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PRELIMINARY ENGINEERING REPORT

DRAINAGE DISTRICT NO. 57
PALO ALTO COUNTY, IOWA

JWA PROJECT NO: E16171

OWNER: Palo Alto County Board of Supervisors

Roger Faulstick
Ron Graettinger
Craig Merrill
Linus Solberg
Keith Wirtz

Carmen Moser, Auditor

AMENDED: 12/18/17



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.

Richard A. Hopper Date 12/18/17
Richard A. Hopper, P.E., License number 8106
My license renewal date is December 31, 2017
Pages or sheets covered by this seal: All

I. INTRODUCTION/HISTORY

A petition to establish Drainage District No. 57 was filed with the Board of Supervisors on April 12, 1913. On May 9, 1913, the board appointed T.R. Martin as the engineer for the study and he filed his report recommending several tile branches on July 7, 1913. The resolution establishing Drainage District No. 57 was approved on September 8, 1913. The bid opening was held on February 16, 1914 and the project was awarded. The Engineer recommended payment to Mason City Brick & Tile Company for completing their contract of furnishing the material on Drainage District No. 57 and the Board of Supervisors accepted the report and recommended payment December 9, 1914.

The most recent petition was filed and the Board of Supervisors appointed Rick Hopper as engineer on November 15, 2016.

II. STARTING POINT, ROUTE AND TERMINUS

Drainage District No. 57 outlets into Lateral No. 1 of Drainage District No. 48 at a point located 450 feet north and 860 feet west of the southeast corner of Section 26-94-32. Branch "A" of Drainage District No. 57 continues directly south approximately 1675 feet before turning northeast and just crossing 510th Avenue before stopping at a point located 700 feet south of the southeast corner of Section 26-94-32. Branch "B" also outlets into Lateral No. 1 of Drainage District No. 48 at the same location as Branch "A". Branch "B" goes slightly southwest to the center of section line 26-94-32 before turning sharply southwest to a point located 680 feet south and 1860 feet east of the northwest corner of Section 35-94-32. It then turns directly east approximately 600 feet before turning south approximately 1000 feet to a point located 940 feet north and 1540 feet west of the center of Section 35-94-32. It then turns south 30 degrees west for 650 feet. After 500 feet, along that route, Branch "B" ends and Branch "C" begins. At this point, located 1920 feet west and 400 feet north of the center of Section 35, Branch "D" continues mainly south for 420 feet. Branch "C" continues in an easterly direction for 1650 feet. Lateral "E" ties into Branch "C" at STA 11+70 just on the west side of 500th Avenue and travels south 340 feet.

III. EXISTING SYSTEM

Branch "A" consists of tile ranging in size from 8" to 12" with a capacity of 3/8". Branch "B" consists of tile ranging from 12" to 15" with a capacity of less than 1/4". Branch "C" consists of tile ranging in size from 8" to 12", with the 10" and 12" tile at capacities of 1/8" and less than 1/4", respectively. Branch D is an existing 6" tile with a 1/4" capacity, and Branch "E" is an existing 6" tile with just less than 1/2" capacity.

IV. PROPOSED IMPROVEMENTS

The proposed improvements will only address improvements to Branch "B" and Branch "C" and will include two options.

The first option would be a new parallel tile with a 1/2-inch drainage coefficient. The pipe for this option would range in size from 12-inch to 24-inch pipe. A cost estimate for this option can be seen following in this report.

The second option would be a new parallel tile with a 1-inch drainage coefficient. The pipe for this option would range in size from 12-inch to 30-inch. A cost estimate for this option can be seen following in this report.

V. RIGHT OF WAY

Since the tile improvements will be offset from the existing tile, additional right-of-way will be required. This will be permanent right-of-way. The permanent right-of-way will be a 30-foot wide easement where most excavation will occur. There may also be crop damage to pay for, but the extent of this is unknown at this time.

VI. COST ESTIMATES

The first estimate will be for a 1/2" drainage coefficient system.

OPTION NO. 1 – 1/2" DRAINAGE COEFFICIENT

ITEM NO.	ITEM DESCRIPTION	QUANTITY & UNIT	UNIT PRICE	TOTAL PRICE
1.	Connection to existing structure	1 Each	\$ 2,000.00	\$ 2,000.00
2.	24" RCP, 1500D	2434 L.F.	\$ 32.00	\$ 77,888.00
*3.	24" RCP, 2000D	66 L.F.	\$ 42.00	\$ 2,772.00
4.	21" RCP, 1500D	2700 L.F.	\$ 28.00	\$ 75,600.00
*5.	18" RCP, 2000D	66 L.F.	\$ 32.00	\$ 2,112.00
6.	18" RCP, 1500D	1104 L.F.	\$ 22.00	\$ 24,288.00
7.	12" RCP, 1500D	630 L.F.	\$ 17.00	\$ 10,710.00
8.	Junction Box	5 Each	\$ 3,500.00	\$ 17,500.00
9.	Tee - 24" x 24" x 12"	1 Each	\$ 700.00	\$ 700.00
10.	Tile Connections	15 Each	\$ 350.00	\$ 5,250.00
*11.	Granular Surfacing	40 Ton	\$ 18.00	\$ 720.00
12.	Exploratory Excavation	8 Hours	\$ 200.00	\$ 1,600.00
13.	Trench Stabilization	15 Ton	\$ 25.00	\$ 350.00
14.	Area Drain	3 Each	\$ 750.00	\$ 2,250.00
ESTIMATED SUBTOTAL CONSTRUCTION COST				\$ 223,740.00
ESTIMATED TOTAL DISTRICT COST				\$ 218,136.00
CONTINGENCIES				\$ 21,814.00
ENGINEERING, LEGAL, PUBLICATION				\$ 24,500.00
CLASSIFICATION				\$ 4,000.00
PERMANENT EASEMENT (4.82 Acres @ \$2000)				\$ 9,640.00
INTEREST				\$ 11,000.00
ESTIMATED TOTAL DISTRICT COST				<u>\$ 289,090.00</u>

AVERAGE COST PER ACRE: \$886.78 (Based on 326 Acres)
(\$71/acre/year for 20 years)
(115/acre/year for 10 years)

*Secondary Road Costs

The second option is for a parallel 1" coefficient system.

OPTION NO. 2 – 1" DRAINAGE COEFFICIENT

ITEM NO.	ITEM DESCRIPTION	QUANTITY & UNIT	UNIT PRICE	TOTAL PRICE
1.	Connection to existing structure	1 Each	\$ 2,500.00	\$ 2,500.00
2.	30" RCP, 1500D	2434 L.F.	\$ 38.00	\$ 92,492.00
*3.	30" RCP, 2000D	66 L.F.	\$ 48.00	\$ 3,168.00
4.	27" RCP, 1500D	2700 L.F.	\$ 36.00	\$ 97,200.00
5.	24" RCP, 1500D	150 L.F.	\$ 32.00	\$ 4,800.00
*6.	21" RCP, 2000D	66 L.F.	\$ 38.00	\$ 2,508.00
7.	21" RCP, 1500D	954 L.F.	\$ 28.00	\$ 26,712.00
8.	12" RCP, 1500D	630 L.F.	\$ 17.00	\$ 10,710.00
9.	Junction Box	5 Each	\$ 4,000.00	\$ 20,000.00
10.	Tee - 30" x 30" x 12"	1 Each	\$ 800.00	\$ 800.00
11.	Tile Connections	17 Each	\$ 350.00	\$ 5,950.00
*12.	Granular Surfacing	40 Ton	\$ 18.00	\$ 720.00
13.	Exploratory Excavation	8 Hours	\$ 200.00	\$ 1,600.00
14.	Trench Stabilization	15 Ton	\$ 25.00	\$ 375.00
15.	Area Drain	3 Each	\$ 750.00	\$ 2,250.00
ESTIMATED SUBTOTAL CONSTRUCTION COST				\$ 270,729.00
ESTIMATED TOTAL DISTRICT COST				\$ 264,333.00
CONTINGENCIES				\$ 26,433.00
ENGINEERING, LEGAL, PUBLICATION				\$ 24,500.00
CLASSIFICATION				\$ 4,000.00
PERMANENT EASEMENT 4.82 Acres @ \$2000				\$ 9,640.00
INTEREST				\$ 13,500.00
ESTIMATED TOTAL DISTRICT COST				<u>\$ 342,406.00</u>

AVERAGE COST PER ACRE: \$1050.32 (Based on 326 Acres)
(\$84/acre/year for 20 years)
(\$137/acre/year for 10 years)

*Secondary Road Costs

VII. CONCLUSION/RECOMMENDATION

The proposed improvements in Drainage District No. 57 include systems with 1/2-inch and 1-inch drainage coefficients. Either of the options will provide greatly improved drainage in the main of the drainage district.

The minimum improvement we would recommend is the 1/2-inch coefficient system.

The board should also consider improving the existing tile of Branch 1 in Drainage District No. 48 from the outlet of Drainage District No. 57 to the main open ditch of Drainage District No. 48. The current drainage coefficient is just over 1/8 inch for this portion of the Lateral No. 1, Drainage District No. 48. A cost estimate for this is shown below.

OPTION NO. 3 – DRAINAGE DISTRICT NO. 48, LATERAL 1

ITEM NO.	ITEM DESCRIPTION	QUANTITY & UNIT	UNIT PRICE	TOTAL PRICE
1.	36" 2000D RCP	2600 L.F.	\$ 55.00	\$ 143,000.00
2.	Junction Box	1 Each	\$ 10,000.00	\$ 10,000.00
3.	36" RCP Apron with Splash Blocks, Gravel & Riprap	1 Each	\$ 3,000.00	\$ 3,000.00
4.	Tile Connections	6 Each	\$ 350.00	\$ 2,100.00
ESTIMATED SUBTOTAL CONSTRUCTION COST				\$ 158,100.00
CONTINGENCIES				\$ 15,810.00
ENGINEERING, LEGAL, PUBLICATION				\$ 15,000.00
INTEREST				\$ 8,000.00
ESTIMATED TOTAL DISTRICT COST				<u>\$ 196,910.00</u>

AVERAGE COST PER ACRE: \$152.64 (Based on 1290 Acres)

The Board of Supervisors, as trustees, for DD#57, should accept this report and set a date for a public hearing.

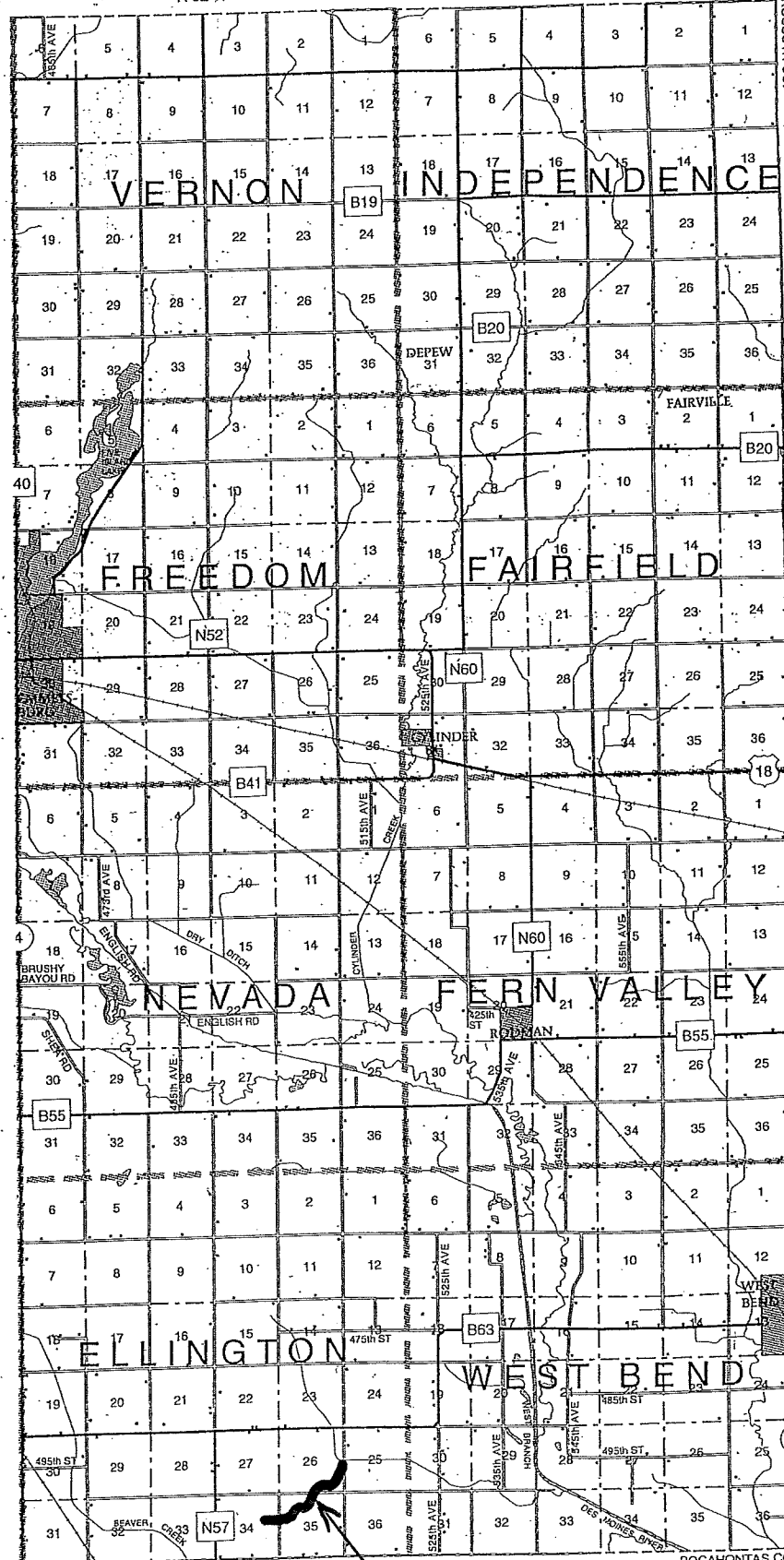
At the hearing the trustees should seek input from landowners regarding which options to pursue. More than one option could be bid with the final decision on which one to construct coming after the bid.

A reclassification will be required with any of the options.

490th AVE
470th AVE
480th AVE
490th AVE
500th AVE
510th AVE
520th AVE
530th AVE
540th AVE
550th AVE
560th AVE
570th AVE
580th AVE

R-32-W
R-31-W

EMMET CO.
POCAHONTAS CO.



270th ST
280th ST
290th ST
300th ST
310th ST
320th ST
330th ST
340th ST
350th ST
360th ST
370th ST
380th ST
390th ST
400th ST
410th ST
420th ST
430th ST
440th ST
450th ST
460th ST
470th ST
480th ST
490th ST
500th ST
510th ST

CHICAGO & NORTH WESTERN TRANSPORTATION CO.
R-32-W
R-31-W
POCAHONTAS CO.

PROJECT LOCATION