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Preliminary Engineer's Report

# Improvement of Judicial Ditch No. 91 Redwood County and Yellow Medicine County, Minnesota

**April 2020**

**S15.120237**

**Submitted by:**

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# Certification

## Preliminary Engineer's Report

For

Improvement of Judicial Ditch No. 91

In

Redwood County and Yellow Medicine County, Minnesota

S15.120237

April 2020

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.

By: Shaun P. Luker

Shaun P. Luker, P.E.

License No. 48756

Date: 4-13-2020

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STATE OF MINNESOTA

REDWOOD COUNTY & YELLOW MEDICINE COUNTY

IN THE MATTER OF THE PETITION FOR AN IMPROVEMENT OF A PUBLIC DRAINAGE SYSTEM IN REDWOOD COUNTY AND YELLOW MEDICINE COUNTY, MINNESOTA:

In December 2019, the Redwood County and Yellow Medicine County Joint Board acting as the Drainage Authority accepted a petition for the improvement of Redwood County and Yellow Medicine County Judicial Ditch No. 91 (JD 91) in accordance with Minnesota Statute 103E.215. This report summarizes the findings of the research, and analysis and is submitted for consideration by the Drainage Authority.

## I. LOCATION AND SCOPE OF IMPROVEMENT

The petitioned area for the improvement of Judicial Ditch No. 91 lies within and provides drainage to portions of Sections 4, 5, 8 and 9 of Underwood Township in Redwood County and portions of Section 33 of Posen Township in Yellow Medicine County. The system consists of open ditches and underground tiles. At the end of the open ditch is an existing pump station that pumps the water from the main open ditch, and into a culvert under County State Aid Highway 46 and into Timm Lake in Section 34 of Posen Township, Yellow Medicine County. The total estimated watershed for the ditch system, is 850 acres.

The proposed improvement of Judicial Ditch No. 91 include upgrades to the pumping station near the outlet into Timm Lake. Exhibit 1 is the copy of the petition for the improvement.

## II. EXISTING DITCH SYSTEM

The existing ditch system was established in 1954 with the original pump station constructed in 1954. Since then, minor repairs and replacements have been made to the original pump station structure, and the pumps themselves.

The existing pump station consists of two mixed flow pumps, one with a 20-horsepower capacity and the other with a 30-horsepower capacity. The discharge pipes for each of the pumps is 12-inches in diameter.

## III. CAPACITY OF EXISTING DRAINAGE SYSTEM

The existing drainage system is comprised of both open ditch and drain tile with a pumping station at the outlet. The portion petitioned for improvement is for the pumping station. The design capacity of the existing pumping station from the original construction plans with both pumps in operation is 4,000 gallons per minute.

The petitioners have reported that the pumping capacity of the existing station is inadequate to keep up with the drainage needs of the watershed. The petitioners have reported that the tile systems that drain into the open ditch system are often underwater and unable to drain freely. The petitioners have reported that the high-water elevations in the open ditch have resulted in regular crop loss in the depressional areas of the watershed.

The estimated capacity of the existing open ditch used the Manning equation. The amount of drainage needed for modern crop production has been compared to standards recommended by the Natural Resources Conservation Service (NRCS). The NRCS Engineering Field Handbook Minnesota Supplement 650.0703 for Grassed Waterways Curve 2 was used to determine the design discharge for the ditch watershed.

NRCS Code 608 guidance states that one foot of freeboard should be provided between the design water surface profile in the open ditch, and the ground elevation of the low areas being served by the open ditch. A summary of the existing capacity for the open ditch is in Table 1.

Table 1: Existing Ditch System Capacity						
Tile/Branch	Location	Drainage Area (Acres)	NRCS Flow (CFS) (Curve 2)	NRCS Flow (GPM)	Calculated Ditch Capacity (CFS)	Ditch Efficiency (%)
<b>JD 91 Main</b>	Outlet	850	33	14,811	64	1.93

As can be seen in Table 1, the existing ditch system should be able to provide a flow capacity of 33cfs or approximately 14,800 gallons per minute in order to meet the NRCS recommended capacity for this watershed. The shape and slope of the ditch can provide a capacity of 64cfs, or nearly double the recommended capacity, but the pumping station is only able to pump at 4,000 gallons per minute or approximately 27% of the recommended capacity.

The petitioners also noted that the existing pumping station requires frequent maintenance and observation to make sure that the pump station is operating properly. The pump station must be manually shut off during cold weather to prevent damage to the pumps from ice. The pump wet well also needs to be cleaned of vegetation during the summer months that plug the pumps. The petitioners would also like to ensure that adequate controls are installed so that the pumps can operate more independently.

#### IV. DISCUSSION OF IMPROVEMENT

As noted earlier, the petitioners have requested the improvement of JD 91. The petitioners have requested the consideration of improvements to the pumping station near the outlet of JD 91 into Timm Lake. A preliminary hydrologic and hydraulic analysis of such a drainage system was performed to establish a preliminary size of the pumping station, to determine quantities for construction of such a system, and analyze the outlet. General observations and results of the analysis are summarized as follows:

##### A. DESCRIPTION

###### 1. Pump Station Improvements Option 1

The first option that the petitioners wanted to consider was improvements to just the controls and sensors that are used to operate the existing 20-horsepower and 30-horsepower pumps. The goals of upgrading the controls and sensors are as follows:

- Installation of a non-contact level sensor for determining the water level in the wet well.
- The ability to operate the existing pumps at variable speeds to match the water level in the wet well.
- The ability to purge the sump of floating vegetation that occurs seasonally.
- Alarm system and temperature control system.

###### 2. Pump Station Improvements Option 2

The second option will be to rehabilitate the existing pumping station to provide a pumping capacity approximately equal to a 1-inch per day drainage coefficient for the upstream watershed of 16,000gpm.

The pumping station rehabilitation will consist of the following items:

- Spot repairs as necessary to the structure of the concrete wet well.
- Two 75 H.P. pumps with a pumping capacity of 8,000gpm each.
- Pump station controls, non-contact level sensor, temperature control, and alarm.
- Two 24-inch diameter forcemain pipes from the wet well
- Riprap at the outlet of the forcemain to minimize erosion.
- The power supply to the new pumping station site will need to be upgraded.
- Three phase power would need to be brought from approximately two miles away.

### 3. Pump Station Improvements Option 3

The third option will be to rehabilitate the existing pumping station to provide a pumping capacity approximately equal to a ¾-inch per day drainage coefficient for the upstream watershed of 12,000gpm, but allow the pumps to potentially be operated at a higher rate in order to achieve the 1-inch per day drainage coefficient of 16,000gpm. The benefit of this option is that the overall pump sizes are smaller and therefore less expensive, and three phase power would not need to be supplied.

The pumping station rehabilitation will consist of the following items:

- Spot repairs as necessary to the structure of the concrete wet well.
- One new 30 H.P. pump with a pumping capacity of 4,000gpm each, and modifications to the existing 30 H.P. pump and 20 H.P pump to obtain a pumping capacity of 4,000gpm each.
- Pump station controls, non-contact level sensor, temperature control, and alarm.
- Three 16-inch diameter forcemain pipes from the wet well
- Riprap at the outlet of the forcemain to minimize erosion.
- The power supply to the new pumping station site will need to be upgraded.

## B. DESIGN DATA

The pumping capacity for the proposed lift station was selected by comparing the NRCS recommended capacity for the open ditch system.

The NRCS recommended drainage coefficient for the JD 91 open ditch is 0.92 inches per day, or approximately 1.0 inches per day. The existing design capacity of the pumping station is 4,000 gallons per minute. Table 2 provides a summary of the comparison of providing different drainage coefficients to the equivalent pumping rates in gallons per minute.

Table 2: Proposed Pumping System Capacity Comparison		
Drainage Coefficient (In. Per Day)	Equivalent Flow (CFS)	Equivalent Pumping Rate (GPM)
1.0	36	16,158
0.75	27	12,117
0.5	18	8,079
0.25	9	4,039

## C. OTHER DITCH FACILITIES

Once the pumping station is constructed, and the water level in JD 91 can be lowered, the existing ditch should be inspected, and if needed, cleaned. Additionally, the ditch banks should be inspected for areas that need repair or re-seeding. Costs for these items of work are

not included in the project cost estimate.

## V. ALTERNATIVE SOLUTIONS

Two other alternative solutions to the proposed Improvement have been evaluated as part of this study.

### A. “DO NOTHING” ALTERNATIVE

The “Do Nothing” Alternative was discussed. However, petitioners have experienced poor drainage throughout the drainage system for many years with excess surface water damaging crops and resulting in frequent crop stress or crop loss. The loss of production equates to an economic loss for Redwood County, Yellow Medicine County, and the State of Minnesota. The loss results in reduced property value for the wet acres, thus affecting the taxing capacity of the Counties and State. Also, the ability of the landowners to receive a reasonable return on their investment is diminished because of inadequate drainage.

For these reasons, the “Do Nothing” alternative was dismissed. The economic question of the cost of the Improvement versus the benefits derived still needs to be evaluated. However, the “Do Nothing” alternative is not viewed as solving the drainage problem in the watershed.

### B. WETLAND RESTORATION

Another alternative would be to restore the typically flooded areas of the watershed to wetland use. This alternative would provide storage in watershed depressional areas for water which is currently accumulating in these areas and drowning out agricultural crops. The proposal would also have added benefits for wildlife and possibly water quality.

Wetland restoration remains a viable option for providing some improvement in the expectations of the drainage system. Finding willing landowners to participate in a restoration project and locating enough funding would be critical to make this option viable. As part of the initial submittal of this Preliminary Report, copies will be provided to the SWCD and NRCS so early coordination can occur for potential funding and technical assistance toward this option. Further discussion regarding this option will be presented as part of the Final Engineer’s Report.

## VI. OTHER CONSIDERATIONS

### A. PERMIT REQUIREMENTS

No permits are anticipated to be required for this Improvement.

### B. WETLANDS

National Wetland Inventory Maps was reviewed to locate potential wetlands subject to regulations.

Impacts of the potential drainage system on individual land parcels will be evaluated by the Natural Resources Conservation Service upon filing of a Form AD 1026 by landowners. This NRCS process will identify any wetlands and measures which need to be taken for the drainage project to avoid impact to these wetlands. Because of federal data privacy requirements, it is not possible for non-landowners to obtain this information. Thus, the obligation for filling out these forms and doing this investigation will rest with individual landowners.

Drainage of non-directly impacted wetlands will be controlled by supplemental drainage systems installed by private owners. Owners are advised that such supplemental drainage may not be permitted under State Wetland Conservation Act, US Army Corps of Engineers and NRCS rules and may affect US Department of Agriculture program eligibility.

#### C. PUBLIC AND PRIVATE BENEFITS AND COSTS

The estimated cost of the proposed Improvement to JD 91 is shown in Exhibit 2 of this report. Benefits for the Improvement, both public and private, will be established by the viewers and a report will be available at the final hearing.

Landowners certainly have other costs associated with construction and maintenance of their individual drainage systems. The proposed Improvement would only serve as an outlet or collector of runoff and drainage flow from the lands within the watershed. Each landowner is responsible to construct and maintain their own drainage system to adequately drain their farmlands. Individual benefits for an adequate drainage system are in increased crop production from farmlands.

The estimated cost of the proposed Improvement is included in this report. The public and private benefits and damages will be available at the final hearing.

The estimated annual cost of pumping the water is not anticipated to substantially change as a result of the improvement. The same volume of water will be pumped on an annual basis, but over a shorter duration of time. Additionally, the inclusion of variable frequency drive controls will allow the pumps to be operated more efficiently.

#### D. AGRICULTURAL EFFECTS

Once installed, the lands within the improved watershed will be largely dependent on this drainage system for both surface and subsurface drainage flows. Thus, it is imperative that the proposed system have adequate capacity to allow for modern farming operations.

#### E. ALTERNATIVE MEASURES

Alternative measures, including those identified in the Redwood County Water Management Plan have been considered in conjunction with this project. Specific proposals as part of the project to incorporate these measures include:

1. Measures to conserve, allocate and use drainage waters include the maintaining of the existing ditch bottom so that groundwater is preserved for crop use and the continued infiltration which will occur in depressional areas of the watershed.
2. Measures to reduce erosion and sedimentation include the restoration of the construction area as soon as possible so surface erosion of disturbed soil is reduced, the use of inlet protection during construction so the discharge of suspended solids is reduced and the use of a rock filter at the outlet during construction so suspended solids are captured.

#### F. WATER QUALITY

Little change in measurable water quality is anticipated because of this Improvement.

The construction documents will contain an erosion and sediment control plan. Incorporation of such devices as inlet protection, riprap at the outlets and permanent grasses as soon as possible following construction are anticipated. These measures will help to reduce erosion and maintain water quality during construction.

#### G. FISH AND WILDLIFE

The threatened or endangered species having the potential to be in the area at the time of this report are the northern long-eared bat. According to the Minnesota DNR, there are no known northern long-eared bat roost trees or hibernacula in the area. Additionally, there are no trees to be removed as a part of the improvement, so there is no anticipated impact to the northern long-eared bat.

Current wet areas within the project watershed do provide for transitory stop over locations for migratory waterfowl. However, these areas currently dry up following wet periods and are then under cultivation and production. It is anticipated that some of these temporary ponding areas will still exist after the construction of the Improvement although ponding times will likely be reduced. Therefore, the provisions for adequate drainage of these lands will not be of a detrimental nature to local wildlife resources.

#### H. GROUNDWATER

The purpose of an agricultural drainage system is to maintain the elevation of the shallow groundwater table sufficiently below the surface to provide for efficient production of crops. The level at which groundwater will be maintained has been and will be determined by the depth of the tile system and private tiles in the area. The proposed improvements do not include the lowering of any existing tiles or the bottom of the open ditch. Therefore, no change in the availability, distribution or use of shallow groundwater within the watershed is anticipated by improvement.

#### I. ENVIRONMENTAL IMPACT

Adverse effects of the proposed Improvement are temporary in nature and are as follows:

1. Temporary noise and dust generation can be expected from construction operations. These impacts are not viewed as significant since there are few residences near the proposed construction route.
2. Temporary erosion of soil may occur in the construction area until permanent ground cover and ground stabilization occurs. This construction erosion will be minimized using inlet protection, riprap and rapid establishment of permanent grass cover.

Numerous beneficial effects are anticipated from the proposed Improvement. Most of these benefits are directly attributable to increased crop production from lands presently damaged through period flooding and ponding. Among the most obvious benefits are:

1. Increased personal farm income.
2. Increased value of benefited farmland.
3. Contribution to the local economy through additional purchases, farm modernization and expansion.

#### J. LAND USE

The present use of land in the JD 91 watershed is largely agricultural. This use is expected to continue.

### VII. ADEQUACY OF THE OUTLET

#### A. GENERAL INFORMATION

As mentioned earlier, the outlet for this ditch system is into Timm Lake in Section 34 of Posen Township in Yellow Medicine County.

#### B. ADEQUACY OF THE OUTLET

The adequacy of Timm Lake to accept the change in flow resulting from the Improvement has been evaluated as required by the ditch statutes. The DNR Timm Lake Management Plan (DOW #87001700) dated January 2018 was used as the basis for the existing peak inflow and existing peak outflow. From Table 2, the existing pumping capacity of the JD 91 pump station is approximately 9cfs. the proposed capacity for Option 2 and the upper limit for Option 3 is 36cfs, an increase of 27cfs. A linear interpolation of the existing information was used to determine the proposed conditions. A comparison of the impact for the 2-Year

through 50-Year events on Timm Lake is in Table 3.

Table 3: Impact to Timm Lake							
Design Event (24-Hour)	Existing Peak Inflow to Timm Lake (cfs) (Note 1)	Proposed Peak Inflow to Timm Lake (cfs)	Existing Peak Outflow from Timm Lake (Note 1)	Proposed Peak Outflow from Timm Lake	Existing Peak Elevation in Timm Lake (Note 2)	Proposed Peak Elevation in Timm Lake	Change in Elevation in Timm Lake (ft.)
2 Year	272	299	16	17	1071.42	1071.49	0.07
5 Year	403	430	25	27	1071.68	1071.73	0.05
10 Year	536	563	35	38	1071.94	1071.97	0.03
25-Year	754	781	53	56	1072.34	1072.37	0.03
50-Year	948	975	70	72	1072.68	1072.72	0.04
100-Year	1,164	1191	89	90	1073.05	1073.12	0.07
Note 1: From Table 2 of DNR Timm Lake Management Plan							
Note 2: From Table 3 of DNR Timm Lake Management Plan							

Because the improvement portion of JD 91 is not adding any additional amount of water to the outlet, and merely changing the rate that the water is discharged the impact to Timm Lake will be minimal. As can be seen in Table 3 the proposed Option 2 and Option 3 improvement will temporarily raise the peak outflow from Timm Lake 1-3cfs, and will raise the peak elevation in Timm Lake 0.03 feet to 0.07 feet. It is therefore our opinion that the outlet is adequate for the proposed Improvement.

### VIII. ESTIMATE OF COST

The preliminary cost estimate to construct the proposed Improvement, as described in this report is shown in Exhibit 2. The cost estimate is broken into two parts. The cost to construct Option 1 to only upgrade the controls and sensors for the existing pumps, and the cost to construct Option 2 to upgrade the pumps, forcemain outlets, and controls.

The total estimated cost for Option 1 is \$44,000.

The total estimated cost for Option 2 is \$758,700. This cost estimate does not include any potential income from the sale of the existing 20 H.P. and 30 H.P. pumps.

The total estimated cost for Option 3 is \$168,200.

### IX. RECOMMENDATIONS

The proposed Option 3 is the preferred option to obtain adequate capacity at the pumping station. The normal operation of the pumping station will be 12,000gpm but will have the capability to be ramped up to approximately 16,000gpm.

The proposed Improvement of JD 91 in Redwood County and Yellow Medicine County, as described in this report, is feasible, practical and necessary to provide drainage for the cultivation of crops within the watershed area. The outlet of Timm Lake is adequate to convey the discharge.

It is the recommendation of your engineer that the Preliminary Engineer’s Report be approved, and the Board order the preparation of the Final Engineer’s Report and appoint Viewers to determine the benefits and damages.

## Exhibit 1: Petition for JD 91 Improvement

PETITION FOR IMPROVEMENT OF  
REDWOOD AND YELLOW MEDICINE COUNTY JUDICIAL DITCH 91

The undersigned hereby petition pursuant to Minn. Stat. 103E.215 for an improvement of Redwood and Yellow Medicine County Judicial Ditch #91 as follows:

- 1) The undersigned Petitioners constitute at least twenty-six percent (26%) of the property area affected by the proposed improvement.
- 2) The undersigned Petitioners also constitute the owners of at least twenty-six percent (26%) of the property area that the proposed improvement passes over.
- 3) The undersigned Petitioners also constitute at least twenty-six percent (26%) of the property area affected by the proposed improvement.
- 4) That accordingly the undersigned Petitioners constitute the required parties with an interest to proceed with this Petition for Improvement.
- 5) The undersigned Petitioners request that the pump house and underground drainage tile of the Redwood and Yellow Medicine County Judicial Ditch 91 system located near Timm Lake be reviewed and improved to current drainage standards.
- 6) The undersigned Petitioners state that said system is old, obsolete and in need of upgrade and improvement so as to function correctly and to current standards.
- 7) Petitioners state that the drainage system has insufficient capacity and needs enlarging in size to furnish sufficient capacity.

8) Petitioners request that an engineer be retained to provide a design for said improvement, but Petitioners generally state and allege that the pump house and underground drainage tile capacity and size needs to be upgraded and enlarged and the system otherwise upgraded and improved so as to function correctly in light of current agricultural customs and standards.

9) Petitioners state the proposed improvement will be a public utility and promote the public health.

10) The undersigned Petitioners warrant and agree that they will pay all costs and expenses that may be incurred if the improvement proceedings are dismissed.

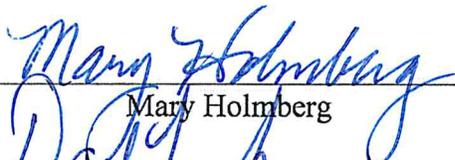
11) Request is made that the entire system be improved or such portions as the engineer deems appropriate (and then as thereafter approved by the Board), based upon the beginning request that the entire system be improved; the names and addresses of certain of the owners that the improvement passes over are as follows:

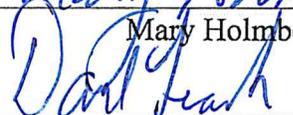
NAME	ADDRESS	PROPERTY
Mary Holmberg – Seller on Contract for Deed	606 Adobe Road Marshall, MN 56258	Pt. Lot 1 NE¼; Lot 2 NE¼, Section 5, Underwood Township, Redwood County, State of Minnesota
Ryan Holmberg – Buyer on Contract for Deed	10330 325th Street Vesta, MN 56292	
Daniel Leach, Daryl Leach and David Leach	11297 295 <sup>th</sup> Street Marshall, MN 56258	Pt. Lot 2 NE¼; Lot 3 NW¼; Lot 4 NW¼, Underwood Township, Redwood County, State of Minnesota
Mary Busiahn Trust	33327 Balsa Avenue Wood Lake, MN 56297	Tr. W½SW¼, Underwood Township, Redwood County, State of Minnesota
Gerry Busiahn Family Trust	33327 Balsa Avenue Wood Lake, MN 56297	Pt. NW¼SW¼; NE¼SW¼; SE¼SW¼; Pt. SW¼SW¼, Underwood Township,

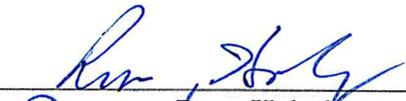
		Redwood County, State of Minnesota
Bradley J. Matthys and Sharon M. Matthys	33635 Acorn Avenue Cottonwood, MN 56229	Lot 3 NW <sup>1</sup> / <sub>4</sub> , Underwood Township, Redwood County, State of Minnesota
Christensen Living Trust	2148 Trenohlme Drive Monument, CO 80132	SW <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> ; SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , Underwood Township, Redwood County, State of Minnesota
Robert Vieaene and Laurie Hill	3126 County Road 9 Marshall, MN 56258	NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> ; NE <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> ; SW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , Underwood Township, Redwood County, State of Minnesota

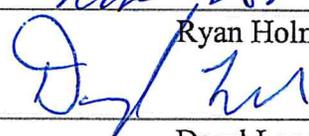
12) The undersigned Petitioners therefore request that this Petition for Improvement be accepted by the Auditors of Redwood County and Yellow Medicine and submitted to the appropriate Board for further proceedings.

Dated: October 21, 2019

  
 \_\_\_\_\_  
 Mary Holmberg

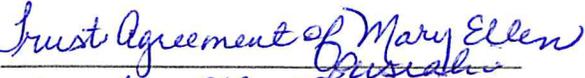
  
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 Daniel Leach

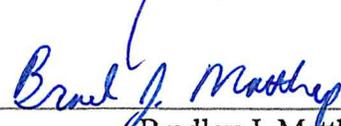
  
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 Ryan Holmberg

  
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 Daryl Leach

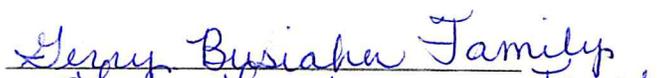
  
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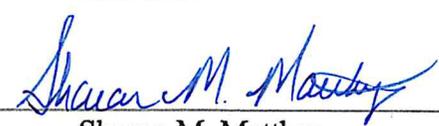
MARY BUSIAHN TRUST

By:   
 \_\_\_\_\_  
 Mary Ellen Busiahn  
 Its Trustee

  
 \_\_\_\_\_  
 Bradley J. Matthys

GERRY BUSIAHN FAMILY TRUST

By:   
 \_\_\_\_\_  
 Lydia Kiepke  
 Its Trustee

  
 \_\_\_\_\_  
 Sharon M. Matthys

SEE ADDITIONAL SIGNATURES ON PAGE 4

CHRISTENSEN LIVING TRUST

By: \_\_\_\_\_

Its: Trustee

  
\_\_\_\_\_

Robert Viaene

  
\_\_\_\_\_

Laurie Hill

CHRISTENSEN LIVING TRUST

By: Harold Christensen

Its: Trustee

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Robert Viacne

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Laurie Hill

# Exhibit 2: Preliminary Cost Estimate

**PRELIMINARY PROJECT COST ESTIMATE**  
**JD NO. 91 IMPROVEMENT -PUMP STATION OPTION 1**  
**REDWOOD AND YELLOW MEDICINE COUNTY, MINNESOTA**

Date: 4/8/2020

Filename: H:\RWCO\S15120237\2\_Preliminary\A\_Calculations\[120237\_Preliminary Cost Estimate.xlsx]Option 3

<b>ITEM NO</b>	<b>ITEM DESCRIPTION</b>	<b>UNIT</b>	<b>TOTAL EST QNTY.</b>	<b>EST UNIT PRICE</b>	<b>TOTAL COST</b>
1	Control Panel and Sensor Improvements	Lump Sum	1.0	\$20,000.00	\$20,000.00
	<b>Subtotal Construction Cost</b>				\$20,000.00
	20% Construction Contingency				\$4,000.00
	Engineering, Legal, and Viewing				\$20,000.00
	<b>TOTAL ESTIMATED COST</b>				<b>\$44,000.00</b>

**PRELIMINARY PROJECT COST ESTIMATE**  
**JD NO. 91 IMPROVEMENT -PUMP STATION OPTION 2**  
**REDWOOD AND YELLOW MEDICINE COUNTY, MINNESOTA**

Date: 4/8/2020

Filename: H:\RWCO\S15120237\2\_Preliminary\A\_Calculations\[120237\_Preliminary Cost Estimate.xlsx]Option 3

<b>ITEM NO</b>	<b>ITEM DESCRIPTION</b>	<b>UNIT</b>	<b>TOTAL EST QNTY.</b>	<b>EST UNIT PRICE</b>	<b>TOTAL COST</b>
1	Mobilization	Lump Sum	1.0	\$10,000.00	\$10,000.00
2	Pumping Station Improvements	Lump Sum	1.0	\$400,000.00	\$400,000.00
3	Electrical Service Upgrades	Lump Sum	1.0	\$10,000.00	\$10,000.00
4	Random Rip Rap Class III	Tons	30	\$60.00	\$1,800.00
5	Rapid Stabilization Method 4	Square Yard	200	\$4.00	\$800.00
	<b>Subtotal Construction Cost</b>				\$422,600.00
	20% Construction Contingency				\$84,600.00
	Engineering, Legal, and Viewing				\$101,500.00
	Three Phase Electrical	Miles	2	\$75,000.00	\$150,000.00
	<b>TOTAL ESTIMATED COST</b>				<b>\$758,700.00</b>

**PRELIMINARY PROJECT COST ESTIMATE**  
**JD NO. 91 IMPROVEMENT -PUMP STATION OPTION 3**  
**REDWOOD AND YELLOW MEDICINE COUNTY, MINNESOTA**

Date: 4/8/2020

Filename: H:\RWCO\S15120237\2\_Preliminary\A\_Calculations\[120237\_Preliminary Cost Estimate.xlsx]Option 3

<b>ITEM NO</b>	<b>ITEM DESCRIPTION</b>	<b>UNIT</b>	<b>TOTAL EST QNTY.</b>	<b>EST UNIT PRICE</b>	<b>TOTAL COST</b>
1	Mobilization	Lump Sum	1.0	\$5,000.00	\$5,000.00
2	Pumping Station Improvements	Lump Sum	1.0	\$85,000.00	\$85,000.00
3	Electrical Service Upgrades	Lump Sum	1.0	\$10,000.00	\$10,000.00
4	Random Rip Rap Class III	Tons	30	\$60.00	\$1,800.00
5	Rapid Stabilization Method 4	Square Yard	200	\$4.00	\$800.00
	<b>Subtotal Construction Cost</b>				\$102,600.00
	20% Construction Contingency				\$20,600.00
	Engineering, Legal, and Viewing				\$40,000.00
	Electrical Transformers	Lump Sum	1	\$5,000.00	\$5,000.00
	<b>TOTAL ESTIMATED COST</b>				<b>\$168,200.00</b>