

August 24, 2015



Osceola County Board of Supervisors
300 7th St.
Sibley, IA 51249

Re: Progress Report- Drainage District No. 9
& Drainage District No. 43, Osceola County

On July 22, 2014, the Osceola County Board of Supervisors acting as Trustees for Drainage District No. 9 (DD9) received a petition requesting an investigation of the District tile for drainage relief. I+S Group (ISG) was appointed to investigate the capacity of the Main Tile and make a report. A Preliminary Engineer's Report was filed on February 3, 2015 with an informational meeting with the landowners held on February 26, 2015 to discuss the findings.

DD9 consists of a Main Tile, one (1) Lateral and seven (7) Branches. The Main Tile runs from its outlet in SE1/4 of SE1/4 of Section 3, East Holman Township in a northeasterly direction 10,492 LF terminating in the NW1/4 of NE1/4 of Section 33, Wilson Township (Please refer to the attached plat). The tile system of DD9 outlets through a concrete headwall in the west road ditch of Redwood Ave at the top end of the tile system of DD43. During low flow events, the tile main of DD9 will discharge to the tile system of DD43 by means of a surface intake at the base of the outlet headwall structure. Higher discharge events will overflow to an existing privately constructed surface channel. The tile main of DD43 then traverses easterly approximately 1.25 miles discharging to the Main Open Ditch of Drainage District No. 11 (DD11).

Since any improvement to DD9 will affect the facilities of DD43, the Board acting as Trustees for DD43 directed ISG to evaluate the need for joint improvements to the facilities of Drainage District No. 43 and Drainage District No. 9. To perform this investigation, the Board further authorized ISG to perform a profile survey of the alignment with downs to the tile lines of both Districts. The landowners traversed by the tile of DD43 were notified by letter of the proposed DD9 improvement and the survey work to be completed. An informational letter dated April 15, 2015 was sent to the landowners of DD43 outside the boundary of DD9, explaining the need to evaluate the capacity of DD43 tile system.

TILE CAPACITY FINDINGS:

Current standards for good agricultural drainage recommend that tile systems serving areas without surface drainage be sized to drain 1/2 inch of runoff per acre per 24 hour period. For lands with surface drainage, the tile system is recommended to be sized based on a 3/8 inch drainage coefficient. The lands in the upper 65% portion of DD9 do not have adequate surface drainage. Therefore, the recommended design capacity of this tile system is calculated using a 1/2 inch drainage coefficient for the upper 65% of the watershed and a 3/8 inch drainage coefficient for the lower 35% percent. The existing capacity of the tile main is computed based on size of the tile and assuming the tile is in good condition. This capacity is then compared to the recommended design capacity. In summary the capacity of the Main Tile of DD9 was found to have less than 30 percent of the recommended capacity, assuming the existing tile is in good condition.

The lands below DD9 in the lower portion of DD43 were found to have adequate surface relief, except for 72 acres in the southwest portion of the watershed. The capacity of DD43 tile main was checked based on 44% of the total lands within the combined boundary of the District

1725 North Lake Avenue + PO Box 458 + Storm Lake, IA 50588-7610

info@is-grp.com + www.is-grp.com

P: 712.732.7745

I+S GROUP

I+S GROUP

needing a 1/2 drainage coefficient. The Main Tile of DD43 was found to have 70 percent of the recommended capacity at its outlet reducing to 65 percent above Station 36+00. To provide the additional capacity by a relief tile line would be costly. Therefore, a surface relief channel was considered where the tile line would pressure relieve to the surface and discharge to a grass waterway to be constructed and maintained by the District. This waterway would outlet to the main open ditch of DD11. Since all of the lands in the assessment boundary of DD9 are also contained within the assessment boundary of DD43, the cost of constructing this waterway would be shared by all 2,300 plus acres in the combined watershed.

IMPROVEMENT OPTIONS:

Drainage District No. 9 has the full right to improve its facilities and increase the discharge to the lands downstream in Drainage District No. 43 and No. 11. However, DD43 has the right to improve their facilities and assess all of the lands served their fair share of these costs to improve their facilities including all of the lands in DD9. Since the capacity of DD43 and DD9 tile main are currently lacking, a joint project between the Districts would be best with the improvement costs distributed based on benefits received.

If Drainage District No. 9 improved its outlet separately there would not be enough depth of cover to accommodate the necessary increase in tile size (20" to 30") and still daylight the outlet above ground at the outlet at Redwood Ave. Therefore, the recommended improvement would involve removing the Main Tile from Station 0+00 to 29+22 and replacing it with a properly sized open ditch and then replacing the tile main with larger tile providing for at least 3/8 inch drainage coefficient from Station 0+00 to 61+19 and 1/2 inch drainage coefficient from Station 61+19 to 154+92.

The combined project would allow the tile line of DD9 to be lowered and connected directly to the top end of the tile of DD43. Because the tile line of DD43 can currently relieve to the surface through the existing intake in the bottom of the west road ditch of Redwood Ave and flow overland by an existing private surface channel, we would recommend the District consider improving on the use of a surface relief channel. This would involve installing a junction box acting as a relief structure between the two district lines with a grass waterway constructed along the natural swale in DD43 to handle the increased discharge of DD9 facilities onto DD43. The waterway would be a district facility with right-of-way acquired from the traversed property owners and maintained by the District.

COST ESTIMATES:

We have updated our original cost estimate for the improvement to DD9 tile main. If DD9 proceeded with this project the landowners of DD43 outside the boundary of DD9 would not be responsible for any of the cost for they receive no benefit. The estimated construction cost is \$581,166.45 with total project cost of \$876,376.45, assuming no wetland mitigation.

The Joint DD43 and DD9 Improvement Option is a joint project between both districts but only the lands currently in DD9 (above the tile main of DD43) would be benefited and pay for the tile work, while all the lands in the combined watershed would pay the cost of the waterway work. The estimated construction cost of the combined project is \$747,736.55 with a total project cost of \$1,210,770.55. Of this the tile improvements would be \$925,169.75 spread over 1,470 acres for an average of \$629.37 per acre. The waterway cost would be \$285,600.80 spread over the combined watershed of 2,324 acres for an average of \$122.89 per acre.

I+S GROUP

Wetland Mitigation would also need to be addressed for both improvements. There is potential of approximately 9.4 acres of wetlands in the DD9 watershed identified by the Fish and Wildlife Inventory Maps. There would be a separate 1.8 acres of potential wetlands in DD43's watershed, below DD9. Wetland determinations would need to be completed on these lands to determine if they are actual "Farmed Wetlands". The cost of mitigation is estimated at \$20,000 per acre.

ENGINEER'S OPINION:

We would recommend the combined DD43 and DD9 Improvement Option be pursued with the DD9 tile main replaced with larger tile at a deeper gradeline and a relief junction structure with grass waterway constructed across the traversed landowners of DD43 to handle the increased discharge from DD9.

Therefore, we recommend that an informal public meeting be held with the landowners of the combined Districts to consider the recommended improvements.

Sincerely,

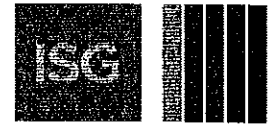


Ivan D. Droessler, P.E.
Civil Engineering Group
I+S GROUP

enc: DD9 & DD43 Plat
Estimates of Probable Costs

c: Charles Bechtold, P.E., Osceola County Engineer

**TILE IMPROVEMENT
DRAINAGE DISTRICT 9 OSCEOLA COUNTY
PRELIMINARY ENGINEER'S ESTIMATE OF PROBABLE COSTS**



PROJECT NUMBER: 17276

DD9 IMPROVEMENT

| ITEM | DESCRIPTION | QUANTITY | UNIT | PRICE | TOTAL |
|------|---|----------|------|-----------|--------------|
| 1. | Mobilization | 1 | JOB | 28,000.00 | \$28,000.00 |
| 2. | Open Ditch Excavation | 10,600 | CY | 2.80 | \$29,680.00 |
| 3. | Spoil Bank Leveling (Two Sides) | 29.22 | STA | 70.00 | \$2,045.40 |
| 4. | Furnish & Install Corrugated Metal Surface Pipe | | | | |
| a. | 15" Dia. | 280 | LF | 24.00 | \$6,720.00 |
| b. | 18" Dia. | 80 | LF | 26.00 | \$2,080.00 |
| c. | 24" Dia. | 40 | LF | 31.00 | \$1,240.00 |
| d. | 36" Dia. | 40 | LF | 40.00 | \$1,600.00 |
| 5. | Furnish & Install Corrugated Metal Tile Ext. Pipe | | | | |
| a. | 15" Dia. | 80 | LF | 25.00 | \$2,000.00 |
| b. | 18" Dia. | 80 | LF | 26.00 | \$2,080.00 |
| 6. | 1500D Reinforced Concrete Pipe, 10" Dia. | 2,344 | LF | 21.00 | \$49,224.00 |
| 7. | 1500D Reinforced Concrete Pipe, 15" Dia. | 1,455 | LF | 25.00 | \$36,375.00 |
| 8. | 1500D Reinforced Concrete Pipe, 24" Dia. | 1,762 | LF | 28.00 | \$49,336.00 |
| 9. | 1500D Reinforced Concrete Pipe, 30" Dia. | 6,966 | LF | 39.00 | \$271,674.00 |
| 10. | Alignment Turns | | | | |
| a. | 10" Dia. R.C.P. Elbow Section, Fabrication Only | 2 | EA | 325.00 | \$650.00 |
| b. | 24" Dia. R.C.P. Elbow Section, Fabrication Only | 3 | EA | 350.00 | \$1,050.00 |
| c. | 30" Dia. R.C.P. Elbow Section, Fabrication Only | 7 | EA | 430.00 | \$3,010.00 |
| 11. | Junction Structures | 5 | EA | 5,000.00 | \$25,000.00 |
| 12. | Drop Structure | 1 | EA | 14,000.00 | \$14,000.00 |
| 13. | Bulkhead Removal | 1 | EA | 5,000.00 | \$5,000.00 |
| 14. | Misc. Drain Tile Repairs & Connections | | | | |
| a. | 10" Dia. | 15 | EA | 275.00 | \$4,125.00 |
| b. | 12" Dia. | 8 | EA | 350.00 | \$2,800.00 |
| c. | 15" Dia. | 2 | EA | 350.00 | \$700.00 |
| 15. | Old Main Connections | 20 | EA | 550.00 | \$11,000.00 |
| 16. | Topsoil Strip, Stockpile, Respread | 7,759 | CY | 2.25 | \$17,457.75 |
| 17. | Tile Trench Stabilization and Cradling Rock | 167 | TN | 25.00 | \$4,175.00 |
| 18. | Crush Existing Tile | 1,000 | LF | 5.00 | \$5,000.00 |
| 19. | Spot Tile Exploration | 3 | HR | 165.00 | \$495.00 |
| 20. | Furnish & Install Riprap | 50 | TN | 45.00 | \$2,250.00 |
| 21. | Fence Cuts | 2 | EA | 250.00 | \$500.00 |
| 22. | Open Ditch Fertilizing & Seeding | 29.22 | STA | 65.00 | \$1,899.30 |

CONSTRUCTION COST SUBTOTAL \$581,166.45

| | |
|---|-------------|
| Engineering Services: | |
| Survey | \$5,000.00 |
| Engineer Administration & Design Services | \$47,000.00 |
| Research/Study/Engineering Report | \$23,500.00 |
| Final Plans & Specs | \$17,500.00 |
| Construction Admin/Staking/Observation | \$15,000.00 |

| | |
|--|-------------|
| Legal & Auditor Services, Publication, Misc. | \$1,500.00 |
| Damages (35.1 AC @ \$700/AC) | \$24,570.00 |
| Contingencies | \$59,000.00 |

IMPROVEMENT PROJECT COST SUBTOTAL \$774,236.45

| | |
|---|-------------|
| Other Potential District Costs: | |
| Right-of-Way | |
| Engineering | \$4,000.00 |
| Taken ROW (2.0 AC @ \$11,000/AC) | \$22,000.00 |
| Easement ROW (4.7 AC @ \$600/AC) | \$2,820.00 |
| Annexation (447 AC) | \$5,000.00 |
| Reclassification (1,470 AC @ \$6.00/AC) | \$8,820.00 |
| Project Warrant Interest | \$59,500.00 |

TOTAL ESTIMATED PROJECT COST \$876,376.45

| | |
|--|----------|
| Average Cost per Assessed Acre (1,470 acres) | \$596.17 |
| Average Cost per Watershed Acre for 10 years | \$59.62 |

WETLAND MITIGATION (9.4 AC @ \$20,000/AC) \$188,000.00

NON-DISTRICT COSTS

| | |
|---|--------------------|
| Secondary Roads: Bored Cut | |
| Furnish & Install 30" 3000D RCP, Highway 9 | 100 LF \$52,500.00 |
| Furnish & Install 30" 3000D RCP, Red Wing Ave | 100 LF \$52,500.00 |

TOTAL ESTIMATED NON-DISTRICT COSTS \$105,000.00

**TILE IMPROVEMENT
DRAINAGE DISTRICT 9 OSCEOLA COUNTY
PRELIMINARY ENGINEER'S ESTIMATE OF PROBABLE COSTS**



PROJECT NUMBER: 17235 & 17781

JOINT DD9 & DD43 IMPROVEMENT

DD9

| ITEM | DESCRIPTION | QUANTITY | UNIT | PRICE | TOTAL |
|------|--|----------|------|-----------|--------------|
| 1. | Mobilization | 1 | JOB | 30,500.00 | \$30,500.00 |
| 2. | 1500D Reinforced Concrete Pipe, 12" Dia. | 2,288 | LF | 24.00 | \$54,912.00 |
| 3. | 1500D Reinforced Concrete Pipe, 15" Dia. | 1,555 | LF | 25.00 | \$38,875.00 |
| 4. | 1500D Reinforced Concrete Pipe, 24" Dia. | 1,762 | LF | 28.00 | \$49,336.00 |
| 5. | 1500D Reinforced Concrete Pipe, 30" Dia. | 9,697 | LF | 39.00 | \$378,183.00 |
| 6. | Alignment Turns | | | | |
| | a. 12" Dia. R.C.P. Elbow Section, Fabrication Only | 2 | EA | 275.00 | \$550.00 |
| | b. 24" Dia. R.C.P. Elbow Section, Fabrication Only | 3 | EA | 350.00 | \$1,050.00 |
| | c. 30" Dia. R.C.P. Elbow Section, Fabrication Only | 12 | EA | 430.00 | \$5,160.00 |
| 7. | Junction Structures | 5 | EA | 5,000.00 | \$25,000.00 |
| 8. | Box Structure | 1 | EA | 6,000.00 | \$6,000.00 |
| 9. | Bulkhead Removal | 1 | EA | 3,300.00 | \$3,300.00 |
| 10. | Misc. Drain Tile Repairs & Connections | | | | |
| | a. 10" Dia. | 15 | EA | 325.00 | \$4,875.00 |
| | b. 12" Dia. | 8 | EA | 350.00 | \$2,800.00 |
| | c. 15" Dia. | 2 | EA | 350.00 | \$700.00 |
| 11. | Old Main Connections | 20 | EA | 550.00 | \$11,000.00 |
| 12. | Topsoil Strip, Stockpile, Respread | 5,175 | CY | 2.25 | \$11,643.75 |
| 13. | Tile Trench Stabilization and Cradling Rock | 207 | TN | 25.00 | \$5,175.00 |
| 14. | Crush Existing Tile | 1,000 | LF | 5.00 | \$5,000.00 |
| 15. | Spot Tile Exploration | 18 | HR | 165.00 | \$2,970.00 |
| 16. | Furnish & Install Riprap | 50 | TN | 45.00 | \$2,250.00 |
| 17. | Fence Cuts | 2 | EA | 250.00 | \$500.00 |

CONSTRUCTION COST SUBTOTAL

\$639,779.75

Engineering Services:

| | |
|---|-------------|
| Survey | \$5,000.00 |
| Engineer Administration & Design Services | \$51,000.00 |
| Research/Study/Engineering Report | \$25,500.00 |
| Final Plans & Specs | \$19,000.00 |
| Construction Admin/Staking/Observation | \$16,000.00 |

Legal & Auditor Services, Publication, Misc.

\$1,500.00

Damages (35.1 AC @ \$700/AC)

\$24,570.00

Contingencies

\$64,000.00

IMPROVEMENT PROJECT COST SUBTOTAL

\$846,349.75

Other Potential District Costs:

| | |
|---|-------------|
| Annexation (447 AC) | \$5,000.00 |
| Reclassification (1,470 AC @ \$6.00/AC) | \$8,820.00 |
| Project Warrant Interest | \$65,000.00 |

TOTAL ESTIMATED PROJECT COST

\$925,169.75

Average Cost per Assessed Acre (1,470 acres)

\$629.37

Average Cost per Watershed Acre for 10 years

\$62.94

WETLAND MITIGATION (9.4 AC @ \$20,000/AC)

\$188,000.00

NON-DISTRICT COSTS

Secondary Roads: Bored Cut

| | | | | |
|---|-----|----|--------|-------------|
| Furnish & Install 30" 3000D RCP, Highway 9 | 100 | LF | 525.00 | \$52,500.00 |
| Furnish & Install 30" 3000D RCP, Red Wing Ave | 100 | LF | 525.00 | \$52,500.00 |

TOTAL ESTIMATED NON-DISTRICT COSTS

\$105,000.00

**TILE IMPROVEMENT
DRAINAGE DISTRICT 9 OSCEOLA COUNTY
PRELIMINARY ENGINEER'S ESTIMATE OF PROBABLE COSTS**



PROJECT NUMBER: 17235 & 17781

JOINT DD9 & DD43 IMPROVEMENT

DD43

| ITEM | DESCRIPTION | QUANTITY | UNIT | PRICE | TOTAL |
|------|---|----------|------|----------|-------------|
| 1. | Mobilization | 1 | JOB | 5,500.00 | \$5,500.00 |
| 2. | Open Ditch Excavation | 1,754 | CY | 2.80 | \$4,911.20 |
| 3. | Spoil Bank Leveling (Two Sides) | 8.26 | STA | 70.00 | \$578.20 |
| 4. | Furnish & Install Corrugated Metal Surface Pipe | | | | |
| | a. 15" Dia. | 20 | LF | 24.00 | \$480.00 |
| | b. 18" Dia. | 20 | LF | 26.00 | \$520.00 |
| 5. | Furnish & Install Corrugated Metal Tile Ext. Pipe | | | | |
| | a. 10" Dia. | 40 | LF | 22.00 | \$880.00 |
| | b. 12" Dia. | 20 | LF | 23.00 | \$460.00 |
| 6. | Waterway Excavation | 14,906 | CY | 2.50 | \$37,265.00 |
| 7. | Waterway Fertilizing, Seeding, & Mulching | 7.8 | AC | 1,200.00 | \$9,360.00 |
| 8. | Topsoil Strip, Stockpile, Respread | 17,238 | CY | 2.25 | \$38,785.50 |
| 9. | Furnish & Install Riprap | 42 | TN | 45.00 | \$1,890.00 |
| 10. | Load, Haul, Place & Compact Bench | 345 | CY | 9.00 | \$3,105.00 |
| 11. | Furnish & Install Rock Riffles | 14 | TN | 45.00 | \$630.00 |
| 12. | Remove & Dispose Existing 42" CMP pipes | 3 | EA | 1,000.00 | \$3,000.00 |
| 13. | Fence Removal & Disposal | 1 | STA | 55.00 | \$55.00 |
| 14. | Open Ditch Fertilizing & Seeding | 8.26 | STA | 65.00 | \$536.90 |

CONSTRUCTION COST SUBTOTAL

\$107,956.80

Engineering Services:

| | |
|---|-------------|
| Survey | \$3,000.00 |
| Engineer Administration & Design Services | \$9,000.00 |
| Research/Study/Engineering Report | \$4,500.00 |
| Final Plans & Specs | \$3,500.00 |
| Construction Admin/Staking/Observation | \$12,000.00 |

Legal & Auditor Services, Publication, Misc.

| | |
|------------------------------|--------------------|
| Damages (17.0 AC @ \$700/AC) | \$1,500.00 |
| Contingencies | \$11,900.00 |
| | <u>\$11,000.00</u> |

IMPROVEMENT PROJECT COST SUBTOTAL

\$164,356.80

Other Potential District Costs:

| | |
|---|--------------------|
| Right-of-Way | |
| Engineering | \$4,000.00 |
| Taken ROW (7.8 AC @ \$11,000/AC) | \$85,800.00 |
| Annexation (370 AC) | \$5,000.00 |
| Reclassification (2,324 AC @ \$6.00/AC) | \$13,944.00 |
| Project Warrant Interest | \$12,500.00 |
| | <u>\$12,500.00</u> |

TOTAL ESTIMATED PROJECT COST

\$285,600.80

Average Cost per Watershed Acre (2,324 acres)

\$122.89

Average Cost per Watershed Acre for 10 years

\$12.29

WETLAND MITIGATION (1.9 AC @ \$20,000/AC)

\$38,000.00

COMBINED TOTALS

COMBINED CONSTRUCTION COST

\$747,736.55

TOTAL COMBINED PROJECT COST

\$1,210,770.55