

JUNE 22, 2021

Osceola County Board of Supervisors
DD64 & DD65 Letter Report
300 7th St
Sibley, IA 51249



RE: DRAINAGE DISTRICT NO. 64 & DRAINAGE DISTRICT NO. 65, OPEN DITCH REPAIR
LANDOWNERS' PETITION FOR INVESTIGATION

SCOPE OF STUDY

On April 2, 2021, petitions were filed with the Osceola County Auditor, requesting that Drainage District No. 64 (DD64) and Drainage District No. 65 (DD65) be investigated for repair. The Board of Supervisors accepted the petition on April 9th, 2021, and appointed ISG to perform a preliminary investigation and report their findings. A topographic survey was conducted to document sediment levels, bank sloughing and tile and surface drain condition and location. In addition, copies of DD64 and DD65 plans were acquired from the Osceola County Engineer's office to determine the original intended or subsequently improved capacity of each the DD64 and DD65 Main Open Ditch.

HISTORY

There is limited history associated with DD64 and DD65 in the records at the Osceola County Courthouse. However, it was found that plans to construct DD64 were developed in cooperation with the United States Department of Agriculture (USDA) Soil Conservation Service in 1969. The construction of DD64 deepened, straightened, and improved segments of Dry Run Creek in Section 5 of Allison Township (T99N, R39W) and Sections 28, 32 and 33 of Fairview Township (T100N, R39W). Plans show that DD64 also established nine (9) Branch Tile. In addition, approximately 800 feet of dike were constructed along the lower extents of DD64. Plans to construct DD65 are dated February 1971, following the establishment of DD64. The construction of DD65, further deepened, straightened, and improved upper segments of Dry Run Creek in Section 20 and 29 of Fairview Township (T100N, R39W). The 1971 plans also indicate that a Main Tile and several surface drains were installed as part of the DD65 construction project.

LOCATION & DESCRIPTION

The Main Open Ditch systems of DD64 and DD65 are contiguous to each other, with the DD64 Main Open Ditch serving as the outlet for the DD65 Main Open Ditch. The DD64 Main Open Ditch begins approximately 400 feet south of Iowa Highway 9, approximately 2 miles west of Harris. The DD65 Main Open Ditch then generally continues north for approximately 2.80 miles, until reaching a 10-foot by 10-foot RC box culvert under Warbler Avenue, where it serves as an outlet for the DD65 Main Open Ditch. The DD65 Main Open Ditch then stretches north for approximately 1 mile before terminating near the center of Section 20 Fairview Township (T100N R39W) at the headwall for the DD65 Main Tile. The combined DD64 and DD65 facilities serve approximately 4,458 acres located between Sections 4 and 5 of Allison Township (T99N R39W) and Sections 16, 17, 18, 19, 20, 21, 28, 29, 30, 32 and 33 of Fairview Township (T100N, R39W).

INVESTIGATION

A topographic survey was conducted in the spring of 2021 to record the existing conditions of the DD64 and DD65 Main Open Ditches, as well as the location of tile extensions and surface drains. In addition, data was collected at all public and private crossings. Please note, that the stationing referenced in this report is based upon the approximate stations listed in the original plans for DD64 and DD65. The outlet of DD64 is at Station 396+00 with the top end at Station 543+66. The outlet of DD65 is at Station 150+00 with the top end at Station 202+00.

Findings

DD64

Existing sediment levels and ditch bank conditions were reviewed in comparison to ditch grades and dimensions specified in the DD64 plans dated March 1969. Table 1 below shows the dimensions specified in the 1969 plans. Review of the projected 1969 profile found that from Stations 396+00 to 426+00 the ditch bottom is either at or below the intended grade line. After Station 426+00 to the 10-foot by 10-foot RC box culvert at Warbler Avenue (STA. 543+66) sediment levels vary between 0 and 2.5 feet in depth with an average depth of accumulation of approximately 0.4 feet. The channel meanders throughout the entire length of the open ditch, which has resulted in multiple areas where the ditch banks have eroded or sloughed. There was also significant beaver activity observed along the ditch, with a total of four (4) beaver dams discovered. These dams slow down flow of the water and increase sedimentation within the ditch. In addition, water trying to find a path around these dams results in increased ditch bank erosion. There are also several areas where field runoff has overtopped the bank, causing bank washouts. Trees, shrubs, and other woody vegetation were found to be growing within, and along the top of banks, with the most concentrated growth occurring between Highway 9 and Warbler Avenue. In addition, Snyder Wildlife Area is overgrown with saplings which is contributing to beaver activity. The tile extensions and surface drains outletting to the ditch were found to be in poor condition and needing to be replaced. Additionally, it was found that several surface drain inlets had been farmed over and smashed, which caused water to overtop the ditch banks.

There are four (4) public crossings which traverse across the DD64 Open Ditch, consisting of three (3) public road crossings and one (1) public trail crossing. The crossings at Iowa Highway 9, Warbler Avenue and Osceola County Trail are all bridges. The crossing under 140th Street (HWY A18) was found to be a 10-foot by 12-foot RC box culvert. All crossings were found to be of adequate capacity for agricultural drainage and with their inverts below the design grade line of the open ditches so that flows are not obstructed.

DD65

Existing sediment levels and ditch bank conditions were reviewed in comparison to ditch grades and dimensions specified in the DD65 plans dated February 1971. Table 2 below shows the dimensions specified in the 1971 plans. Review of the projected 1971 profile found that from Stations 150+00 to 168+54, sediment levels vary between 0 and 2.5 feet in depth with an average depth of accumulation of approximately 0.75 feet. Sediment accumulation is the most significant from Stations 188+00 to the top end (STA 202+00), with an average depth of approximately 1.25 feet in depth. The sediment is causing a partial blockage of the District's Main Tile outlet, causing backpressure on this system that serves approximately 411 acres. The Tile Main consists of 3,750 feet of 12-inch tile installed on a grade of 0.13%. The Main Tile traverse northwest along a waterway and helps to provide drainage to otherwise land locked parcels. The Tile Main was found to have approximately 24% of a 3/8-inch drainage coefficient. The DD65 Main Tile is undersized for the lands it serves, however the back pressure caused by the sediment in the ditch is further reducing the capacity.

The channel meanders throughout the entire length of the open ditch, which has resulted in multiple areas where the ditch banks have eroded or sloughed. There are also several areas where the spoil banks along the ditch have been farmed down and field runoff is overtopping the bank, causing bank washouts. Some trees, shrubs and other woody vegetation were found sporadically along the open ditch, with no areas of concentration. No major beaver activity was found. The tile extensions and surface drains outletting to the ditch were found to be in poor condition, except for a few recently installed surface drains. The headwall at the top end of DD65, was found to be in fair condition and is sufficiently stabilizing the grade above. Additionally, it was found that several surface drain inlets had been farmed over and smashed, which caused runoff to overtop the ditch banks.

There are three (3) crossings which traverse the DD65 Open Ditch, consisting of two (2) public road crossings and one (1) private crossing. The first crossing is a 10-foot by 10-foot RC box culvert under Warbler Avenue, which was found to be of



adequate capacity and installed at or slightly below the grade line of the ditch. The second crossing is a 60-inch RC pipe under 130th Street, the culvert was found to be of adequate capacity and installed at or below the design gradeline. In addition, there is a 6-foot by 6-foot RC double box culvert to the east of the 60-inch RC pipe, which existed prior to the establishment of DD65. However, this double box culvert is installed approximately 4.8 feet above the ditch’s grade line and only provides relief during large storm events. The last crossing is a 30-inch CMP crossing, which serves as a private field crossing at approximately Station 200+75. The crossing was found to be installed above the original intended grade line by approximately 1-foot and is restricting the ditches capacity. The condition of this culvert is unknown due to high water levels, however from review of historical aerials it would appear the culvert is approximately 30-years old and nearing the end of its lifespan. If the same size culvert was installed at the proper elevation it would have adequate capacity for agricultural drainage.

Evaluation

DD64

Due to the flat grades of the DD64 MOD, flow velocities were analyzed to determine if they would cause increased sedimentation. According to the Iowa Drainage Guide, “Velocities less than 1.5 feet per second should be avoided since siltation will take place and permit growth of mosses and weeds.”. The Iowa Drainage Guide’s Drainage Curve C was used to determine flow volumes. Table 1 below shows the normal flow data for DD64.

Table 1: Drainage District No. 64, Flow Analysis

Drainage District No. 64, Main Open Ditch						
Start Station	End Station	Grade (ft/ft)	Sideslope	Bottom Width	Flow Volume (cfs)	Velocity (fps)
396+00	408+00	0.0004	2H:1V	14'	184.79	1.96
408+00	427+38	0.0004	2H:1V	10'	142.18	1.89
427+38	445+00	0.0008	2H:1V	4'	134.36	2.47
445+00	465+00	0.0008	2H:1V	4'	127.66	2.44
465+00	484+05	0.0008	2H:1V	4'	122.83	2.41
484+05	522+90	0.0008	2H:1V	4'	119.18	2.39
522+90	543+66	0.008	2H:1V	4'	104.6	2.32

Based upon the normal flow velocities we would not expect increased siltation and sedimentation rates to occur during normal flows. In addition, soils along the ditch were analyzed to verify there would not be erosive velocities in the channel. A review of the USDA Web Soil survey determined that the DD65 Main Open Ditch primarily consists of Canisteo clay loam. According to the Iowa Drainage Guide, the maximum allowable velocity for clay loams is 4.0 fps. Therefore, we would not expect significant bank erosion within the channel during normal flows.

DD65

Due to the relatively steep grade of the DD65 ditch, it was analyzed to determine if there would be erosive velocities during normal storm flows. The Iowa Drainage Guide’s Drainage Curve C was used to determine flow volumes. The original plans for the DD65 Main Open Ditch indicate that the ditch was constructed on a 0.17% grade line with a 4-foot bottom and 2H:1V sideslopes. However, we found that the actual grade of the DD65 Open Ditch is 0.20%. Table 2 below shows normal flow data for DD65.



Table 2: Drainage District No. 65, Flow Analysis

Drainage District No. 65, Main Open Ditch						
Start Station	End Station	Grade (ft/ft)	Sideslope	Bottom Width	Flow Volume (cfs)	Velocity (fps)
150+00	202+00	0.002	2H:1V	4	78.87	3.03

A review of the USDA Web Soil survey determined that the DD65 Main Open Ditch primarily consists of Canisteo clay loam. According to the Iowa Drainage Guide, the maximum allowable velocity for clay loams is 4.0 fps. Therefore, we would not expect significant bank erosion within the channel during normal flows.

Annexation Evaluation

As part of our investigation, we mapped the watershed boundary of each District using LiDAR and reviewed them against the existing assessment schedules on file at the Osceola County Courthouse, to determine if there are any lands currently draining to a facility of the District which are not being assessed for benefit.

DD64

Review of the current assessment schedule and 1969 plat found that there are only 29 parcels totaling approximately 227 acres being assessed for benefit in DD64. From review of the watershed it was found that there are approximately 4,458 acres of land draining to the outlet of DD64. (Please refer to the District plat attached). However, 1,231 acres of land drain through a natural channel near the outlet of DD64 and are receiving little to no benefit from the ditch. Therefore, it was found that there is approximately 3,226 acres which are currently benefitting from the DD64 MOD. Of the 3,226 acres of land benefitting from the DD64 MOD, it was found 734 acres are part of parcels which are already being assessed for benefit and approximately 2,506 acres of land would need to be annexed into DD64. In addition, there is one (1) parcel included for benefit which does not appear to benefit from DD64. It is clear that at the time of DD64’s establishment, the original classification and determination of benefits was not properly completed.

DD65

Review of the current assessment schedule and 1971 plat found that there are 62 parcels totaling approximately 1,588 acres being assessed for benefit in DD65. (Please refer to the District plat attached). From review of the watershed it was found that there are approximately 1,618 acres of land draining to the outlet of DD65. Due to parcels splits and other minor changes in watershed boundary compared to the original there would be approximately 83 acres of land that we would recommend for annexation into DD65. In addition, there are eleven (11) parcels currently being assessed for benefit, which do not appear to be receiving benefit from DD65.

Reclassification

We also completed a preliminary review for reclassification of benefits of each district. It is our recommendation that both DD64 and DD65 undergo a reclassification of benefit. DD64’s current schedule has never been properly developed and needs to have a significant amount of lands annexed for benefit. In addition, there is only one (1) DD64 assessment schedule and no formal schedule has ever been developed for DD64’s branch tile. DD65’s current schedule has not been properly maintained over the years; As parcels were split, the assessed parcels have not been properly tracked. In addition, there is only one (1) schedule and no formal schedule has ever been developed separating the DD64 Main Open Ditch and Main Tile.

SUMMARY & RECOMMENDATION

It is clear that the DD64 and DD65 Main Open Ditch could benefit from a repair. It is our recommendation that the DD64 and DD65 Main Open Ditches have sediment cleaned out to the original intended grade line, beaver dams removed, meanders repaired, and ditch banks pulled with spoil banks reshaped. We would also recommend that all trees, shrubs, and woody vegetation be removed along the open ditch within the top of banks and 25 feet outside the top of banks. Additionally, we recommend that both DD64 and DD65 undergo annexation and reclassification. Based upon the cost estimates included in Appendix A, an Engineer's Report and hearing with landowner is not required. Senate File 353 made changes to Iowa Code Section 468.126, so that an Engineer's Report is not required if the repair's estimated cost exceeds \$50,000 or the adjusted competitive bid threshold, whichever is more; the competitive bid threshold for 2021 is \$139,000. It is still our recommendation that even though an Engineer's Report is not required, that an informational hearing be held, so that landowners within the District are informed of the project. This is especially important that since there will be annexation and reclassification associated with the repair project.

Sincerely,



Cole M. Budach, E.I.

Graduate Engineer

Cole.Budach@ISGinc.com

c: Rochelle VanTilburg, Osceola County Auditor
Shantry Dake, Osceola County Drainage Clerk

APPENDIX A: Cost Estimate

OPEN DITCH REPAIR
DRAINAGE DISTRICT 64 OSCEOLA COUNTY
ESTIMATE OF PROBABLE COSTS



PRELIMINARY REPORT - JUNE 2021

PROJECT NUMBER: 21-25208

DD64 PROPOSED OPEN DITCH REPAIRS

ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
1.	Mobilization	1	JOB	6,110.00	\$6,110.00
2.	Open Ditch Excavation	6,150	CY	2.80	\$17,220.00
3.	Spoil Bank Leveling (Two Sides)	148.20	STA	140.00	\$20,748.00
4.	Clearing & Grubbing	1	JOB	2,500.00	\$2,500.00
5.	Rock & Rubbish Removal	1	JOB	1,500.00	\$1,500.00
6.	Furnish & Install Corrugated Metal Tile Ext. Pipe, 12" Dia.	660	LF	27.00	\$17,820.00
7.	Furnish & Install Corrugated Metal Tile Ext. Pipe, 15" Dia.	20	LF	31.00	\$620.00
8.	Furnish & Install Corrugated Metal Tile Ext. Pipe, 18" Dia.	40	LF	35.00	\$1,400.00
9.	Furnish & Install Corrugated Metal Surface Drain, 15" Dia.	600	LF	34.00	\$20,400.00
10.	Furnish & Install Corrugated Metal Surface Drain, 18" Dia.	340	LF	38.00	\$12,920.00
11.	Furnish & Install Corrugated Metal Surface Drain, 24" Dia.	40	LF	44.00	\$1,760.00
12.	Furnish & Install Corrugated Metal Surface Drain, 30" Dia.	40	LF	52.00	\$2,080.00
13.	Furnish & Install Corrugated Metal Surface Drain, 36" Dia.	40	LF	60.00	\$2,400.00
14.	Furnish & Install Riprap	100	TN	50.00	\$5,000.00
15.	Beaver Dam Removal	4	EA	250.00	\$1,000.00
16.	Open Ditch Fertilizing & Seeding	148.20	STA	100.00	\$14,820.00
CONSTRUCTION COST SUBTOTAL					\$128,300.00
OTHER DISTRICT COSTS					
	Annexation				\$6,500.00
	Reclassification (3,262 AC @ \$6/AC 955 AC @ \$5/AC)				\$24,327.00
TOTAL ESTIMATED PROJECT COST					\$159,200.00

OPEN DITCH REPAIR
DRAINAGE DISTRICT 65, OSCEOLA COUNTY
ESTIMATE OF PROBABLE COSTS



PRELIMINARY REPORT - JUNE 2021

PROJECT NUMBER: 21-25209

DD65 PROPOSED OPEN DITCH REPAIRS

ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
1.	Mobilization	1	JOB	2,480.00	\$2,480.00
2.	Open Ditch Excavation	2,913	CY	2.80	\$8,156.40
3.	Spoil Bank Leveling (Two Sides)	50.65	STA	140.00	\$7,091.00
4.	Clearing & Grubbing	1	JOB	2,500.00	\$2,500.00
5.	Rock & Rubbish Removal	1	JOB	1,500.00	\$1,500.00
6.	Furnish & Install Corrugated Metal Tile Ext. Pipe, 12" Dia.	260	LF	27.00	\$7,020.00
7.	Furnish & Install Corrugated Metal Surface Drain, 15" Dia.	140	LF	34.00	\$4,760.00
8.	Furnish & Install Corrugated Metal Surface Drain, 18" Dia.	70	LF	38.00	\$2,660.00
9.	Furnish & Install Corrugated Metal Surface Drain, 24" Dia.	70	LF	44.00	\$3,080.00
10.	Furnish & Install Corrugated Metal Surface Drain, 30" Dia.	40	LF	52.00	\$2,080.00
11.	Furnish & Install Private Field Crossing, 30" Dia.	40	LF	75.00	\$3,000.00
12.	Furnish & Install Riprap	50	TN	50.00	\$2,500.00
13.	Open Ditch Fertilizing & Seeding	50.65	STA	100.00	\$5,065.00
CONSTRUCTION COST SUBTOTAL					\$51,900.00
OTHER DISTRICT COSTS					
	Annexation				\$5,000.00
	Reclassification (1,618 AC @ \$6/AC 410 AC @ \$5/AC)				\$11,758.00
TOTAL ESTIMATED PROJECT COST					\$90,300.00