JACOBSON-WESTERGARD & ASSOCIATES, INC.
Consulting Engineers & Land Surveyors

105 South 6th Street
Estherville IA 51334
Phone (712) 362-2647
www.jacobson-westergard.com

ENGINEER'S REPORT

DRAINAGE DISTRICT NO. 89 TILE REPAIR/IMPROVEMENTS WINNEBAGO COUNTY, IOWA

PROJECT NO: E22104

LICENSED PROFESSIONAL ENGINEER
COLLIN J. KLINGBEIL
24741
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Collin Klingbeil Date 6/21/23

Collin J. Klingbeil, P.E.
License number 24741
My license renewal date is December 31, 2023
Pages or sheets covered by this seal:
ALL

I. INTRODUCTION/HISTORY

A. Scope

A petition for drainage tile improvements in Drainage District No. 89 (DD89) of Winnebago County,Iowa was filed with the Board of Supervisors on June 29, 2022 and is enclosed. The petition asks for repair of tile blowouts in Section 23 of Mt. Valley Township (T-98-N, R-23-W) and that the tile belowered. The Winnebago County Board of Supervisors, acting as trustees for DD89, appointed Jacobson-Westergard & Associates, Inc. to complete the necessary survey, study, plan, and report.This report addresses the petition.

Drainage District No. 89 is located in Sections' 21, 22, 23, 15, 16, 26, & 27 of Mt. Valley Township (T-98-N, R-23-W) of Winnebago County, approximately 1 mile north and 5 miles east of Forest City, Iowa.

B. History

- May 9, 1919 – petition filed for establishment of Drainage District No. 89
- August 7, 1919 – Engineer's Report Filed by O.N. Gjellefald recommending construction of a tile system with tile ranging in size from 30" to 6" in diameter and including a Main Tile as well as Laterals 1, 2, 3, 4, 5, 5A, 5B, 6, 6A, 6B, 7, 8, & 9.
- September 24, 1919 – hearing on establishment held, district established
- October 7, 1919 – opened bids, awarded construction contract to C.E. Paine for $30,890.00
- July 1, 1920 – classification report filed
- September 9, 1920 – classification hearing held, report approved with modifications
- November 28, 1989 – Seven landowners in the district mutually agreed to provide for the repair of the Main Tile in Section 23 of Mt. Valley Twp. We understand this work included hauling and placing fill over the tile in an area with very little cover near the outlet.
- October 26, 1998 – petition filed for improvement or repair to Lateral No. 5, and asked that the tile be lowered if possible. Winnebago County Engineer Jim Witt was asked to investigate.
- November 24, 1998 – County Engineer recommended that approximately 1,400 feet of the existing Lateral 5 tile be replaced, relocated, and placed at a flatter grade to provide adequate cover (from STA 16+00 to approx. 30+00).
- December 22, 1998 – meeting held to discuss Lateral 5 repairs. Approval given to proceed with repairs.
    - One Objection Stated: *"The tile has been that shallow for the last 25-30 years. This has always been there and only until the use of large machinery and V-rippers has this problem surfaced on this farm…if this gets done, then there will be filings up and down the main."*
- January 26, 1999 – Holland Contracting awarded the project for Lateral 5 for $6,410.
    - 380 feet of 6" perforated plastic tile
    - 195 feet of 6" perforated plastic tile for Lateral 5B
    - 800 feet of 12" perforated plastic tile
    - 300 feet of 12" dual wall perforated plastic tile
- July 2, 2008 – petition filed for repair to 30" main tile in west part of Section 23. Location described as NW of buildings in peat.
- November 16, 2009 – petition filed for repair to 12" Lateral 5 tile in Section 22.
- 2011 – NRCS replaced and re-rerouted portions of Main and Lateral 6 Tile along west edge of Section 22 with non-perforated dual wall polyethylene tile as part of a wetland reserve program (WRP) project.
- Spring 2013 – Repair made to Lateral 9 tile by Holland Contracting
- June & August 2013 – Winnebago County purchased tracts of land, that are enrolled in the wetland reserve program.
- 2020 – Major wetland restoration project was completed in the drainage district
- June 29, 2022 – petition filed to repair and lower Main Tile

II. EXISTING TILE STARTING POINT, ROUTE AND TERMINUS

The Main Tile for DD89 outlets into the Main Open Ditch of Drainage District No. 101 at a location in the NW1/4 SE1/4 of Section 23 of Mt. Valley Township (T-98-N, R-23-W). From the outlet it extends generally WSW approximately 3,200 feet with 30" diameter tile. From that point it extends generally NW in Section 22 with nearly 7,000 feet of tile ranging from 24" to 10" in diameter. The very upper end of the tile extends into the NE1/4 NE1/4 of Section 21 with approximately 440 feet of 8" diameter tile. The Main Tile crosses 220th and 210th Ave which are both gravel roads.

Lateral 1 Tile starts in the NE1/4 SW1/4 Section 23 of Mt. Valley Township where it connects to the Main Tile. Lateral 1 Tile is 8" diameter tile and extends approximately 154 feet north.

Lateral 2 Tile starts in the NE1/4 SW1/4 Section 23 of Mt. Valley Township where it connects to the Main Tile. Lateral 2 Tile is 8" diameter tile and extends approximately 184 feet north.

Lateral 3 Tile starts in the NE1/4 SW1/4 Section 23 of Mt. Valley Township where it connects to the Main Tile. Lateral 3 Tile extends generally south and is comprised of 1,000 feet of 10" diameter tile and 1,205 feet of 8" tile. It crosses 360th St before ending.

Lateral 4 Tile starts in the NW1/4 SW1/4 Section 23 of Mt. Valley Township where it connects into the Main Tile. It runs generally north along the east side of 220th Ave for approximately 1,281 feet and is 8" in diameter.

Lateral 5 Tile starts in the NE1/4 SE1/4 Section 22 of Mt. Valley Township where it connects into the Main Tile. It runs generally south and west and ends in the SW1/4 SE1/4 Section 22. It ranges in size from 12" to 6" in diameter and is approximately 3,234 feet in length.

Lateral 5A Tile starts in the SW1/4 SE1/4 Section 22 of Mt. Valley Township where it connects into the Lateral 5 Tile. It runs generally south for approximately 340 feet, is 6" in diameter and crosses 360th St before ending.

Lateral 5B Tile starts in the SW1/4 SE1/4 Section 22 of Mt. Valley Township where it connects into the Lateral 5 Tile. It runs generally south for approximately 350 feet, is 6" in diameter and crosses 360th St before ending.

Lateral 6 Tile starts in the NE1/4 SE1/4 Section 22 of Mt. Valley Township where it connects into the Main Tile. It runs generally WNW for approximately 4,538 feet and ranges from 16" to 10" in diameter. The upper approximately 430 feet was replaced with non-perforated dual wall polyethylene plastic pipe in 2011. Another approximately 1,400 feet was replaced (with non-perforated dual wall plastic) and relocated around a wetland/peat area just west of the center of Section 22. It crosses 210th Ave before ending.

Lateral 6A Tile starts in the SE1/4 NW1/4 Section 22 of Mt. Valley Township where it connects into the Lateral 6 Tile. It runs generally SW for approximately 1,392 feet and is 8" in diameter. The tile was plugged and abandoned as part of a recent wetland restoration project.

Lateral 6B Tile starts in the SW1/4 NW1/4 Section 22 of Mt. Valley Township where it connects into the Lateral 6 Tile. It runs generally south for approximately 234 feet and is 6" in diameter.

Lateral 7 Tile starts in the SW1/4 NE1/4 Section 22 of Mt. Valley Township where it connects into the Main Tile. It runs generally west for approximately 460 feet and is 8" in diameter.

Lateral 8 Tile starts in the NE1/4 NW1/4 Section 22 of Mt. Valley Township where it connects into the Main Tile. It runs generally north and west for approximately 800 feet and is 10" in diameter. However, Lateral 8 Tile was plugged and abandoned as part of a wetland restoration project in 2020.

Lateral 9 Tile starts in the NE1/4 NE1/4 Section 21 of Mt. Valley Township where it connects into the Main Tile. It runs north along 210th Ave for approximately 900 feet and is 8" in diameter.

III. INVESTIGATION

Survey data was collected on the Main Tile in Section 23 of Mt. Valley Township in the fall of 2022. In addition, engineer's reports and plats, plans, and profiles of district facilities were reviewed. An informational meeting was held on February 21, 2023.

A. Tile Cover:

When the Main Tile was installed in 1919 the first 800 – 900 feet had only 1 – 2.5 feet of cover (depth of soil over the top of the pipe). Currently, in this reach we find the tile exposed and broken in several places and it appears the cover is now often less than 1 foot. This is despite fill dirt being hauled and placed over this reach in approximately 1989. For a district tile we typically recommend no less than 2.5 feet of cover in normal conditions, and at least 3 feet of cover where the ground is likely to subside (peat ground) or erode (surface waterway).

There are issues with cover in several additional areas throughout the district. DD89 contains an estimated 184 acres of land comprised of peat soils. See attached map showing peat soil areas. These soils are located in depressional areas and are very high in organic matter. Once drained, the ground surface of these soils subside, or "sink". In comparing the profile of the ground when the tile system was installed with the ground profile today, we find that the ground over the Main Tile and Lateral 4 in the peat ground in the western portion of Section 23 has subsided up to 4 feet. In this area soil cover over the tile is often less than 1 foot. It also appears that the ground has subsided about 2 feet in the peat ground overlaying Lateral 5 tile. We did not complete a full survey of the tile system but anticipate that other areas of peat ground have also subsided a great deal.

Limited cover has become a serious problem for this tile system. In looking at profiles of the various tile systems within the district, there are cover issues in several peat areas where subsidence has occurred. Tile installed in the early 1900's was only expected to last for 50 years and has already long outlasted its life expectancy. Large farm equipment is likely to damage the tile. Even if it is not damaged, the forces exerted on the tile can shift it, moving it out of alignment or out of grade, thus harming drainage performance. Based on our survey we can see evidence of this on the Main Tile in Section 23, where the design grade was only a minimal 0.05% to begin with. In addition to the maintenance issue, when the ground subsides the performance of the tile systems is negatively impacted. The lateral width from the tile that is drained is diminished. It is vital that this issue be addressed so the tile system can remain fully functional for many years to come.

B. Wetlands:

We are aware that there have been several wetland restoration projects inside and adjacent to DD89 over the last ten years. The lands with permanent wetlands are primarily in the upper reaches of the district, and the properties are currently owned either by the State of Iowa, or Winnebago County. See enclosed public lands/restored wetlands map. Much of the private tile in these areas has been blocked or broken. Additionally, based on the construction plans, DD89 Laterals 6A & 8 tile have been broken or blocked and we consider them to be abandoned. Portions of the Main Tile and Lateral 6 through the wetland complex were replaced with non-perforated dual-wall plastic pipe.

It bears noting that the restored wetland areas on publicly owned ground still benefit from the facilities of DD89. When the water level exceeds the permanent pool elevation water enters the tile system through an intake. There are also still areas of public land that have operational tile systems, some of which were installed as part of the wetland restoration projects.

Upon NRCS review, the work proposed in this report will not affect the restored wetlands.

C. Design Capacity of Existing Tile System:

The adequacy of the existing tile system has been analyzed, and is shown in the tables below and in the enclosed maps. Note that the capacities shown assume the tile is in good condition, which is likely not the case. The design parameter commonly used for drainage tile is known as the *drainage coefficient (DC)*. According to the Iowa Drainage Guide, the drainage coefficient is the rate at which water can be removed from the land, and is expressed as the equivalent depth of water covering the surface of the drained area that can be removed in 24 hours. A design drainage coefficient of 1/2" – 1" per day is commonly used in Iowa. However, in the early 1900's tile systems were commonly designed at a drainage coefficient of 1/4" to 1/8" or less.

This district is somewhat unique in that approximately 1/3rd of the land area is owned either by the State of Iowa, or Winnebago County. A large portion of the public land is part of a restored wetland complex. The drainage needs for this land differ from typical privately owned farmland utilized for row crop agriculture. The restored wetlands will use the tile system infrequently, and typically directly following a large rainfall event. Once the excess water is drained the tile system is fully available to the rest of the district for subsurface drainage needs. To account for this in analyzing the adequacy of the existing system, we have calculated an "equivalent drainage coefficient" which does not include the public land acres in the calculation.

It is our opinion that if the entire district were to be drained adequately for row crop agriculture a drainage coefficient of 3/4" – 1" per day would be required. Removing the public lands from the equation, we would recommend an equivalent drainage coefficient of at least 3/4" per day.

Design Capacity of Original DD89 Tile Systems

Lateral	Starting Station	Dia. (in)	Grade (%)	Ex. Capac. (cfs)	Approx. Length	Acres Drained	DC (in/day)	Equiv. DC (in/day)
Main	0+00	30	0.05%	10.84	1,500	971.3	0.27	0.39
	15+00	30	0.05%	10.84	1,700	869.7	0.30	0.47
	32+00	24	0.19%	11.62	1,100	792.4	0.35	0.58
	43+00	22	0.19%	9.22	400	552.1	0.40	0.83
	47+00	18	0.15%	4.81	1,667	335.1	0.34	0.65
	63+67	16	0.15%	3.51	1,633	308.4	0.27	0.53
	80+00	14	0.15%	2.46	1,600	190.5	0.31	0.49
	96+00	10	0.15%	1.00	443	95.3	0.25	0.25
	100+43	8	0.20%	0.64	440	41	0.37	0.37
1	0+00	8	0.20%	0.64	154	2.2	6.91	6.91
2	0+00	8	0.20%	0.64	184	4.1	3.71	3.71
3	0+00	10	0.20%	1.16	1,000	59.2	0.47	0.47
	10+00	8	0.20%	0.64	1,205	42.6	0.36	0.36
4	0+00	8	0.20%	0.64	1,281	12.7	1.20	1.20
5	0+00	10	0.80%	2.32	600	144.4	0.38	0.47
	6+00	12	0.20%	1.88	1,000	131.5	0.34	0.43
	16+00	10	0.70%	2.17	600	95.8	0.54	0.74
	22+00	10	0.20%	1.16	600	59.2	0.47	0.60
	28+00	8	0.45%	0.96	200	47.8	0.48	0.67
	30+00	6	0.45%	0.44	234	19.4	0.55	1.83
5A	0+00	6	0.30%	0.36	340	11.3	0.77	0.77
5B	0+00	6	0.30%	0.36	350	21.6	0.40	0.40
6	0+00	16	0.10%	2.87	2,100	209.8	0.33	0.86
	21+00	12	0.10%	1.33	1,400	124	0.26	0.85
	35+00	10	0.10%	0.82	1,038	54.8	0.36	0.65
6A*	0+00	8	0.50%	1.01	1,392	51.7	0.46	1.11
6B	0+00	6	0.30%	0.36	234	25.8	0.34	1.22
7	0+00	8	0.70%	1.19	460	9.8	2.90	12.37
8*	0+00	10	0.20%	1.16	800	71.5	0.39	1.25
9	0+00	8	0.20%	0.64	900	54.3	0.28	0.28

*: Tile abandoned as part of wetland restoration project.

The original tile system appears to have generally been designed for a drainage coefficient between 1/4" and 1/3" per day, with some reaches being at or above 1/2" per day. The equivalent drainage coefficient (not considering the public lands) is at or above 1/2" per day for most of the laterals. Considering the public lands, it is our opinion that the tile in most need of improvement is the Main Tile from the outlet to where Lateral 5 Tile enters it.

IV. PROPOSAL

Several options were discussed at the February 21, 2023 informational meeting. Each option is presented and discussed below.

Option #1 – Improvement:

A. Main Tile:

The investigation has confirmed the need for drainage relief in the district. We recommend lowering, relocating, and improving the lower reach of existing Main Tile between the outlet and the juncture with Lateral 5. We have found that the improvement would result in double the design capacity of the current system. We would not be able to increase the grade (as compared to the existing system) if a repair is done. In order to gain enough cover near the ditch we propose to move the outlet approximately 320 feet south of its current location. The proposed tile would be routed around the large peat area in the western portion of Section 23 of Mt. Valley Township, extend into Section 22, and would intercept Laterals 3, 4, & 5. The proposed improved reach of Main Tile would be 30" in diameter for its entire length.

B. Sub Main 1 Tile:

We recommend uncovering and crushing the existing 30" diameter Main Tile for the first approximately 950 feet (where there are serious cover issues) and replacing it with an 8" dual-wall HDPE pipe. The existing tile has little to no cover. The proposed tile would be laid in the same trench as the existing Main Tile, and would intercept both Laterals 1 & 2. It is likely that fill dirt would need to be hauled in to fill the void created by replacing the 30" tile (with very little cover) with an 8" tile. We estimate approximately 160 CY, or about 8 side-dump loads of dirt would be needed.

C. Sub Main 2 Tile:

We recommend uncovering and crushing the existing 30" and 24" diameter Main Tile in the large peat area straddling Sections 22 & 23 and replacing it with approximately 1,700 feet of tile ranging from 15" diameter RCP to 8" dual-wall HDPE. The existing tile has very little cover. The proposed tile would be laid in the same trench as the existing main, and would intercept the lower end of Lateral 4 (below where the new main would intercept it). It is likely that fill dirt would need to be hauled in to fill the void created by replacing the 30" and 24" diameter tile (with very little cover) with smaller tile. We estimate approximately 240 CY, or about 12 side-dump loads of dirt would be needed.

D. Tile Material:

We recommend the proposed tile be constructed using reinforced concrete pipe (RCP) for all pipe 12" diameter and larger. Dual-wall HDPE is much more susceptible to deflection, and relies heavily on the strength of the backfill material around it. Deflection is of particular concern in this case due to the subsided peat soils in the district. Additionally, public installation standards require installation in a water-free trench and that the pipe be encased in a crushed rock envelope. Mandrel or video testing is required 30 days after final backfill. Excessively deflected pipe is required to be replaced.

Option #2 – Lower Outlet:

At the February 21, 2023 informational meeting held regarding this project, a discussion was had regarding lowering approximately 1,200 feet of the Main Tile, starting at the outlet. There are currently approximately 4 acres that are not farmed in this area, where the Main Tile has very little depth of cover. The goal with this option would be to replace the tile in poor condition and gain cover over the tile. With this option the blowouts further to the west near 220th Ave. in Section 23 would be addressed by patch repair. Technically this option would be considered an improvement. The main advantage of this option is the lower cost. However, there are several reasons why this option is not ideal:

1. The lowered tile will still have minimum depth of cover of only 2 feet, unless additional fill dirt is added.
2. With this option, the district would be paying for 1,200 feet of new 30" dia. RCP but would not be gaining any flow capacity. With Option 1 the flow capacity would be doubled.

3. The cover issues in the peat ground in the western portion of Section 23 will not be addressed and blowouts will continue to occur, incurring expense to the district. At some point the Main Tile will need to be replaced/relocated.
4. A large expensive structure would be needed at the upper end of the lowered tile, to create a transition between the original and new tile.

Option #3 – Right-of-way acquisition and Repair:

A possible option to addressing the petition would be for the district to acquire right-of-way (ROW) over the Main Tile system in Section 23 in areas where there is little to no cover over the tile. These areas would no longer be farmed, and no equipment would be allowed on them.

Assuming a ROW width of 30 feet centered on the tile, we estimate that approximately 1.5 acres of ROW would need to be acquired. At current land prices, purchasing 1.5 acres seems reasonable; however, a large premium would need to be paid due to severing the property. Appraisers would need to be appointed by the Board to determine the damage to the property value and corresponding compensation for the acquisition of the ROW. If this alternative were pursued, we would have to locate the tile in the areas of little to no cover and get a survey to record the ROW acquisition. The current tile blowouts would also need to be repaired.

We note that this option is also far from the ideal solution. The condition and adequacy of the 100+ year old tile will remain a concern, and it will only get worse in time. Blowouts will likely continue to occur whether the land over the tile is farmed or not. The district would need to seed grass over the (shallow) tile, spray for weeds, and the grass roots could invade the tile restricting drainage. This would only be a temporary solution. At some point in time the Main Tile will need to be replaced.

Option #4 – Repair:

If no other option is approved, a repair would be required by Iowa law (see Iowa Code 468.126). A repair would at a minimum include fixing/patching the tile blowouts that currently exist on the Main Tile. We would also recommend hauling in fill dirt in reaches of the Main Tile in Section 23 with little to no cover. We advise against this option. Fill dirt was placed over the Main Tile near the outlet in approximately 1989 and problems continue. This would only be a temporary solution. It should only be considered as a last resort, if remonstrance is met on the proposed improvements.

V. RIGHT-OF-WAY

Iowa Code grants drainage district a permanent right of egress and ingress, and right of access for maintenance, repair, improvement, and inspection of drainage district facilities. Unless right-of-way is acquired, landowners will be reimbursed for any damages caused in the process of maintenance, repair, improvement, or inspection.

The district will need an area to perform the proposed work. The work limits for this project will generally be 50 feet from each side of the proposed tile. Compensation for damages within the work limits is normally determined at the completion hearing and is subject to approval by the Board of Supervisors.

VI. COST ESTIMATES

Option #1 – Improvement:

SECTION 1: CONSTRUCTION ASSESSABLE TO PRIVATE LANDS

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
MAIN TILE					
1	30" DIA. RCP APRON W/ANIMAL	1	EA	$4,000.00	$4,000.00
2	30" DIA. RCP, 1500D	2,529	LF	$80.00	$202,320.00
3	30" DIA. RCP, 2000D	1,304	LF	$83.00	$108,232.00
4	RCP TEE, 30" x 30" x 30" DIA.	1	EA	$1,750.00	$1,750.00
5	RCP TEE, 30" x 30" x 24" DIA.	2	EA	$1,600.00	$3,200.00
6	RCP TEE, 30" x 30" x 15" DIA.	1	EA	$1,500.00	$1,500.00

7	RCP TEE, 30" x 30" x 12" DIA.	1	EA	$1,300.00	$1,300.00
8	30" DIA. RCP END CAP	1	EA	$300.00	$300.00
9	24" DIA. RCP END CAP	1	EA	$250.00	$250.00
10	12" DIA. RCP END CAP	1	EA	$200.00	$200.00
SUB MAIN 1					
11	12" DIA. CMP TILE OUTLET	20	LF	$40.00	$800.00
12	8" DIA. HPDE, DUAL-WALL PIPE	930	LF	$20.00	$18,600.00
13	8" x 8" DIA. HDPE, DUAL-WALL TEE	2	EA	$50.00	$100.00
14	CONNECT TO EXISTING 30" DIA. TILE	1	EA	$500.00	$500.00
15	CRUSH IN PLACE, EXISTING 30" DIA.	950	LF	$3.00	$2,850.00
16	FILL DIRT OVER TILE TRENCH	160	CY	$20.00	$3,200.00
SUB MAIN 2					
17	15” DIA. RCP, 2000D	1,051	LF	$50.00	$52,550.00
18	12” RCP, 2000D	95	LF	$35.00	$3,325.00
19	8" DIA. HPDE, DUAL-WALL PIPE	500	LF	$20.00	$10,000.00
20	15" TO 12" RCP REDUCER	1	EA	$1,500.00	$1,500.00
21	CRUSH IN PLACE, EXISTING 24-30"	1,646	lf	$3.00	$4,938.00
22	FILL DIRT OVER TILE TRENCH	240	CY	$20.00	$4,800.00
OTHER ITEMS					
23	TILE CONNECTIONS, LESS THAN 8"	30	EA	$400.00	$12,000.00
24	TILE CONNECTIONS, 8" DIA. AND LARGER	8	EA	$600.00	$4,800.00
25	EXPLORATORY EXCAVATION	10	HR	$250.00	$2,500.00
26	TRENCH STABILIZATION AND BEDDING STONE	40	TN	$35.00	$1,400.00
27	MOBILIZATION	1	LS	$22,000.00	$22,000.00
				ESTIMATED SECTION 1 COST:	$469,000

SECTION 2: CONSTRUCTION ASSESSABLE TO SECONDARY ROADS

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
35	30" RCP, 2000D	66	LF	$85.00	$5,610.00
36	15" DIA. RCP, 2000D	66	LF	$55.00	$3,630.00
37	INTAKE, SW-512 (IDOT), CASE 2, 24" DIA.	1	EA	$5,000.00	$5,000.00
38	INTAKE, SW-512 (IDOT), CASE 2, 15" DIA.	2	EA	$3,000.00	$6,000.00
39	INTAKE CASTING, SW-604 (IDOT), TYPE 5 CASTING	1	EA	$600.00	$600.00
40	INTAKE CASTING, BEEHIVE FOR 15" DIA. RCP	2	EA	$500.00	$1,000.00
41	TRENCH STABILIZATION AND BEDDING STONE	20	TN	$35.00	$700.00
42	SILT FENCE, INSTALLATION AND REMOVAL	40	LF	$4.00	$160.00
43	MOBILIZATION	1	LS	$1,000.00	$1,000.00
				ESTIMATED SECTION 2 COST:	$24,000

ESTIMATED SUBTOTAL CONSTRUCTION COST:	**$493,000**
CONSTRUCTION CONTINGENCIES	**$49,000**
ESTIMATED TOTAL CONSTRUCTION COST	**$542,000**

ESTIMATED TOTAL ASSESSABLE CONSTRUCTION COST	**$518,000**
NON-CONSTRUCTION COSTS	
ENGINEERING - (REPORT, HEARINGS, PLANS & SPECS, BID LETTING, CONSTRUCTION, COMPLETION)	$95,000
LEGAL, PUBLICATIONS, MAILINGS, ETC.	$6,000
ANNEXATION	$3,000
RE-CLASSIFICATION	$9,000
TEMPORARY EASEMENT (14 Acres @ $1,000/AC)	$14,000
OTHER DAMAGES	$5,000
INTEREST	$30,000
ESTIMATED TOTAL DISTRICT COST	**$680,000**

AVG COST PER ACRE (BASED ON 971 ACRES):	$700
AVERAGE COST PER ACRE PER YEAR AT 6% INTEREST FOR 10 YEARS:	$95
AVERAGE COST PER ACRE PER YEAR AT 6% INTEREST FOR 20 YEARS:	$61

Option #2 – Lower Outlet:

SECTION 1: CONSTRUCTION ASSESSABLE TO PRIVATE LANDS

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
MAIN TILE					
1	30" DIA. RCP APRON W/ANIMAL	1	EA	$4,000.00	$4,000.00
2	30" DIA. RCP, 2000D	1,200	LF	$83.00	$99,600.00
3	RCP TEE, 30" x 30" x 12" DIA.	2	EA	$1,300.00	$2,600.00
4	SW-403 DEEP WELL RECTANGULAR	1	EA	$15,000.00	$15,000.00
5	30" DIA. RCP, 2000D FOR BLOWOUT	50	LF	$100.00	$5,000.00
OTHER ITEMS					
6	Tile Connections, Less than 8" Dia.	3	EA	$400.00	$1,200.00
7	Tile Connections, 8" Dia. and Larger	2	EA	$600.00	$1,200.00
8	Exploratory Excavation	5	HR	$250.00	$1,250.00
9	Trench Stabilization and Bedding Stone	10	TN	$35.00	$350.00
10	Mobilization	1	LS	$7,000.00	$7,000.00
				ESTIMATED SECTION 1 COST:	$137,000

ESTIMATED SUBTOTAL CONSTRUCTION COST:	**$137,000**
CONSTRUCTION CONTINGENCIES	**$14,000**
ESTIMATED TOTAL CONSTRUCTION COST	**$151,000**
ESTIMATED TOTAL ASSESSABLE CONSTRUCTION COST	**$151,000**
NON-CONSTRUCTION COSTS	
ENGINEERING - (REPORT, HEARINGS, PLANS & SPECS, BID LETTING, CONSTRUCTION, COMPLETION)	$50,000
LEGAL, PUBLICATIONS, MAILINGS, ETC.	$3,000
ANNEXATION	$3,000
RE-CLASSIFICATION	$9,000
TEMPORARY EASEMENT (3 Acres @ $1,000/AC)	$3,000
OTHER DAMAGES	$1,000
INTEREST	$8,000
ESTIMATED TOTAL DISTRICT COST	**$228,000**

AVG COST PER ACRE (BASED ON 971 ACRES):	$235
AVERAGE COST PER ACRE PER YEAR AT 6% INTEREST FOR 10 YEARS:	$32
AVERAGE COST PER ACRE PER YEAR AT 6% INTEREST FOR 20 YEARS:	$20

Option #3 – Right of Way Acquisition and Repair:

We estimate the cost of acquiring right-of-way to be $85,000 – $100,000 (value of land plus damage to the rest of property due to severing it, making it hard to farm around). With the repairs, engineering, annexation, and reclassification we estimate the total project cost to be approximately $146,000.

Option #4 – Repair:

The cost of repairing the tile breaks is difficult to estimate, as the condition of the tile adjacent to the breaks is unclear (making it difficult to estimate the length of tile to be installed). However, assuming 50 feet of 30" diameter tile need replaced, fill dirt will be hauled in, and including engineering, annexation, and reclassification we estimate the total project cost to be approximately $90,000.

VII. ASSESSMENT SCHEDULE REVIEW

Benefited Lands:

There are several parcels that are materially benefited by district facilities that are not included in the existing assessment schedule. We recommend annexing these lands into Drainage District No. 89, which would require further analysis, a separate report, and a public hearing. At this point in time it appears as though there are approximately 23 acres within 5 total parcels that would be annexed. See enclosed map.

Existing Classification:

A map of the existing classification is enclosed. This district is still under its original assessment schedule from 1920. All district tile facilities are included in this single assessment schedule. Under this schedule all lands are assessed for work done on any tile in the district, regardless of whether the lands benefit from it. For example, parcels that drain into Lateral 3 tile would help pay for repairs to Lateral 5 Tile, which they do not use nor benefit from. The remedy for this is to develop separate assessment schedules for each district facility, to make the cost of improvements and future repairs more equitable. This process is called re-classification, and we recommend it be done regardless of what work is done on the district tile system. Re-classification is done by a classification commission which includes an engineer and two Winnebago County landowners who neither own nor have any interest in the lands being re-classified. A report would be filed and a public hearing would be held.

Pre-Classification:

We also note that the existing assessment schedule is of no use in estimating parcel-by-parcel costs associated with this project. To give landowners a better estimate of their share of the project costs, at the Board's direction we developed a pre-classification. This is similar to the re-classification that the Board would consider at the end of the project but would be an estimate and to be used for informational purposes only. Work on the pre-classification can be reused as part of the final reclassification. The pre-classification is a separate report.

VIII. FARM PROGRAM WETLAND COMPLIANCE

We have mailed letters to owners of lands that would receive benefits from the proposed improvements and are potentially in the USDA Farm Program, requesting certified wetland determinations from the Natural Resources Conservation Service (NRCS). Only landowners or their authorized agents may request the determination.

If any farmed wetlands exist on your property within Drainage District No. 89, the construction of the proposed drainage improvements may be considered by the NRCS to be a conversion and place you in jeopardy of being in violation of farm program rules and may be required to forfeit and/or refund farm program payments received after the work commences.

If the improvements are constructed and you have farmed wetlands that are converted, your options are to either cease farming the wetland acres or purchase mitigation credits through a wetland

mitigation bank. The current fee is approximately $20,000 per acre. If you believe the wetland determination to be in error, you may request a review by the NRCS.

It is solely the responsibility of the landowner to keep themselves in farm program compliance, but because of the potential impacts to landowners within the district, we ask that you provide a certified wetland determination prior to the improvement hearing for the Board to consider.

As of the filing of this report we are not aware of any farmed wetlands located on the agricultural lands within the DD89 watershed. See enclosed map.

IX. CONCLUSION/RECOMMENDATIONS

This report confirms the need for drainage repairs and improvements within Drainage District No. 89. Several options are presented in the report. We recommend Option #1 which includes an improvement of the lower reaches of the Main Tile. The improvements proposed will provide the drainage capacity needed now and for many decades to come, and address the cover issues over the lower reaches of the Main Tile. The estimated project cost for the recommended improvement is $680,000. Yield increases for agricultural lands and increased market value of property are all potential benefits of the project. See the separate pre-classification report for parcel-by-parcel project cost estimates, to be used for informational purposes only.

There are approximately 23 acres of land that appear to benefit from the proposed facilities that are not on the existing assessment schedule. In order for these lands to be assessed to help pay for the proposed improvements, as well as future maintenance, we recommend these lands be annexed into Drainage District No. 89.

The existing assessment schedule of Drainage District No. 89 is inequitable, and re-classification is recommended, regardless of what work is done on the tile system.

The Board of Supervisors, as trustees, for Drainage District No. 89, should tentatively approve this report and set a date for a public hearing. At the hearing, the trustees should seek input from landowners. Once modifications to the report are made, if any, the proposed improvement project should be approved, the engineer should be directed to develop plans and specifications and proceed toward bid letting, and the engineer should be directed to proceed with annexation and re-classification.

Sincerely,

JACOBSON-WESTERGARD & ASSOCIATES INC.

Collin Klingbeil

Collin J. Klingbeil, P.E.

Encl. Petition
Peat Soils Map
Drainage Coefficient Maps
Public Lands / Restored Wetlands Map
Wetland Determination Status Map
Preliminary Annexation Map
Existing Classification Map
Preliminary Layout of Option #1 - Improvement

PETITION FOR DRAINAGE IMPROVEMENT 6.29.22 Form 85 P-F2691

(Old Form No. 379) (Sec. 1939 to 1998)

DD89

TO THE BOARD OF SUPERVISORS OF Winnebago COUNTY, IOWA.

The undersigned land owners whose lands will be affected by, or assessed for the expense of the proposed improvement, respectfully petition for the establishment of a drainage improvement district, described by metes and bounds as follows, to-wit:

Alan Johnson would like to have the tile lowered which would be an improvement.

Alan Johnson
6-29-22

Situated in Winnebago County and more particularly described by sections and parts of sections, as follows, to-wit:

PETITION FOR REPAIRS

Date 6.23.22

I wish to call your attention to the necessity for repair to Drainage District

No. 89 Lat. No. Main Tile

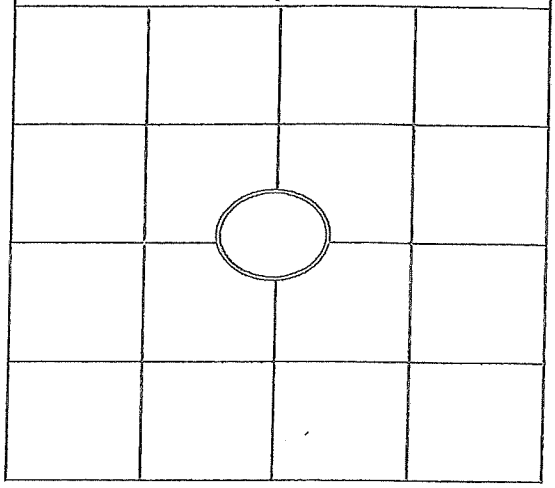
Located in Section 23

Township Mt Valley

Owner/Tenant Alan Johnson

Phone 641-590-5966

Fill in the section below as to where the repair is needed



Requested by

Phone

Signature

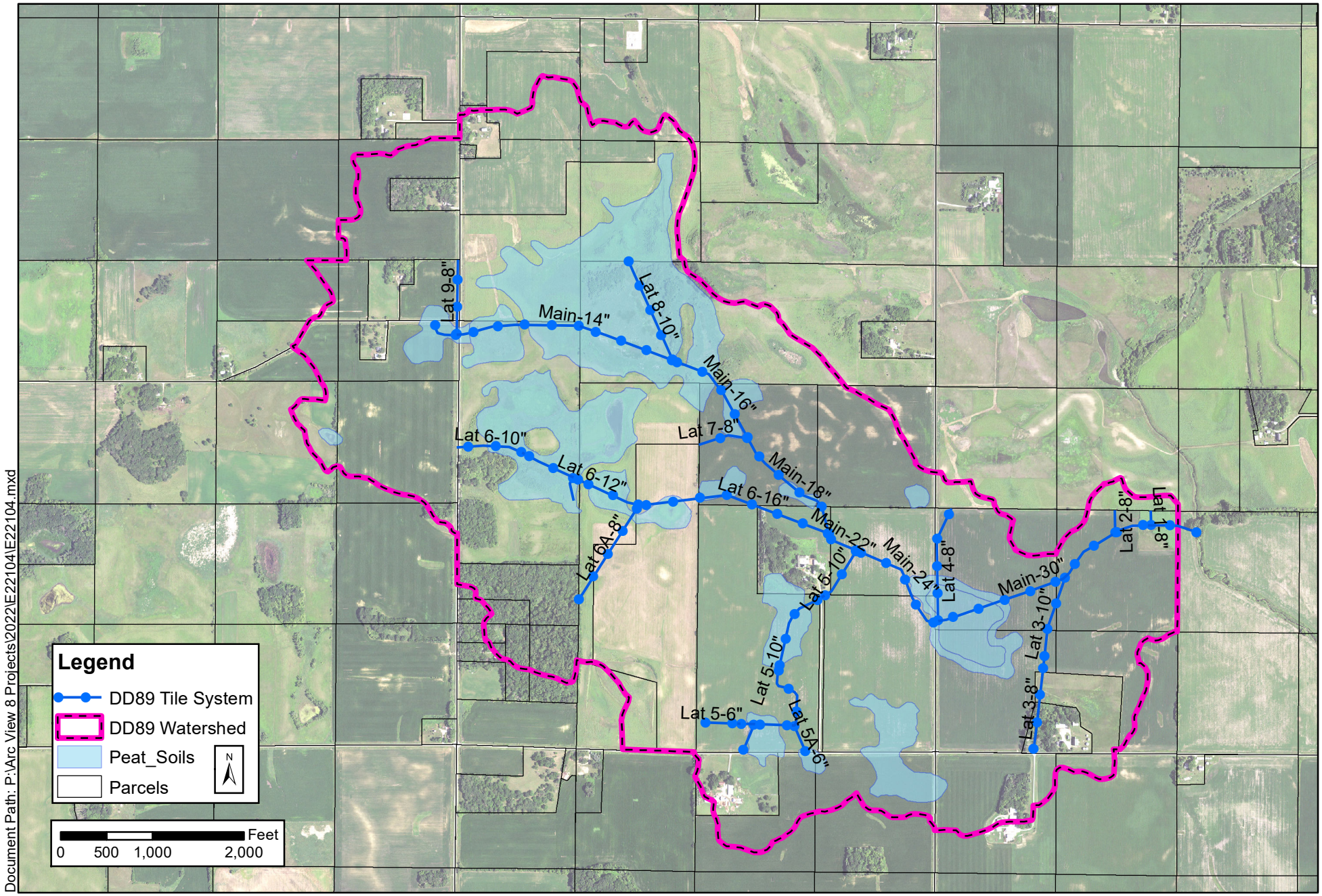
Approved by Supervisor

Location of problem

Notes tile holes - would also like to lower the tile

Drainage District No. 89
Peat Soils Map
Winnebago County, Iowa

JACOBSON-WESTERGARD
& ASSOCIATES, INC.
Consulting Engineers & Land Surveyors
www.jacobson-westergard.com

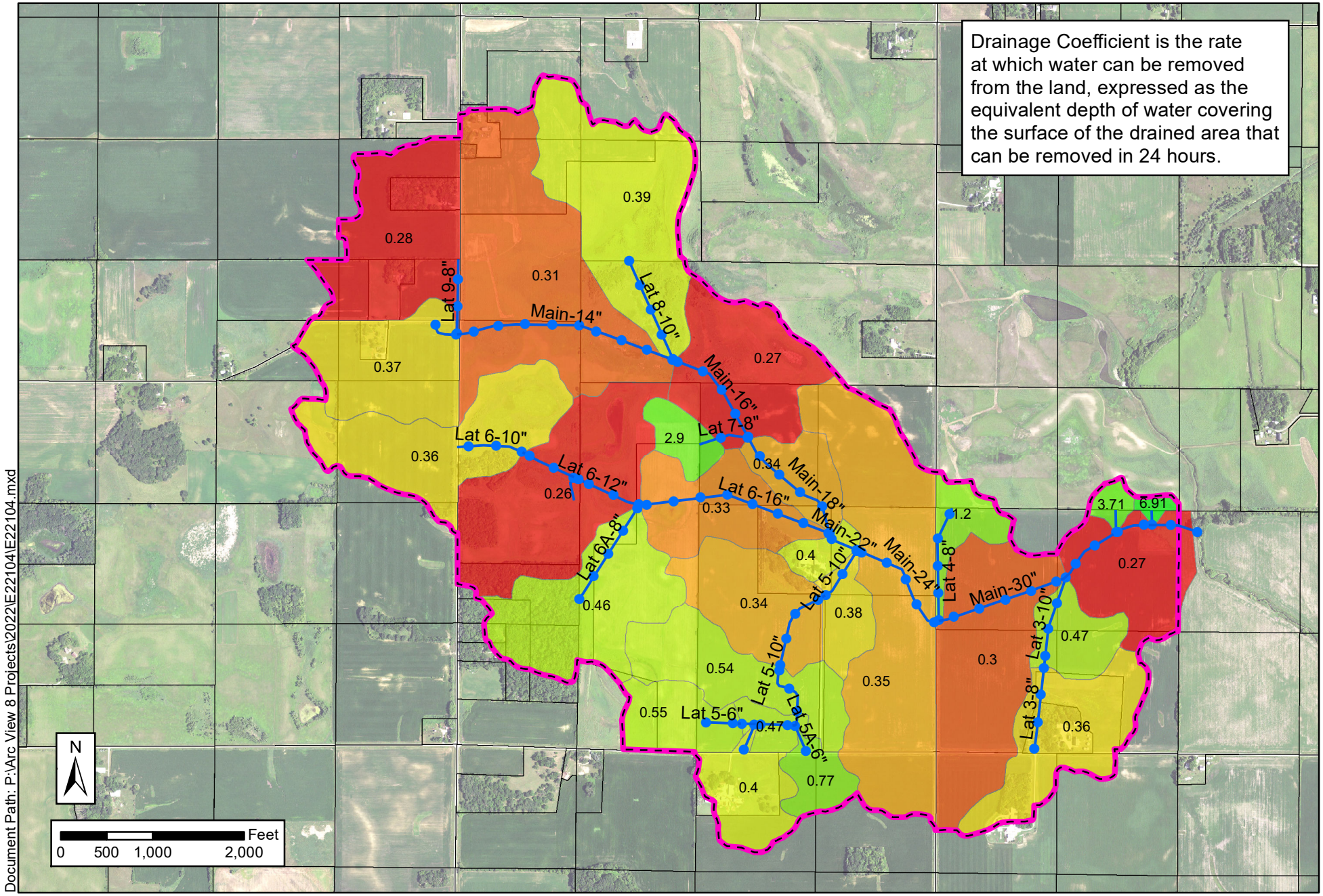


Document Path: P:\Arc View 8 Projects\2022\E22104\E22104.mxd

Drainage District No. 89
Drainage Coefficient Map

Winnebago County, Iowa

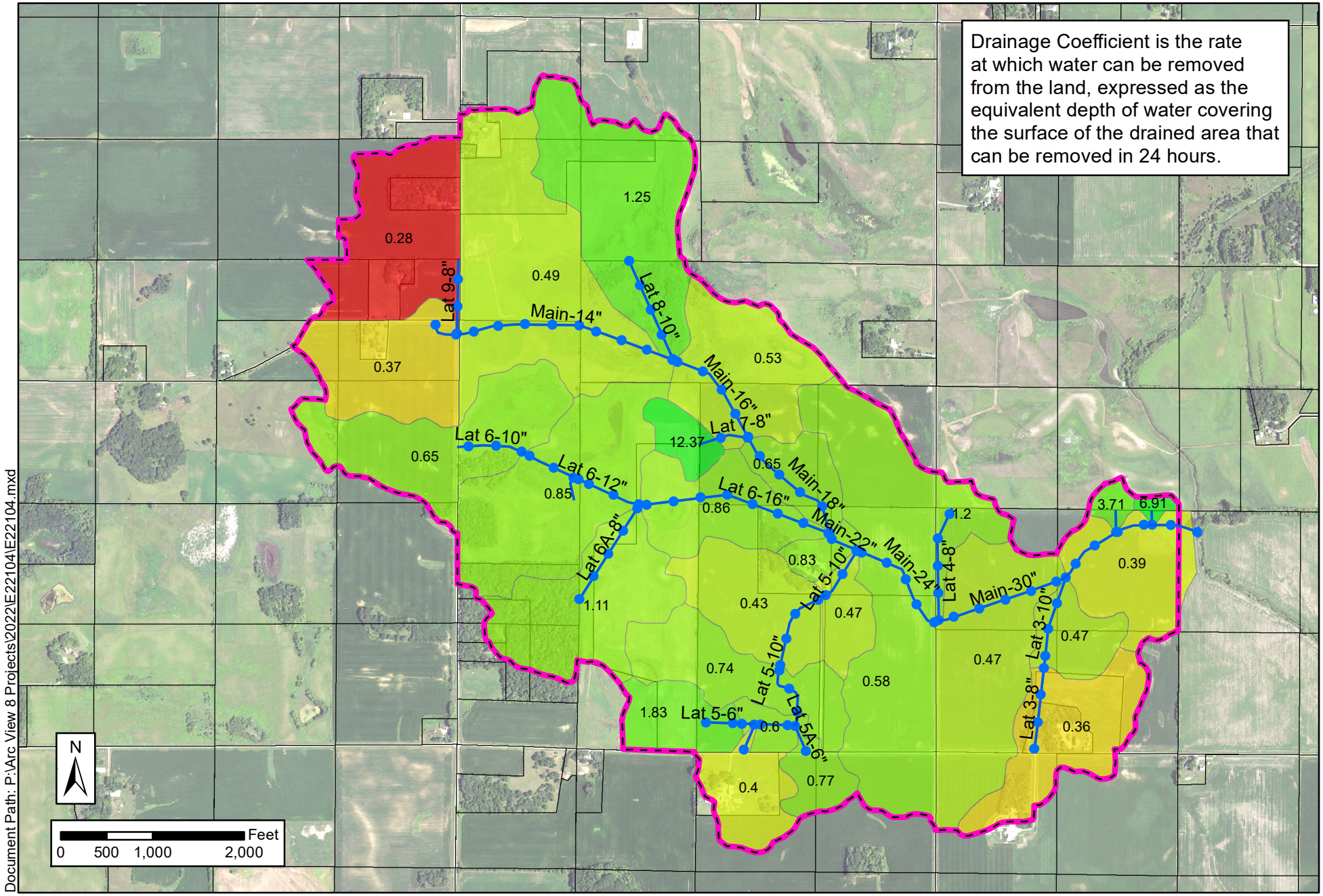
JACOBSON-WESTERGARD
& ASSOCIATES, INC.
Consulting Engineers & Land Surveyors
www.jacobson-westergard.com



Drainage District No. 89
Equivalent Drainage Coefficient Map with Public Lands Removed

Winnebago County, Iowa

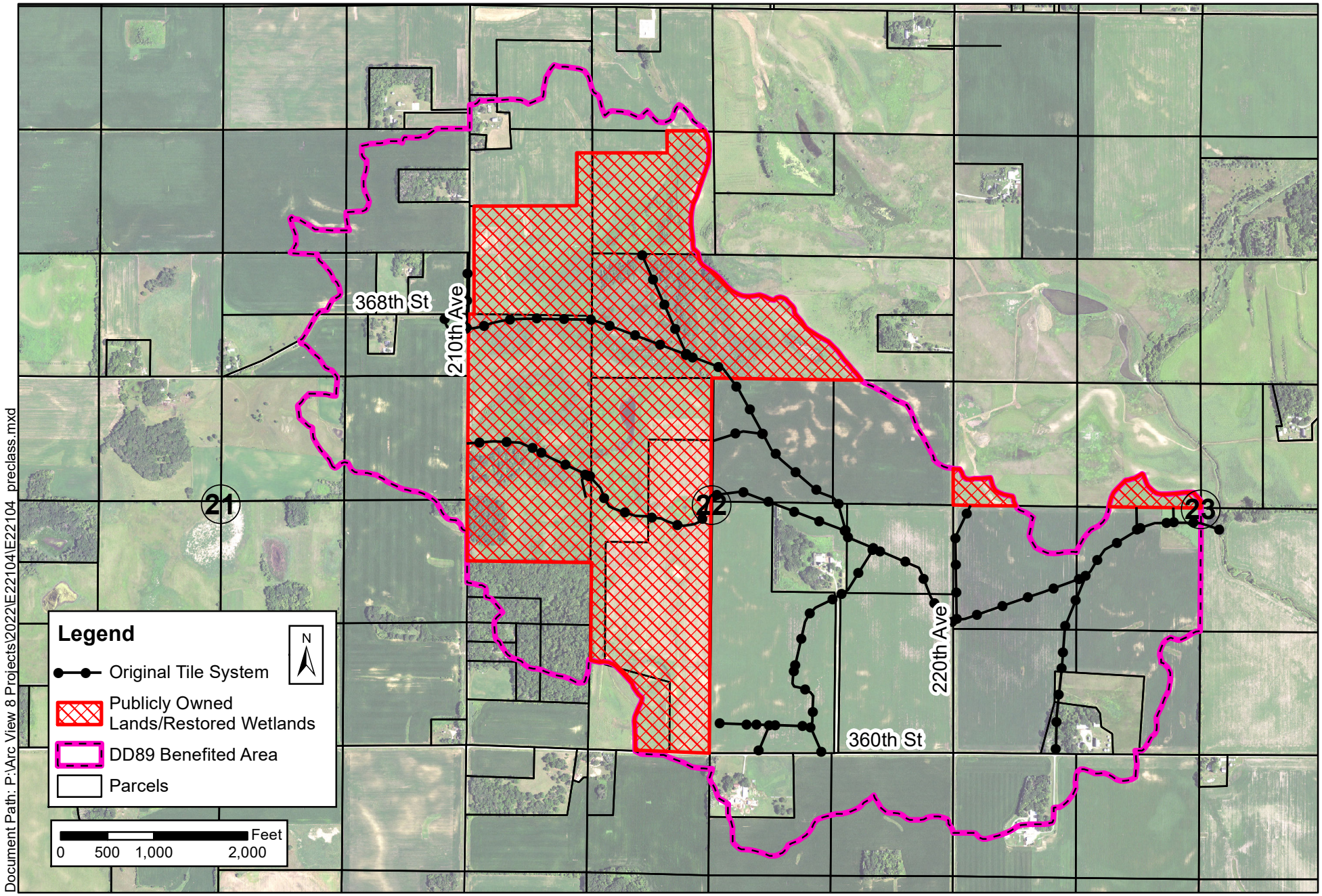
JACOBSON-WESTERGARD & ASSOCIATES, INC.
Consulting Engineers & Land Surveyors
www.jacobson-westergard.com



Drainage District No. 89
Publicly Owned Land / Restored Wetlands

Winnebago County, Iowa

JACOBSON-WESTERGARD
& ASSOCIATES, INC.
Consulting Engineers & Land Surveyors
www.jacobson-westergard.com

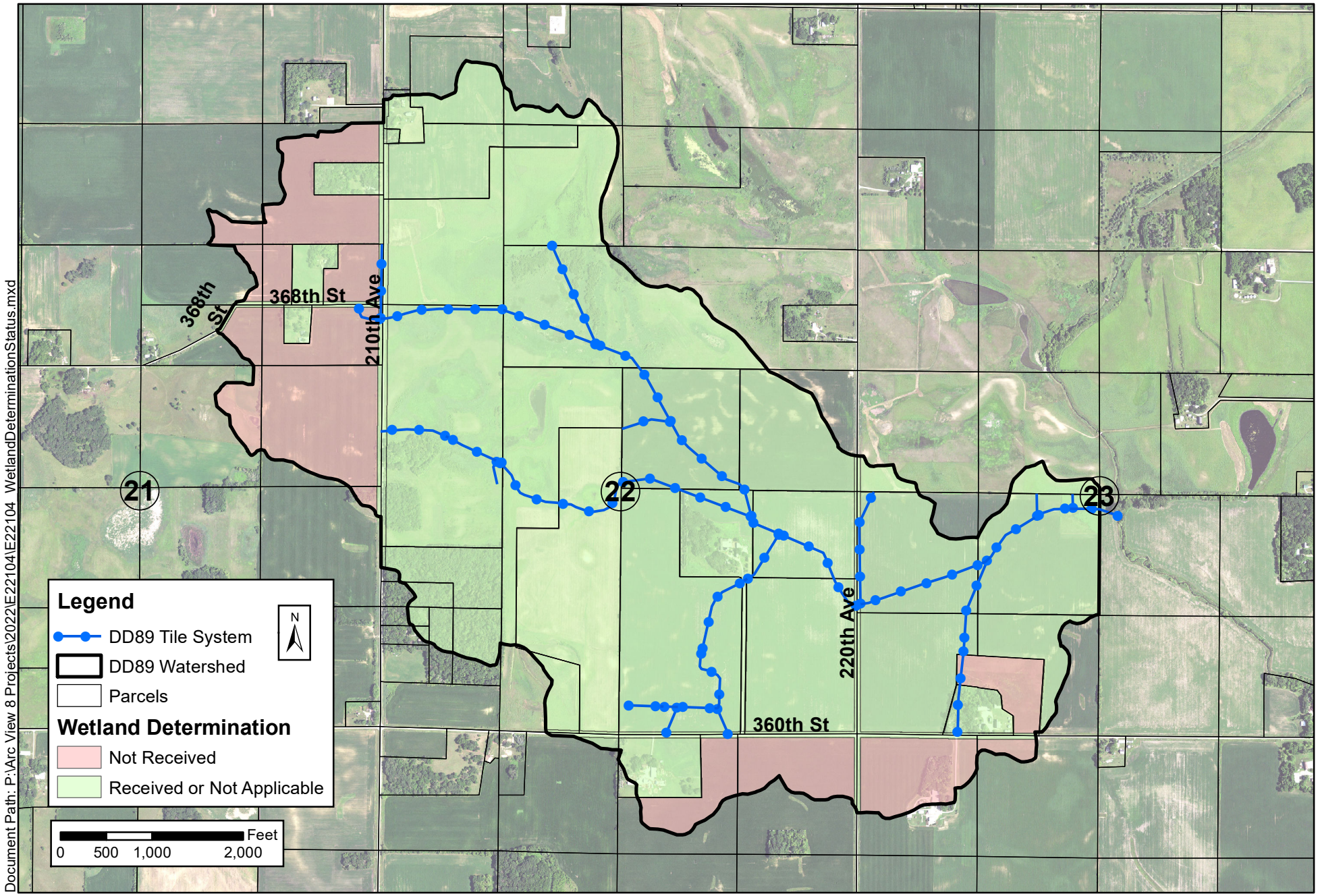


Document Path: P:\Arc View 8 Projects\2022\E22104\E22104_preclass.mxd

Drainage District No. 89
Wetland Determination Status Map, 6/20/2023

Winnebago County, Iowa

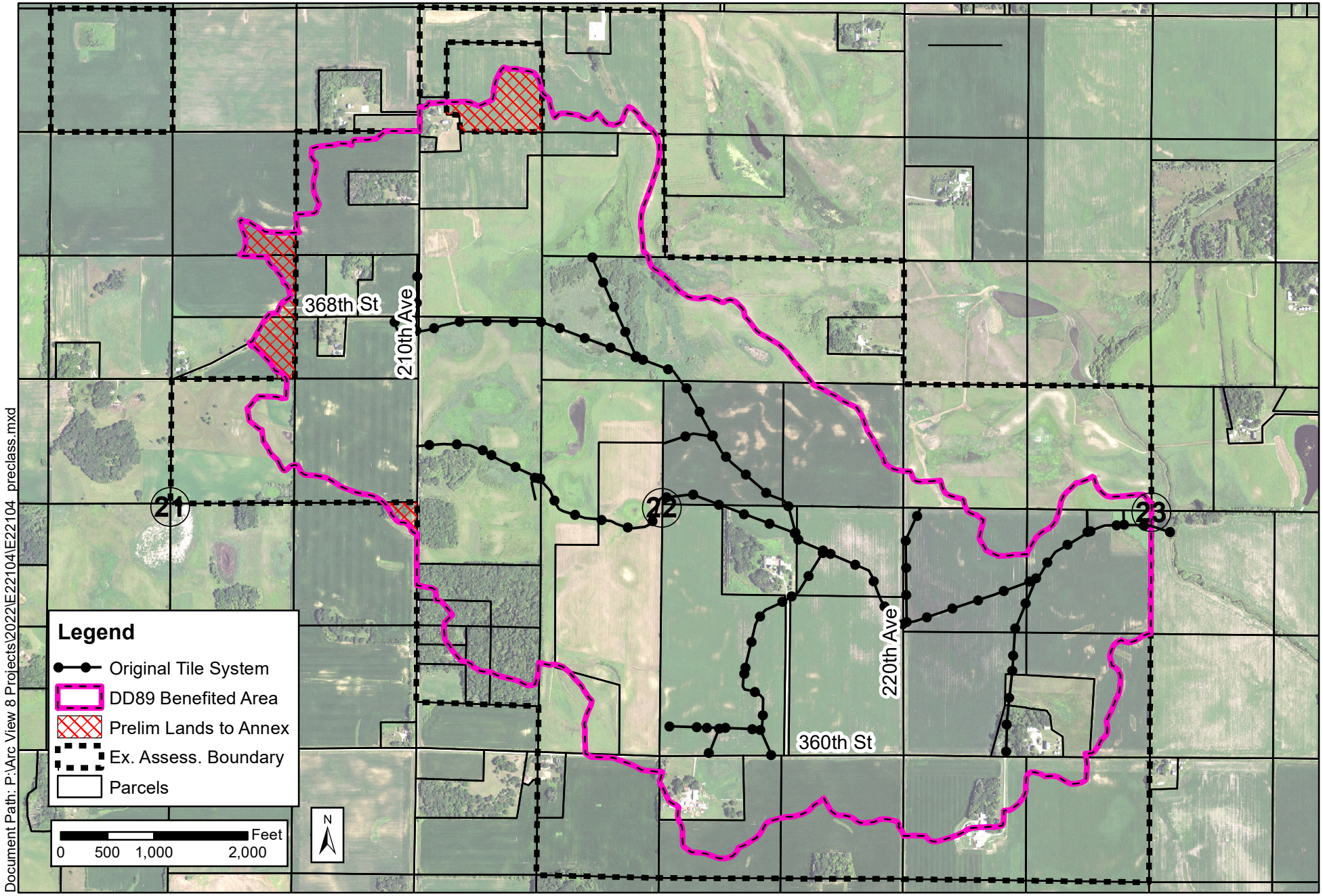
JACOBSON-WESTERGARD
& ASSOCIATES, INC.
Consulting Engineers & Land Surveyors
www.jacobson-westergard.com



Drainage District No. 89
Preliminary Annexation Map

Winnebago County, Iowa

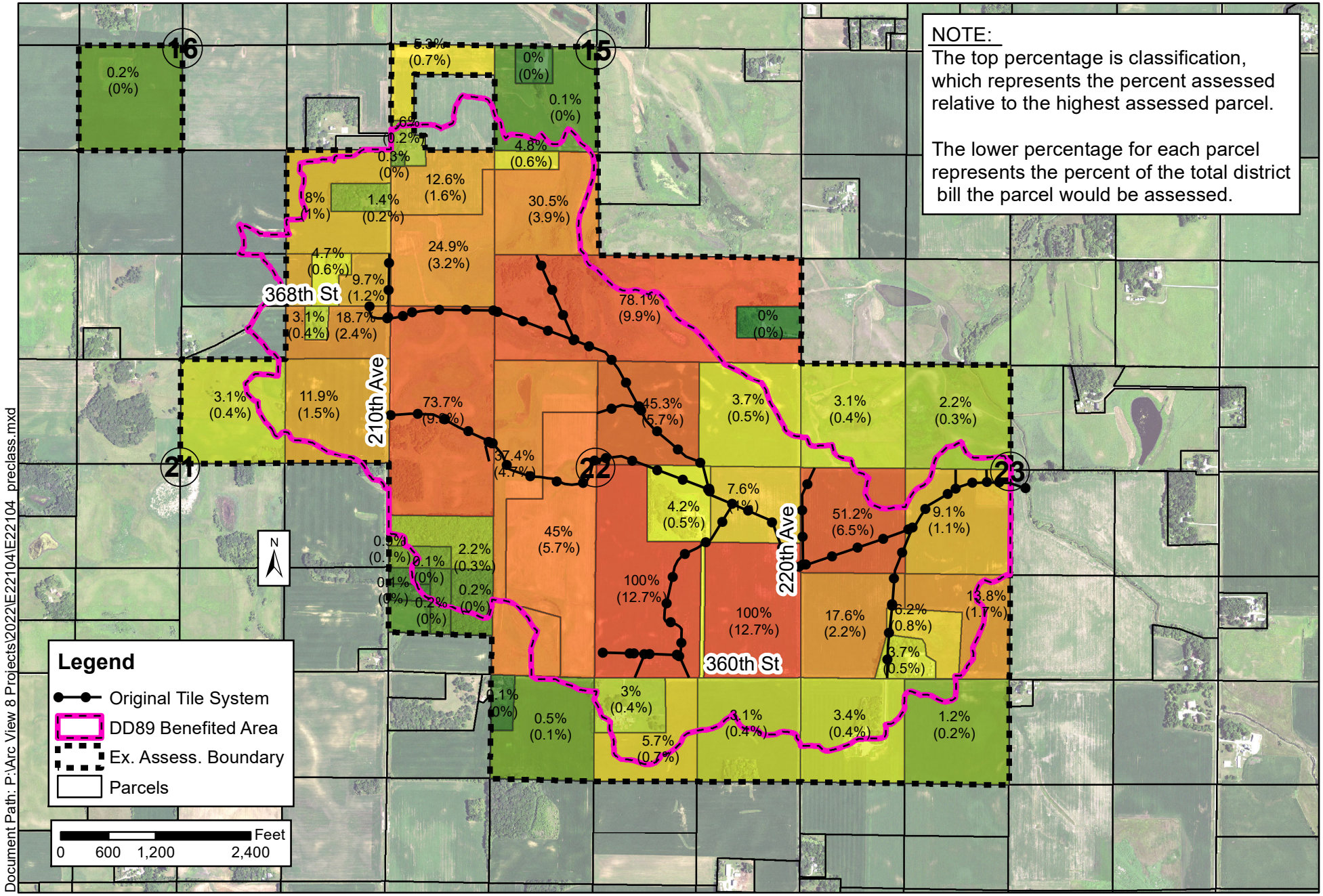
JACOBSON-WESTERGARD
& ASSOCIATES, INC.
Consulting Engineers & Land Surveyors
www.jacobson-westergard.com



Drainage District No. 89
Existing Assessment Schedule

Winnebago County, Iowa

JACOBSON-WESTERGARD & ASSOCIATES, INC.
Consulting Engineers & Land Surveyors
www.jacobson-westergard.com



Document Path: P:\Arc View 8 Projects\2022\E22104\E22104_preclass.mxd

16

15

14

21

22

23

WATERSHED BOUNDARY

BEGIN PROPOSED MAIN TILE

END PROPOSED SUB MAIN 1

BEGIN PROPOSED SUB MAIN 1

BEGIN PROPOSED SUB MAIN 2

END PROPOSED MAIN

END PROPOSED SUB MAIN 2

EXISTING MAIN

EXISTING MAIN

EX LAT 6

EX LAT 5

EX LAT 4

EX LAT 3

368TH ST

360TH ST

220TH AVE

210TH AVE

HOLTAN VALERE G & SANDY L NW SW EX TR SEC 15 98 23

HOLTAN VALERE ETAL NE SW EX TR SEC 15 98 23

ROWER, ANDREW

HOLTAN VALERE G & SANDY L SW SW EX TRACTS SEC 15 98 23

KEHM, JOHN

STATE OF IOWA PT SE ¼ SW ¼ & PT SW SE SEC 15-98-23

QUAD H FARMS LLC & HOLLAND SHARON K SE SE EX TR SEC 13-98-23

OLSON, DONALD & ARCELIA

STATE OF IOWA PT SW SW SEC 15-98-23 & PT NW NW SEC 22-98-23

RILEY DIANNE A & FRANK W N ½ NW NE SEC 21 98 23

RILEY DIANNE A & FRANK W 10.5 A S OF RD'S 1/2 NW NE SEC 21 98 23

RILEY DIANNE A & FRANK W S ½ NE NE EX TR SEC 21 98 23

WINNEBAGO COUNTY N ½ NE & NE NW SEC 22 98 23

BENSON AARON P SW NE SEC 21 98 23

RILEY DIANNE A & FRANK W SE NE SEC 21 98 23

WINNEBAGO COUNTY SW NW & S ½ NW NW & N ½ NW SW SEC 22 98 23

STATE OF IOWA E ½ SW ¼ AND SE ¼ NW ¼ WRP EASEMENT SEC 22 98 23

FC SEVERSON FARMS LLC SW NE SEC 22 98 23

FC SEVERSON FARMS LLC SE NE SEC 22 98 23

BUFFINGTON BRUCE L ETAL SW NW SEC 23 98 23

BUFFINGTON BRUCE L ETAL SE NW SEC 23 98 23

RILEY DIANNE A & FRANK W E 41.25A N ½ SE SEC 21 98 23

BENSON, JANE E S ½ NW SW SEC 22 98 23

STATE OF IOWA E ½ SW ¼ AND SE ¼ NW ¼ EXC WRP EASEMENT NE SW SEC 22 98 23

SEGERSTROM, DEREK SCOTT & REBECCA LEE TR IN SE ¼ SEC 22 98 23

JOHNSON IVAN L TRUST & PHYLLIS M TRUST E 246A OF NE SE SEC 22 98 23

JOHNSON ALAN T & LINDA A NW SW SEC 23 98 23

JOHNSON ALAN T & LINDA A NE SW SEC 23 98 23

JOHNSON IVAN L REVOC TR & PHYLLIS M REVOC TR SE ¼ EX TR SEC 22 98 23

JOHNSON IVAN L REVOC TR & PHYLLIS M REVOC TR SE ¼ EX TR SEC 22 98 23

JOHNSON ALAN T & LINDA A SW SW EX PART SEC 23 98 23

KNUDTSON JAY PARCEL "C" & "D" IN S ½ SEC 23 98 23

INGLAND JOHN & MICHELLE TR IN NW NE SEC 27 98 23

MILLER DIANE NE NE SEC 27 98 23

MILLER DIANE NW NE EX TR SEC 27 98 23

NELSON DAVID J NW NW SEC 26 98 23

NELSON DAVID J NE NW SEC 26 98 23

JACOBSON–WESTERGARD & ASSOCIATES, INC.
CONSULTING ENGINEERS LAND SURVEYING
105 S. SIXTH ST. ESTHERVILLE, IOWA
PHONE: (712) 362-2604 Toll Free (866) 215-2298
E-MAIL: jwa@jacobson-westergard.com
Web Site: www.jacobson-westergard.com

REVISIONS	BY	DATE

DRAINAGE DISTRICT No. 89
TILE IMPROVEMENTS
WINNEBAGO COUNTY, IOWA

SITE PLAN
FOR OPTION #1 - IMPROVEMENT

Date	Designer	Drafts'man	Checker
6/20/23	CJK	CJK	CJK

Project Number
E22104

Sheet
A.02

S:\Civil 3D Projects\2022\E22104\E22104_A_SHTS.dwg