presence of Owner's representative and documented.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction. Conform to requirements of the NRTL, NFPA 70, and NFPA 70E.

#### 1.11 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- B. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70 (refer to article 110).
- C. Coordinate minimum sizes of enclosures and boxes with the actual installed arrangement of user interface devices, support fittings, and conduit locations.
- D. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- E. An Electrical Contractor licensed in Minnesota shall oversee and perform all electrical work and installations in the field. The Electrical Contractor shall obtain all required licenses, fees, permits, and inspections. Costs are the responsibility of the Electrical Contractor.



## PART 2 - MATERIALS

### 2.1 CONTROL

- A. The control panel shall be constructed in accordance with Underwriter's Laboratories (UL) Standard 698A—"Industrial Control Panels for Hazardous Locations" and applicable portions of UL Standard 913—"Intrinsically-Safe Apparatus and Associated Apparatus for use in Class I, II, and III, Division 1, Hazardous Locations". The control panel shall be constructed in a facility sanctioned by Underwriters Laboratories to provide a UL-recognized control panel. Each completed panel shall include a UL label indicating acceptance under Standard 698A and/or UL 508 (as applicable).
  - 1. Provide a serialized UL label inside the panel indicating UL acceptance.
- B. Control, alternation, logic functions, alarms, and all other functions shall be performed with proven field experience and relay logic as described herein and detailed on the drawings. Furnish and install a complete, storm water lift station control panel and field instruments.
- C. The systems manufacturer/integrator shall assume responsibility for proper installation and functioning of the equipment and assist in startup and commissioning of the Pump Station. The systems manufacturer is responsible for a fully functional control system including all programming for the main control panel and starters.
- D. The control cabinet and interior components shall be rated for temperatures experienced in the area (ambient temperature of -48°F to 114°F). Provide an enclosure heater and/or cooling equipment if internal components are not rated for operation in such temperatures.

### 2.2 ENCLOSURE

- A. The described equipment shall be housed in a NEMA 3R (or higher rated) Stainless Steel enclosure. The enclosure shall be constructed of not less than fourteen (14) gauge Type 304 stainless steel. The enclosure shall be listed by Underwriters Laboratories, Inc (UL). The enclosure shall contain an interior back panel for mounting control panel components. The enclosure shall be designed specifically for mounting in an unprotected outdoor location. The enclosure shall be sufficiently sized for housing all control panel components without crowding, and the dimensions will be reviewed with the Engineer to determine feasibility in the location in which the panel shall be installed.
- B. The enclosure shall have a gasketed (oil-resistant), hinged (stainless steel piano type), front weather door with locking 3-point latch. The door(s) shall have a manual stop to remain open at ninety (90) degrees without being held open. The inside of the door shall have a pocket for holding control panel drawings.
- C. The enclosure shall have a full height internally mounted hinged dead front panel. All the components normally accessed by operating personnel shall be accessible without opening the dead front. Dead-front to be hinged and have tool-less opening access.
- D. Provide a ventilated, louvered skirt and twenty-four (24) inch legs for the enclosure.
- E. All conduits, fittings, or connections shall enter the enclosure through the bottom only for any outdoor enclosure. Except for the service entrance, which must be segregated.
- F. An equipment ground lug shall be provided for grounding the enclosure. The ground lug shall be suitable for the service provided to the enclosure sized per the NEC. In all cases, the enclosure must be adequately grounded per article 250 of NEC.

## 2.3 WIRING AND TERMINALS

- A. All wiring shall have not less than 600 volt insulation and all power wiring and bus shall be in complete conformity with the National Electric Code and State, Local, and NEMA electrical standards. All wiring shall be neatly trained and laced. Control wiring shall be color coded and wire numbered. All wires shall be numbered. Color coding is:

Black	Phase Power (120 Volts to Ground)
Blue	Phase Power (120 Volts to Ground)
Orange	High Leg (208 volts) per NEC 110.15, and only high leg.
White	Neutral, and only neutral (as required by NEC).
Green	Equipment Ground, and only grounds (as required by NEC).
Other Colors	Switched, Low Voltage DC, Controls, Miscellaneous, etc.

- B. All control wiring shall be contained within plastic/PVC wiring duct with covers. Where dimensional constraints prevent the use of wiring duct, wires shall be trained to panel components in groupings. The wire groupings shall be bundled and tied not less than every three (3) inches with nylon self-locking cable ties as manufactured by Panduit or equal.
- C. Every other cable tie shall be fastened to the enclosure door or inner device panel with a cable tie mounting plate with pressure tape. Where wiring crosses hinged areas, such as when trained from the inner device panel to the enclosure door, spiral wrap shall be used.
- D. All connections shall be made at approved terminal blocks (barrier-type) with mechanically printed marker strips. Hand-written markers are not acceptable. All terminal blocks for control wiring shall have minimum continuous current capacity of 25A at rated voltage 600VAC/VDC. The minimum size of terminal blocks shall be 5mm in width and be suitable for clamping wire between 22 and 12 AWG. Control circuits requiring more than 25A or wire larger than 12 AWG may be of a different style. The clamping unit inside the terminal block shall secure wire by means of positive screwing system. No terminals shall have more than two wires per compression location. Blocks must be UL recognized.
1. Power wiring shall be terminated on barrier type blocks sized for the application.
- E. There shall be fifteen (15) percent spare terminals (minimum of ten [10]) provided in panel.
- F. All terminals and conductors shall be labeled in correlation with control panel drawings.
- G. Comply with NEC 408.3 regarding the 208 Volt high leg for open delta connected service. The "B" phase shall be the phase having the higher voltage to ground. Provide integral orange wire color insulation for the B phase per NEC 110.15. Label panel according to NEC 408.3(F)(1) and NEC 408.4.

## 2.4 INCOMING ELECTRIC UTILITY SERVICE

- A. The contractor is responsible for coordinating with the electric utility company for electric service. There will be no construction costs or utility fees for the new service. The following is a broken-out list of responsibilities between the different parties:
1. Utility Responsibility:
    - a. Transformers (open delta bank).
    - b. Primary Cable/new distribution lines and power poles.
    - c. Secondary Cable up to metersocket.
    - d. Trenching for the secondary cable.
    - e. LED light on power pole facing lift station.
    - f. All wiring and conduit on power pole.

- g. Meter.
- 2. Contractor Responsibility:
  - a. Metersocket (self-contained, 200 Amp, 3-phase, lever by-pass type).
  - b. Rigid steel conduit riser up to metersocket from a point 24" below ground.
  - c. Main disconnect equipment and cables from metersocket.
  - d. Coordination with utility in advance of construction. Notify utility no later than two (2) weeks after notice to proceed is issued.
  - e. All arrangements associated with installed the incoming electrical service to the metersocket shall be the responsibility of the electrical contractor.
- B. The service pole and metering will be done ahead of the lift station control panel. The lift station control panel shall be service entrance rated (SUSE).
- C. All metering shall be done ahead of the main disconnect and control panel. Where this specification deviates from those requirements the Contractor shall install in accordance with the power company requirements.
- D. The electrical service and control panel shall operate at 240 volts, three (3) phase, open delta w/ a center tap, sixty (60) Hz, no less than 200 Amps.
- E. The control panel shall include a neutral bus for terminating the service neutral, the grounding electrode conductor, and the equipment grounding conductors. The neutral bus shall be bonded to the control panel enclosure per NEC requirements.
- F. The control panel shall include a main circuit breaker for the service entrance. The circuit breaker shall be UL service entrance rated and labeled.

## 2.5 COMPONENTS

- A. Circuits Breakers
  - 1) Unless otherwise noted, breakers shall be molded case, thermal magnetic with a minimum 22,000 amp RMS symmetrical interrupting capacity at rated voltage. Breakers shall be UL labeled and sized as shown on the drawings.
  - 2) Branch Circuit Breakers shall be provided as follows:
    - a. Square D Type QOU, or equal
    - b. Provide a disconnect means and short circuit protection for any 120 VAC (or less) devices not powered from the motor starter circuit.
  - 3) Panel Main Circuit Breaker shall be provided as follows:
    - a. Square D Type PowerPact JD series, or equal
    - b. Service entrance rated
    - c. Additional details as noted in Service Entrance section above.
    - d. Provide adjustable AC magnetic trip with range between 5 and 10 multiplied by the rated current.
  - 4) Pump Motor Circuit Breakers shall be provided as follows:
    - a. Thermal-Magnetic, as recommended by the soft starter manufacturer.
    - b. Capable of being locked in the off position.
  - 5) Provide flush mounting arrangement to allow operator access to the circuit

breakers without opening the inner door of the control panel.

B. Surge Protection (SPD)

- 1) Provide a surge protection device meeting the requirements of ANSI/IEEE C-62.41 and C62.45 Category A, B, and C. Listed per UL 1449 (type 1 or type 2) with EMI/RFI noise filtering, and UL 1283 listed. Provide an SPD for the incoming power feed with 20 kA Nominal Discharge Current and Surge Current Rating no less than 60 kA per mode (120 kA per phase). Eaton SPD120240S2K series or equal.
- 2) Provide a control system surge protector. Provide a Critec, Phoenix Contact, or MTL MA15, or equal, power surge suppressor and filter protection for the PLC and SCADA circuitry. 120 Volt inline with 300V peak clamping voltage. Provide dry contact status indicator. Additional TVSS protection shall be provided whenever voltage is changed via transformer within the control panel at the secondary of the transformer.

C. Phase Loss Relay (Voltage Monitor)

- 1) The control panel shall include a phase loss, low voltage, phase reversal and phase unbalance relay with adjustable trip delay of one (1) to ten (10) seconds. The relay shall automatically reset upon restoration of normal power. The relay shall include contacts for trip indication, and shall be UL listed or recognized
- 2) Installed in accordance with manufacturer recommendations.
- 2) Symcom Motor Saver Model 102 series or equal.

D. Lightning Arrestor (Surge Capacitor)

- 1) Provide a lightning arrestor surge capacitor in addition to the surge protectors. Provide Delta CA603R or equal.

E. Motor Soft Starter

- 1) Application: submersible pumps with variable torque load.
- 2) Furnish and Install Digital Soft Starters (solid-state reduced voltage controller unit) for each pump motor to reduce water knock on the plumbing system and reduce mechanical stress on the pipe work and valves. Provide microprocessor based soft starters with built-in motor overload protection and silicon-controlled rectifiers (SCR). Units vary the conduction period and control the voltage (and therefore torque) to the motor during starting, running, and stopping. Once the motor is up to full speed and full voltage is applied to the motor, SCRs are bridged by their integral bypass contacts.
- 3) Manufacturer/Model: Allen-Bradley SMC-3 series, or approved equal.
- 4) Minimum Required Features:
  - a) Soft Start – output voltage is ramped from user-adjustable initial torque setting out to user selectable start time.
  - b) Current Limit – User adjustable current limit start by maintaining a constant current to the motor, 450% full load current is maximum allowed.
  - c) Soft Stop – Output voltage is ramped down from full voltage to zero voltage according to a user selectable ramp time. Coast to rest is also a selectable option.

- d) Integrated Bypass Contactor – Bridging of SCRs once motor reaches full voltage and speed.
  - e) Integrated Motor Overload Protection – Meeting requirements of NEC 430. Starter thermal overloads shall be microprocessor based.
  - f) DIP (dual in-line package) switches – Allowing setting of the start/stop profile, built in overload, connection type, selectable trip class (10, 15 or 20), and auxiliary contact characteristics for process optimization and setup efficiency.
  - g) Rotary Switch for selection of motor FLA. System integrator must set according to NEC 430 for the motor provided.
  - h) LED light to provide status information including fault type.
  - i) Push to reset/hold to test button to quickly test for fault conditions or reset the unit. Provide contact/solenoid for a remote reset button on the control panel dead front which can be operated without opening the dead front panel.
  - j) Provide auxiliary NO contact. Provide contacts as required to interface with the control panel dead front lights and pushbuttons. Provide “Running” (up to speed) and “Overload Fault” contacts.
  - k) Provide fan module as required for the ambient temperatures listed in section 2.1 of this specification.
  - l) 120 volts AC control power.
- 5) Minimum Required Ratings:
- a) Pump 1: 460 volts, 60 Hz, 3-phase, 1.3 service factor, 60 Hp, 108 Amps minimum.
  - b) Pump 2 (existing) 460 volts, 60 Hz, 3-Phase.
  - c) If for any reason motor full load current nameplate ratings are listed as higher than these values, then soft starters with higher ampere rating must be provided at no additional cost.
  - d) The contractor and system integrator are responsible for setting the soft starter motor overload settings to comply with NEC 430 and the motor manufacturer’s recommendations. Dip switch settings for trip class, connection type, and start/stop profile are also the responsibility of the contractor.
  - e) Rated impulse voltage: 6 kV.
  - f) Minimum Fault Current Rating: 10 kA.
  - g) Listed by an OSHA Nationally Recognized Testing Laboratory (NRTL). IEC ratings are not allowed as a substitute.
  - h) Provide heating and cooling, if necessary, of control cabinet so that soft starter operates and is stored within its environmental ratings. At a minimum, the soft starter shall have a +40°C maximum operating temperature. Refer to section 2.1 for site ambient temperatures.
  - i) 1.0 G peak operational vibration rating.
  - j) Provide fusing for control/auxiliary contacts if rating is less than control circuit.
- 6) Provide field testing of the soft starters when connected to the pumps. Contractor to field verify the operation of pumps with well full of water. Verify the overload buttons, control switches, indicator lights, and selector switch settings operate according to specification and manufacturer’s recommendations. Coordinate motor starter settings with the manufacturer and in accordance with NEC 430.

F. Pilot Devices

- 1) Pilot devices including, but not limited to, selector switches, pushbuttons, and indicating lights, shall be of the heavy duty, oil tight type, bearing a NEMA 4X rating, with press-to-test feature. The contacts shall meet NEMA rating A600. The devices shall be of 30 millimeter diameter. Unless noted otherwise the devices shall be mounted on the dead front panel and shall include a nameplate and escutcheon. The devices shall be Allen Bradley Bulletin 800T, Cutler-Hammer

Type T, or Square D Class 9001 units, or equal. Indicating lights shall be of the LED type with opaque colored lens. Selector switches shall be provided with the necessary number of positions required to provide the necessary functionality. Provide pilot devices as follows:

- 2) Selector Switches
  1. Pump #1: Hand-Off-Auto, rotary type.
  2. Cabinet Light: Hand-Off-Auto, rotary type.
  3. High Level Float: Momentary Rotary Test type.
  4. Low Level Float: Momentary Rotary Test type.
  5. Kill Pump Float: Momentary Rotary Test type.
  
- 3) Indicating Lights
  1. Pump #1 Pump Running (Green)
  2. Pump #1 Seal Fail (Yellow/Amber)
  3. High Water (Red)
  4. Low Level (Yellow/Amber)
  5. Power Ok (Blue)
  6. Refer to pushbuttons for additional requirements.
  7. Indicating lights must be large enough to allow hand replacement without the use of special tools. Provide an uninstalled spare light for each color installed.
  
- 4) Pushbuttons
  1. Pump #1 Pump Fail/Overload Reset (combo red indicating light)

#### G. Nameplates

- 1) Nameplates which identify pilot device functions shall be mounted on the dead front panel. Nameplates shall also be provided for circuit breakers and other devices mounted in the dead front panel which would be ambiguous without identification. Provide typed laminated engraved plastic or bakelite.
  - a) Label pump lights and switches.
  - b) Label all circuit breakers, lights, and switches on the deadfront.
  - c) Provide a typed etched nameplate on the panel to indicate the service, voltage, and high leg in accordance with NEC 408.3(F)(1) and NEC 408.4.
  - d) Provide a nameplate on the metersocket to indicate voltage and high leg.
  
- 2) A plastic-coated wiring diagram shall be supplied on the inner door of panel. Label all terminals and tag all conductors to correlate with wiring diagram.

#### H. Running Meters

- 1) An elapsed time meter for each pump shall be mounted on the dead front door. The meter shall operate on 120 VAC 60 Hz, shall indicate in hours and tenths of hours with six digits, and shall be non-resettable. The meter shall be circular and mount through a 2.18 inch diameter hole. Elapsed time meter shall be Redington Model 710, Engler model 700-002 or equal.

- 2) One meter shall be mounted on the dead front door to roughly record the number of gallons that have been pumped. Provide a non-resettable mechanical display. No flow meter will be installed. Calibrate the time each pump is running to estimate the number of gallons.

I. Enclosure Heat

- 1) The enclosure shall be provided with an internal heater that is UL listed. The heater shall be properly sized to maintain adequate temperature within the enclosure for all electronics mounted within the enclosure to operate within specification. The heater shall operate on 120 VAC and shall have adjustable integral thermostat control. Hoffman DAH series or equal.

J. Control Relays and Timers

- 1) Required control relays and timers shall be of the plug-in type and shall include the necessary sockets. Relays and timers shall be equipped with silver cadmium oxide contacts, a dust cover, and retaining clips. Relays and timers must be UL recognized. Coil ratings for relays and timers shall be clearly noted in the bill of materials. Insulation resistance shall be 1000 megohms, dielectric withstand shall be 2,000 VAC between non connected terminals.
- 2) Control relays shall be Allen Bradley 700-HB series, Idec RR series, or equal. Control relays shall be at least 3PDT, unless otherwise approved. Control relays shall have contacts rated at ten (10) amps.
- 3) Timers shall be Allen Bradley 700-HT series, NCC A1M series, or equal. Timers shall be at least DPDT, unless otherwise approved. Timers shall have contacts rated at ten (10) amps.
- 4) Provide all control relays and timers required for a fully functional system as described in the sequence of operations and the plans.

K. GFCI Receptacle

- 1) Provide an exterior cabinet mounted ground fault circuit interrupter (GFCI) type convenience receptacle rated at twenty (20) amperes. Provide "in-use" type cover to meet NEC requirements for outdoor locations. Only the cover shall extrude from the cabinet, boxes are not permitted to be installed exterior to the cabinet.

L. Intrinsically Safe Barriers and Relays

- 1) Provide intrinsically safe barriers and relays for all level instrumentation, float switches, and other devices levels which extend into the wet well at the sanitary lift station. Devices shall be panel mounted and UL 913 (6<sup>th</sup> Edition) listed for use in Class I, Division I, Groups A, B, C, D, hazardous atmospheres. The isolation barriers and relays as well as all other components in the control panel shall be factory installed in accordance with UL 698A.

M. Non-Alarm Light

- 1) Furnish and install a steady-burn Green LED light on the exterior of the control panel, but side mounted to the enclosure, to operate whenever there are no alarm or trouble conditions. A lit green light indicates system is normal.
- 2) Light shall be rated for cold temperatures down to -50°C ambient, fully

weatherproof IP66 NEMA 4X, heavy-duty corrosion resistant aluminum construction, shall not exceed 30 watts, UL listed, shock and vibration resistant, 120VAC operation, and long-life 60,000 hour LED light source with metallic lens guard. Provide high intensity LED source that can be seen during the day, 165 effective candela minimum.

- 3) Furnish and install Federal Signal 191XL series with LHWB side mounting bracket or approved equivalent.

N. Pump Seal Fail and Temperature Protection

- 1) Provide device or module to monitor submersible pumps for seal failure or overtemperature shall be installed within the control panel (for example, Flygt MiniCAS solid state device, ABS Sealminder, or equal). Upon an over-temperature condition, the inner door mounted pilot light will illuminate (the exterior green light will turn off) and the motor shall shut down. When the temperature reaches an acceptable level, the pump shall automatically re-start. Upon seal failure condition, the pump shall continue to run and the inner door mounted pilot light shall illuminate (and the exterior green light will turn off).

O. Cabinet Interior Light

- 1) Provide an interior white LED cabinet light. Mount at top of cabinet interior to outer door, but exterior to dead-front door. Light shall be 120 volts, 400 lumens, -30°C operating temperature, NEMA 4X rated. Hoffman LEDA1S35 series or equal. Provide with connection and mounting kit.
- 2) Provide a door switch to control the light (in conjunction with a rotary panel switch) in automatic mode. Protect with a fuse or circuit breaker. Hoffman ALFSWD series or equal. Provide with cable connection and mounting kits.

P. Additional Space

- 1) Provide a 12"x12" space within the control panel for possible future equipment.

Q. Remote Control Device

- 1) Provide a FieldNET M2 Control for remote control and remote monitoring of lift station operations. Controller should be able to monitor pump on/off, water level, real-time amperage draw, and approximate flow rate.

## 2.7 INSTRUMENTATION AND WET WELL EQUIPMENT

A. Float Switches

- 1) Utilize float switches within the existing lift station. Elevations will be determined in the field and coordinated with existing lift station.

B. Cable Hangar

- 1) The system integrator is to furnish a stainless steel cable hangar to be provided for installation within the lift station wet well.

C. Anchor Kit



- 1) General Specifications: 15 lb vinyl coated cast iron anchor, 1/8" 316 stainless steel vinyl coated cable or chain, 316 stainless steel anchors. Provide stainless steel bracket and hardware.
- 2) Manufacturer/Model: Equal to Anchor Scientific WRW.

### **PART 3 – OPERATIONAL REQUIREMENTS**

#### **3.1 LEVEL CONTROL OPERATION**

- A. The panel shall include provisions for normal pump down operation using a liquid level floats and relays. Control panel should be able to control both lift stations based on the elevation of the water surface. The operation sequence shall be as follows:
  - 1) Low Level "Pump On (Auto Only)" Float – Used to normally deactivate the existing pump, which pumps approximately 2,000GPM.
  - 2) All Stop "Pump Lockout (Kill Power)" Float – Used as a redundant low-level pump cut out both pumps.
  - 3) High Level Float – Used as the high-level indication. If this float is actuated the 60 Hp larger pump will activate.
  - 4) Operate floats with timers for hysteresis as required to avoid nuisance starting and stopping.
  - 5) Float test switches will mimic the operation of the respective float.
- B. Control of the 60 HP Pump
  - 1) When the level in the wet well rises to the high-level float "pump on" set point, the larger pump #1 shall be activated. If the high float remains on for greater than 10 minutes, then the high water alarm light will become activated, and the green exterior light will deactivate. Lights to remain on until the float returns to normal off state.
  - 3) When the level in the wet well lowers to the low-level float "pump off" set point, the pump shall be deactivated.
  - 4) When the level in the wet well lowers to the all stop float "pump lockout" set point, the pump shall be deactivated, as a redundancy.
  - 5) Hand Off Auto Switch:
    - a) When in the auto position, the level controls as described above shall control the operation of the pump. When in the hand position, all safeties shall be bypassed except overload protection. When in the off position, the pump shall not run in any case.
- C. Control of the Existing Pump
  - 1) When the level in the wet well rises to the low-level float "pump on" set point, the existing pump shall be activated.
  - 3) When the level in the wet well lowers to the low-level float "pump off" set point, the

pump shall be deactivated.

- 4) When the level in the wet well lowers to the all stop float "pump lockout" set point, the pump shall be deactivated, as a redundancy.
- 5) Hand Off Auto Switch:
  - a) When in the auto position, the level controls as described above shall control the operation of the pump. When in the hand position, all safeties shall be bypassed except overload protection. When in the off position, the pump shall not run in any case.

D. Miscellaneous:

- a. The cabinet exterior green light will turn off in any alarm or trouble condition.
- b. The respective pump run light will operate once pump is at full speed.
- c. The seal fail light will operate when such condition exists for the respective pump.
- d. The pump fail light will operate when there is a thermal fail indication from either the soft starter or from the motor thermal fail contact for each respective pump. Pushing the combo light/button will reset the soft starter.
- e. The high level light will operate when the high level float is active for greater than 10 minutes.
- f. The low level light will operate when the all stop float is active.
- g. The power ok blue light will operate whenever the SPD, arrestor, and phase monitor are in a non-alarm status. Obviously will not operate in a power outage.
- h. The hour meters will operate whenever power is sent to the respective motor.
- i. The gallon meter will operate whenever power is sent to any motor, operating at a different speed for each different motor.
- j. Whenever the cabinet interior light rotary switch is in auto mode, the door switch shall control the light. When the rotary switch is on or off, it shall override the door switch.

E. Nameplate

- 1) Provide typed etched instructions on the control panel deadfront summarizing the above basic control procedures for the pump and the requirements for proper operation.

F. The systems integrator shall provide all equipment for a fully functional system.

## **PART 4 – CONSTRUCTION REQUIREMENTS**

### **4.1 INSTALLATION**

- A. Install the control panel as detailed on the drawings.
- B. A factory trained service person shall be present when the station is put into service and shall certify to the Engineer that all equipment has been installed correctly and is operating properly. Actual startup commissioning of the control panel shall be a cooperative effort with the Owner.
- C. Provide instruction to the Owner's representative in the proper care and operation of the equipment.
- D. Contractor shall make all adjustments necessary to obtain proper operation of the lift station controls. This shall include, but is not limited to, adjusting starters; providing the

necessary type and quantity of device, relay, and starter contacts; and changing wire connections to device contacts.

#### 4.2 ELECTRICAL SERVICE

- A. Coordinate electrical service connection work with the power company. Contractor shall be responsible for all coordination with the utility in regard to the service connection.
- B. Refer to section 2.4 for additional requirements.

#### 4.3 CONDUIT INSTALLATION

- A. Conduit size shall be shown on the plans or as required by the NFPA 70. All raceways shall be installed in accordance with NECA Standard of Installation and as specified herein.
- B. Pull boxes or fittings shall be installed as job site and pulling requirements dictate.
- C. All conduits shall be kept dry and free of water or debris with pipe plugs and caps.
- D. Underground conduit runs shall have a minimum cover of two (2) feet.
- E. Conduits containing the float cables shall be identified with permanently affixed labels with the wording, "Intrinsic Safe Wiring."
- F. All conduits penetrating the wall of the wet well shall have appropriate seals as detailed in Article 501 of the NEC.

#### 4.4 WIRING INSTALLATION

- A. All wire shall be installed in the specified raceways. Wire pulling shall be performed through the system in such a manner as to not exceed the maximum tensile strength of the cable being pulled as allowed by the NFPA 70 and/or cable manufacturer. All handling and installation of wire and cables shall be done by competent and skilled workmen who shall use methods, which will prevent damage to the wire and cable. Pulling compound shall dry to a fine, lubricating, non-conductive powder and shall be approved by the cable manufacturer.
- B. Adequate measures shall be employed to determine that the raceways are free of foreign material and moisture before pulling wire or cable.
- C. Any conductor used for equipment grounding purposes shall be green in color unless it is bare. Conductors with white or green covering shall not be used to indicate other than neutral or grounding. This limitation applies to all power and control circuits.
- D. Conductors shall be without splice from termination to termination.
- E. Every bolt, lug, and screw termination shall be tightened with a torque wrench or torque screwdriver to the torque values specified in UL standards and/or as specified by the device manufacturer.

#### 4.5 CONTROL PANEL INSTALLATION

- A. Control panel shall be installed where shown on the plans or as indicated by the Engineer. Control panels shall be secured to mounting surface with stainless steel fasteners.
- B. Provide a grounding electrodes (ground rod) for the station per NEC 250:

- 1) Provide a No. 6 AWG grounding electrode conductor to connect the grounding electrode to the neutral bus.
- 2) Connect the grounding conductor in the pump motor cables to the neutral bus.
- 3) Bond electrode to the wet well concrete rebar and metal piping per NEC.

#### 4.6 START UP AND FIELD TESTING

- A. A certified technical representative from the system integrator shall be provided for a period of not less than four (4) hours for the purpose of final connections, testing, calibration, and startup, in the presence of the owner's personnel.
- B. Prior to startup, the system shall be tested for proper connections and installation to ensure that the monitor system is properly installed.
- C. The system integrator shall test and verify that all controls are running properly and that all alarms conditions activate the appropriate indication light.
- D. The system integrator shall submit a letter of certification stating that the system is fully operable as verified by field test results.

#### 4.7 TRAINING

- A. The Contractor shall provide a minimum of one (1) hour of training on operation of the control panel(s) to the Owner.

### **PART 5 – MEASUREMENT AND PAYMENT**

- 5.1 Payment for full control system as specified in this section shall be included in the lump sum bid price for the surface water pump station as described in Section 11213. No separate or additional compensation will be paid to the contractor.

**END OF SECTION**

# Appendix D

## Opinion of Probable Construction Cost

## Opinion of Probable Construction Cost

Project: High Island Creek Watershed District Project 10 - 2019 Petition

29-Oct-20

## Roadway

Line No.	Item	Quantity	Unit	Unit Price	Total Price
1	2021.501 Mobilization	1	LS	\$ 5,000.00	\$ 5,000.00
2	2101.501 Topsoil Stripping	1	LS	\$ 2,000.00	\$ 2,000.00
3	2104.503 Remove 48" Reinforced Concrete Pipe Culvert	85	LF	\$ 25.00	\$ 2,125.00
4	2105.507 Common Borrow (LV)	200	CY	\$ 20.00	\$ 4,000.00
5	2211.503 Aggregate Base (CV) Class 5	100	CY	\$ 25.00	\$ 2,500.00
6	2501.511 60" RC Pipe Culvert Class 3	88	LF	\$ 360.00	\$ 31,680.00
7	2501.515 60" RC Pipe Aprons	2	EA	\$ 2,800.00	\$ 5,600.00
8	2451.609 Pipe Bedding Material	100	CY	\$ 40.00	\$ 4,000.00
9	2511.504 Random Rip Rap (Class III)	52	Ton	\$ 95.00	\$ 4,940.00
10	2568.60 Traffic Control	1	LS	\$ 2,500.00	\$ 2,500.00
11	2573.54 Filter Log Type Straw Bioroll	100	LF	\$ 3.00	\$ 300.00
12	2575.501 Turf Establishment	0.5	Acre	\$ 1,500.00	\$ 750.00
13	2575.503 Floatation Silt Curtain Type Moving Water	40	LF	\$ 25.00	\$ 1,000.00
14	2576.523 Erosion Control Blanket Category 3	520	Sq Yd	\$ 1.50	\$ 780.00
	Roadway Subtotal				\$ 67,175.00

## Pump Station

Line No.	Item	Quantity	Unit	Unit Price	Total Price
15	Supply Pump - 7500 gpm at 15-ft lift, 60HP 3 Phase with step up booster (convert 230v to 460v), 2-floats, electrical components	1	LS	\$ 49,879.00	\$ 49,879.00
16	Supply Discharge Piping for New and Existing Pumps, Buried	1	LS	\$ 5,008.00	\$ 5,008.00
17	Supply Rip Rap, Suction and Discharge Sides	260	Ton	\$ 90.00	\$ 23,400.00
18	Install Pump, Piping, Rip Rap	1	LS	\$ 5,800.00	\$ 5,800.00
19	Supply and Install 72-inch Riser With 36-inch Intake	1	LS	\$ 26,400.00	\$ 26,400.00
20	36-in CP Culvert (smooth)	56	LF	\$ 85.00	\$ 4,760.00
	Subtotal Pump Station				\$ 115,247.00

## Separable Maintenance Costs

21	Bank Repair Downstream CR 64				\$ 5,700.00
22	Bank Repair Downstream Pump Station				\$ 4,500.00
	Subtotal Separable Maintenance				\$ 10,200.00

## Summary

	5% Construction Contingency				\$ 9,631.10
	Permanent Easement for CR 164	0.15	Acre	\$ 8,000.00	\$ 1,200.00
	Temporary Easement for CR 164	0.05	Acre	\$ 8,000.00	\$ 400.00
	Total Estimated Construction Cost				\$ 203,853.10
	Legal, Administration, Viewing Engineering				\$ 10,000.00
					\$ 53,376.81
	Total Estimated Project Cost				\$ 267,229.91

Estimated Construction Cost Comparison

Project: High Island Creek Watershed District Project 10 - 2019 Petition

29-Oct-20

Roadway With 48-inch RCP Replacement

Line No.	Item	Quantity	Unit	Unit Price	Total Price
1	2021.501 Mobilization	1	LS	\$ 5,000.00	\$ 5,000.00
2	2101.501 Topsoil Stripping	1	LS	\$ 2,000.00	\$ 2,000.00
3	2104.503 Remove 48" Reinforced Concrete Pipe Culvert	85	LF	\$ 25.00	\$ 2,125.00
4	2105.507 Common Borrow (LV)	200	CY	\$ 20.00	\$ 4,000.00
5	2211.503 Aggragate Base (CV) Class 5	100	CY	\$ 25.00	\$ 2,500.00
6	2501.511 48" RC Pipe Culvert Class 3	88	LF	\$ 250.00	\$ 22,000.00
7	2501.515 48" RC Pipe Aprons	2	EA	\$ 2,500.00	\$ 5,000.00
8	2451.609 Pipe Bedding Material	100	CY	\$ 40.00	\$ 4,000.00
9	2511.504 Random Rip Rap (Class III)	52	Ton	\$ 95.00	\$ 4,940.00
10	2568.60 Traffic Control	1	LS	\$ 2,500.00	\$ 2,500.00
11	2573.54 Filter Log Type Straw Bioroll	100	LF	\$ 3.00	\$ 300.00
12	2575.501 Turf Establishment	0.5	Acre	\$ 1,500.00	\$ 750.00
13	2575.503 Floatation Silt Curtain Type Moving Water	40	LF	\$ 25.00	\$ 1,000.00
14	2576.523 Erosion Control Blanket Category 3	520	Sq Yd	\$ 1.50	\$ 780.00
	Roadway Subtotal				\$ 56,895.00

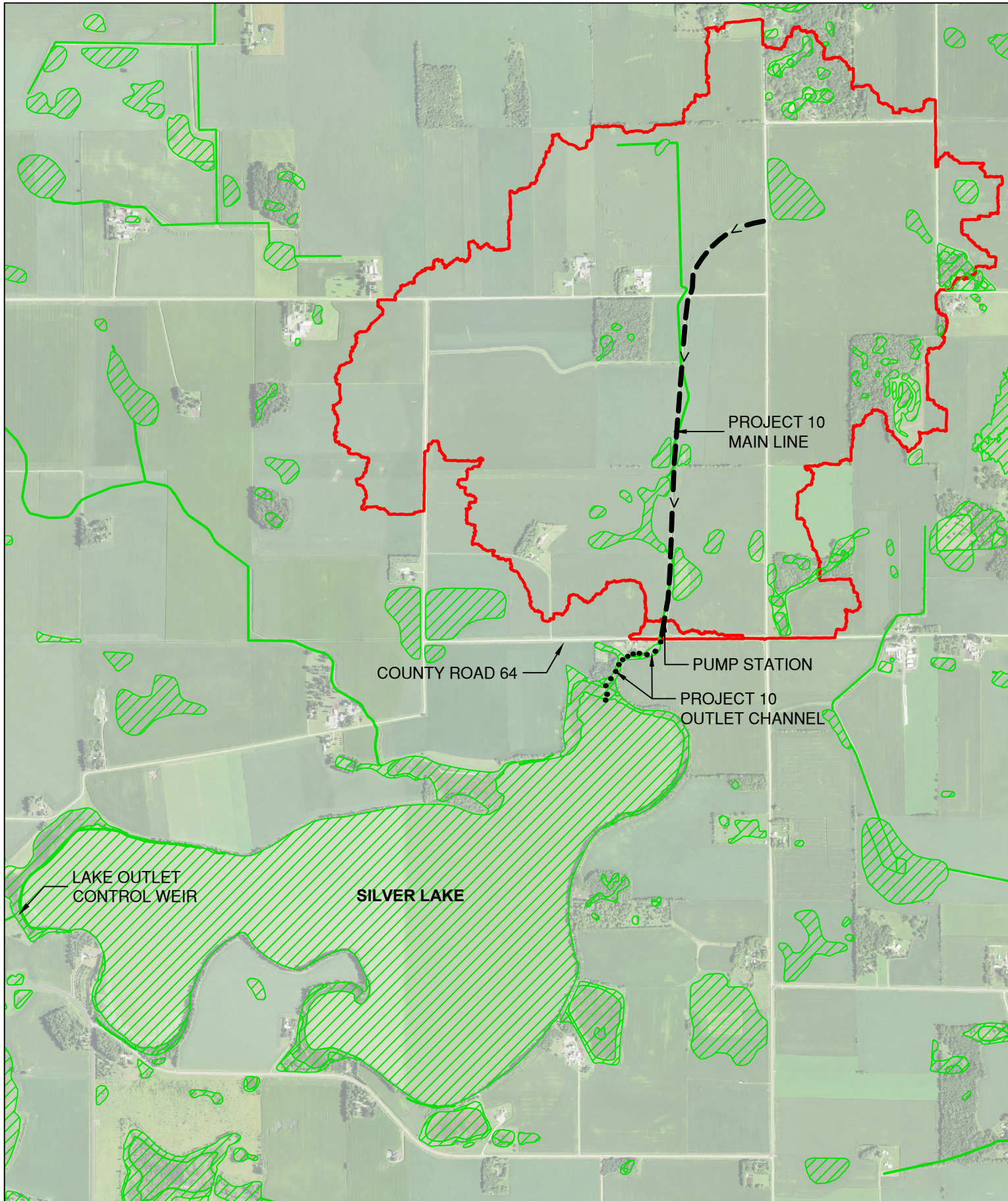
Cost Summary

Total Estimated Project Cost	\$ 267,229.91
Roadway Cost	\$ 56,895.00
Separable Maintenance	\$ 10,200.00
Total Estimated Improvement Cost	\$ 200,134.91

# Appendix E

## Wetlands in Project 10 Watershed





PROJECT 10  
MAIN LINE





COUNTY ROAD 64

PUMP STATION


PROJECT 10  
OUTLET CHANNEL

LAKE OUTLET  
CONTROL WEIR

SILVER LAKE

LEGEND	
	WATERSHED BOUNDARY
	MAIN LINE
	OUTLET CHANNEL
	WETLAND





**EXHIBIT 3**

**WETLANDS IN PROJECT 10 WATERSHED**

HIGH ISLAND CREEK WATERSHED DISTRICT

SIBLEY COUNTY, MINNESOTA