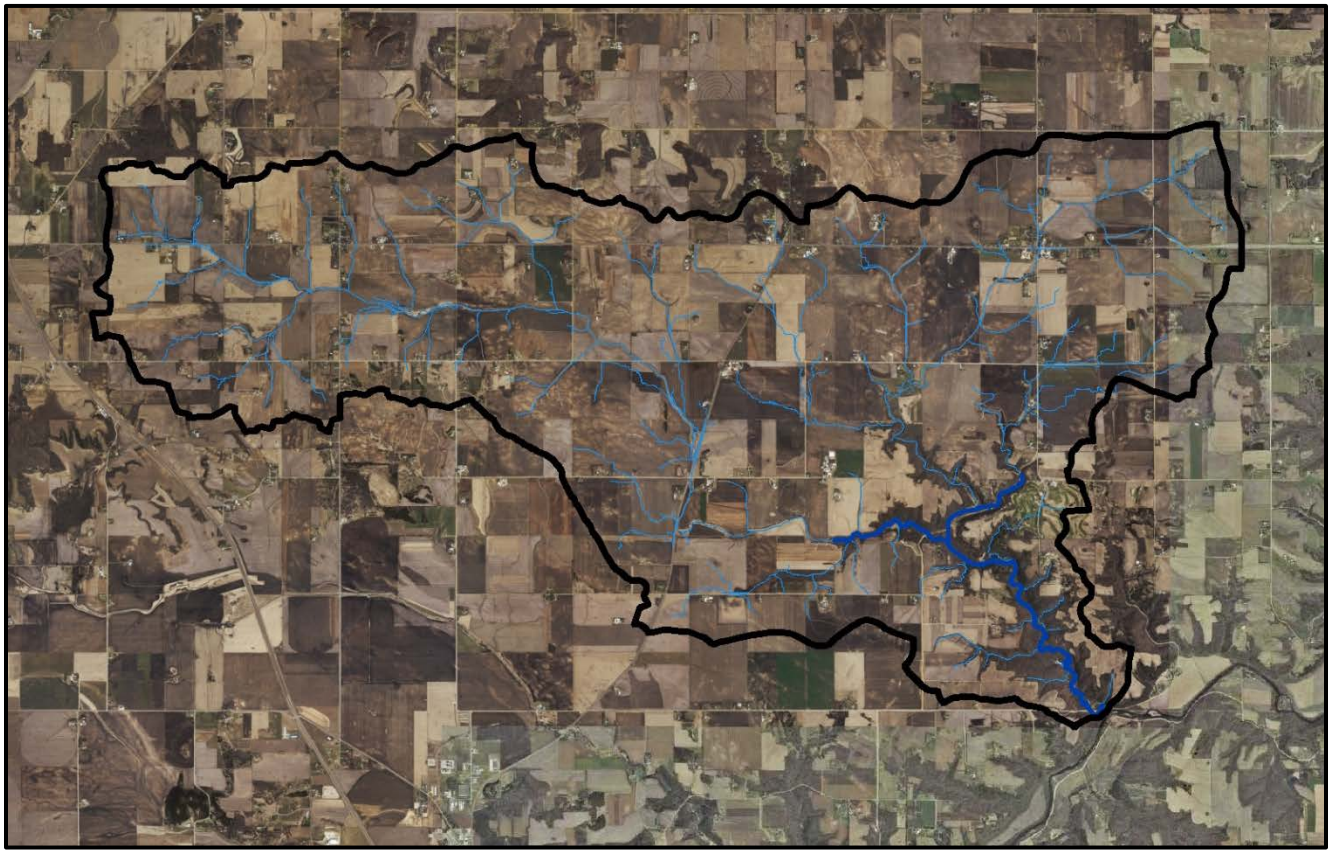
SUBWATERSHED ANALYSIS

FOR

TROUT BROOK

DAKOTA COUNTY, MN
MARCH 2016

(UPDATED OCTOBER 2021)



Prepared by:

DAKOTA COUNTY
SOIL & WATER
CONSERVATION DISTRICT

CLEAN WATER LAND & LEGACY AMENDMENT

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This report details a rural sub-watershed analysis (SWA) that was completed to generate recommended locations for implementing conservation practices. The SWA prioritizes and targets future efforts of the Dakota County Soil and Water Conservation District (SWCD) and its various partners at a subwatershed scale. This document should be considered one part of an overall watershed restoration plan. Additional watershed restoration efforts include educational outreach, stream restoration, riparian zone management, upstream discharge reductions, upland native plant community restoration, pollutant source control and other rural best management practices.

Results of this analysis are based on the development of conceptual project-specific best management practices that provide water quality treatment and water volume reductions on the landscape. Relative comparisons are then made between projects to determine where a stronger focus should occur to further design and initiate implementation efforts. Final, site-specific designs will need to be developed to obtain more refined estimates of the reported pollution removal amounts reported herein. This typically occurs after the procurement of committed partnerships and funds relative to the specific target project.

The pollutant removal estimates may be used to prioritize practices within the Trout Brook Watershed and for grant applications but in no case should this data be used to represent actual pollutant removal until after installation is complete and site-specific modeling and/or monitoring data is available.

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Executive Summary

Trout Brook has an 18,111 acre watershed and is located in southeastern Dakota County. Land use within the watershed is predominantly agricultural and topography, in general, is gently rolling to very steep, which makes this land area challenging for conservation efforts. Water quality monitoring has revealed high turbidity and nitrate concentrations and Trout Brook has been placed on the list of impaired waters due to high turbidity (2006), high nitrates (2010), and biological impairment due to lack of sensitive macroinvertebrates (2014).

This report details an analysis focused on identifying and assessing potential sediment reduction Best Management Practices (BMPs) in the watershed directly tributary to Trout Brook. Residue Management and cover crops are BMPs that were identified as much-needed BMPs throughout the Trout Brook watershed during the field reconnaissance stage of this analysis. These BMPs were not modeled for this report due to the large number of conventionally tilled acres and lack of an accurate treatment analysis model for pollutant reduction. It has been and will continue to be, however, an ongoing goal of the Dakota County SWCD to promote these BMPs throughout the Trout Brook Watershed, especially in areas dominated by erosive soils and high potential for pollutant delivery.

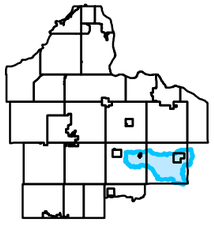
Potential projects were identified through a series of steps that included the Agricultural Conservation Planning Framework (ACPF), field reconnaissance, and identifying site-specific constraints and characteristics. After feasible projects were identified, potential sediment reductions were calculated and preliminary cost estimates were compiled. The projects were then ranked based on the cost per ton of sediment removal per year over a 10 year life cycle. The top 346 practices are identified and prioritized by cost effectiveness in Table 3.

This report includes maps of the proposed location and aerial extent of recommended BMP projects within the Trout Brook watershed to provide a general understanding and approach to reducing sediment loss and improving water quality. If a specific project outlined in this report is selected for installation, site specific designs, landowner agreements, and funding sources must be secured in order to implement the BMP. The collection of projects listed in this report should be updated on a regular basis as new projects or new technologies are identified.

Source: (Aerial) Dakota County 2015

PROJECT LOCATION

Dakota County
State of Minnesota



Trout Brook Watershed
Dakota County, MN

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting
- Trout Brook Watershed

0 0.5 1 2 Miles

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Summary of Potential BMPs

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
1	I	DGS-14-02-01	Grassed Waterway	3000	Lin. Feet	1721.25	$13,950	$0.81
2	II	DGS-18-03-04	Filter Strip	2.5	Acres	219.21	$1,900	$0.87
3	I	DGS-14-02-02	Grassed Waterway	2300	Lin. Feet	1319.63	$12,025	$0.91
4	I	DGS-22-03-01	Grassed Waterway	2300	Lin. Feet	1207.5	$13,925	$1.15
5	I	DGS-22-04-03	Grade Stabilization Structure	1	Each	1718.8	$21,075	$1.23
6	I	DGS-22-04-02	Grade Stabilization Structure	1	Each	2062.5	$32,200	$1.56
7	II	DGS-12-01-09	Grassed Waterway	1320	Lin. Feet	504.9	$9,330	$1.85
8	I	DGS-15-02-02	Grassed Waterway	1200	Lin. Feet	459	$9,000	$1.96
9	II	DGS-22-02-01	Grassed Waterway	500	Lin. Feet	393.75	$8,075	$2.05
10	II	DGS-18-03-01	Filter Strip	2.3	Acres	90.05	$1,850	$2.05
11	I	DGS-14-01-01	Grassed Waterway	2600	Lin. Feet	522.11	$12,850	$2.46
12	II	DGS-29-01-01	Grassed Waterway	3400	Lin. Feet	578	$15,050	$2.60
13	I	DGS-22-03-02	Grassed Waterway	480	Lin. Feet	252	$8,010	$3.18
14	I	DGS-22-04-01	Grade Stabilization Structure	1	Each	3437.5	$111,700	$3.25
15	II	DGS-12-01-10	Grassed Waterway	1600	Lin. Feet	306	$10,100	$3.30
16	I	DGS-14-03-05	Grassed Waterway	1150	Lin. Feet	221.38	$7,538	$3.40
17	I	DGS-14-03-03	Grassed Waterway	750	Lin. Feet	251.02	$8,888	$3.54
18	I	DGS-08-03-01	Grassed Waterway	2100	Lin. Feet	357	$13,275	$3.72
19	I	DGS-15-03-03	Grassed Waterway	1250	Lin. Feet	185.94	$7,763	$4.17
20	II	DGS-12-04-03	Grassed Waterway	500	Lin. Feet	191.25	$8,075	$4.22
21	II	HAM-13-03-02	Filter Strip	1	Acres	34.62	$1,525	$4.40
22	III	HAM-14-01-01	Grassed Waterway	1300	Lin. Feet	138.13	$6,450	$4.67
23	I	DGS-15-02-01	Grassed Waterway	900	Lin. Feet	172.13	$8,175	$4.75
24	II	HAM-13-02-04	Filter Strip	1.8	Acres	35.31	$1,725	$4.89
25	II	DGS-36-03-02	Grassed Waterway	50	Lin. Feet	103.13	$5,063	$4.91
26	I	DGS-14-01-03	Grassed Waterway	800	Lin. Feet	160.65	$7,900	$4.92
27	II	DGS-35-02-01	Critical Area Planting	0.1	Acres	28.88	$1,450	$5.02
28	II	DGS-12-04-01	Grassed Waterway	1375	Lin. Feet	184.08	$9,481	$5.15
29	I	HAM-15-01-01	Grassed Waterway	1200	Lin. Feet	153	$9,000	$5.88
30	II	DGS-23-02-01	Grassed Waterway	950	Lin. Feet	141.31	$8,313	$5.88
31	I	DGS-27-04-04	Grassed Waterway	700	Lin. Feet	104.13	$6,525	$6.27
32	II	DGS-13-01-07	Grassed Waterway	1320	Lin. Feet	147.26	$9,330	$6.34
33	II	DGS-24-03-05	Grassed Waterway	670	Lin. Feet	99.66	$6,458	$6.48
34	I	HAM-10-04-03	Grassed Waterway	1200	Lin. Feet	127.5	$9,000	$7.06
35	I	DGS-07-04-01	Grassed Waterway	1000	Lin. Feet	106.25	$8,450	$7.95
36	II	DGS-29-02-01	Grassed Waterway	1400	Lin. Feet	119	$9,550	$8.03
37	I	DGS-11-04-02	Grassed Waterway	900	Lin. Feet	100.4	$8,175	$8.14
38	II	DGS-27-02-04	Grassed Waterway	2300	Lin. Feet	119.74	$10,125	$8.46
39	II	DGS-22-02-02	Grassed Waterway	350	Lin. Feet	67.38	$5,738	$8.52
40	II	DGS-28-01-01	Grassed Waterway	2100	Lin. Feet	133.88	$11,475	$8.57
41	I	DGS-11-03-02	Grassed Waterway	1200	Lin. Feet	103.95	$9,000	$8.66
42	I	HAM-10-01-01	Water and Sediment Control Basin	1	Each	74.38	$6,450	$8.67
43	I	HAM-10-04-04	Water and Sediment Control Basin	1	Each	74.38	$6,450	$8.67
44	I	HAM-13-04-01	Grassed Waterway	2700	Lin. Feet	172.13	$15,225	$8.85
45	I	DGS-08-03-03	Grassed Waterway	850	Lin. Feet	90.31	$8,038	$8.90
46	I	DGS-08-03-05	Grassed Waterway	850	Lin. Feet	90.31	$8,038	$8.90
47	I	HAM-10-03-02	Grassed Waterway	850	Lin. Feet	90.31	$8,038	$8.90
48	I	DGS-08-04-01	Grassed Waterway	650	Lin. Feet	82.88	$7,488	$9.03
49	II	DGS-34-02-03	Grassed Waterway	1100	Lin. Feet	81.81	$7,425	$9.08

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
50	II	HAM-10-03-01	Grassed Waterway	2700	Lin. Feet	143.44	$13,125	$9.15
51	I	DGS-20-03-01	Grassed Waterway	1400	Lin. Feet	104.13	$9,550	$9.17
52	I	DGS-34-01-01	Grassed Waterway	1400	Lin. Feet	104.13	$9,550	$9.17
53	I	DGS-08-03-04	Grassed Waterway	800	Lin. Feet	85	$7,900	$9.29
54	I	HAM-11-03-01	Water and Sediment Control Basin	1	Each	69.06	$6,450	$9.34
55	II	HAM-14-03-02	Grassed Waterway	1300	Lin. Feet	96.69	$9,275	$9.59
56	III	DGS-27-02-03	Grassed Waterway	1800	Lin. Feet	93.71	$9,000	$9.60
57	II	DGS-22-03-09	Grassed Waterway	1000	Lin. Feet	74.38	$7,200	$9.68
58	II	DGS-07-02-01	Grassed Waterway	750	Lin. Feet	79.69	$7,763	$9.74
59	I	HAM-11-04-04	Water and Sediment Control Basin	1	Each	63.75	$6,450	$10.12
60	II	HAM-11-03-08	Water and Sediment Control Basin	1	Each	61.09	$6,450	$10.56
61	I	HAM-13-04-02	Filter Strip	2.1	Acres	17.04	$1,800	$10.56
62	I	DGS-15-01-02	Grassed Waterway	880	Lin. Feet	65.45	$6,930	$10.59
63	I	DGS-27-03-01	Grassed Waterway	2000	Lin. Feet	104.13	$11,200	$10.76
64	I	DGS-11-03-01	Grassed Waterway	1000	Lin. Feet	66.94	$7,200	$10.76
65	II	DGS-12-03-01	Grassed Waterway	400	Lin. Feet	53.55	$5,850	$10.92
66	I	DGS-18-01-01	Water and Sediment Control Basin	1	Each	58.44	$6,450	$11.04
67	I	HAM-15-04-03	Grassed Waterway	1000	Lin. Feet	74.38	$8,450	$11.36
68	I	HAM-15-04-06	Grassed Waterway	1000	Lin. Feet	74.38	$8,450	$11.36
69	I	DGS-17-01-02	Grassed Waterway	1600	Lin. Feet	85	$10,100	$11.88
70	I	HAM-13-01-05	Water and Sediment Control Basin	1	Each	53.92	$6,450	$11.96
71	II	DGS-28-02-01	Grassed Waterway	2400	Lin. Feet	102	$12,300	$12.06
72	II	DGS-10-04-01	Grassed Waterway	850	Lin. Feet	56.9	$6,863	$12.06
73	I	DGS-12-03-02	Grassed Waterway	500	Lin. Feet	66.94	$8,075	$12.06
74	I	DGS-08-03-06	Water and Sediment Control Basin	1	Each	53.13	$6,450	$12.14
75	I	DGS-18-01-02	Water and Sediment Control Basin	1	Each	53.13	$6,450	$12.14
76	I	HAM-11-04-05	Water and Sediment Control Basin	1	Each	53.13	$6,450	$12.14
77	I	DGS-27-04-01	Grassed Waterway	700	Lin. Feet	52.06	$6,525	$12.53
78	II	DGS-16-02-02	Water and Sediment Control Basin	1	Each	51	$6,450	$12.65
79	II	DGS-22-01-03	Grassed Waterway	400	Lin. Feet	53.55	$6,800	$12.70
80	II	DGS-17-01-05	Grassed Waterway	1050	Lin. Feet	66.94	$8,588	$12.83
81	I	DGS-07-04-02	Critical Area Planting	16.3	Acres	42.64	$5,500	$12.90
82	II	DGS-27-02-05	Grassed Waterway	1100	Lin. Feet	57.27	$7,425	$12.96
83	II	DGS-23-04-01	Grassed Waterway	300	Lin. Feet	43.14	$5,625	$13.04
84	I	DGS-14-03-08	Grassed Waterway	275	Lin. Feet	40.91	$5,569	$13.61
85	I	DGS-08-04-02	Grassed Waterway	475	Lin. Feet	50.74	$7,006	$13.81
86	I	DGS-14-03-01	Grassed Waterway	1000	Lin. Feet	52.06	$7,200	$13.83
87	I	DGS-08-03-02	Grassed Waterway	450	Lin. Feet	47.81	$6,938	$14.51
88	I	DGS-20-03-05	Grassed Waterway	700	Lin. Feet	52.06	$7,625	$14.65
89	I	DGS-11-04-03	Grassed Waterway	800	Lin. Feet	53.55	$7,900	$14.75
90	I	DGS-11-02-03	Grassed Waterway	600	Lin. Feet	40.16	$6,300	$15.69
91	II	DGS-35-02-10	Grassed Waterway	1100	Lin. Feet	46.75	$7,425	$15.88
92	I	DGS-18-02-01	Critical Area Planting	2.4	Acres	12.63	$2,025	$16.03
93	I	HAM-23-01-01	Grassed Waterway	1400	Lin. Feet	59.5	$9,550	$16.05
94	II	DGS-23-02-02	Grassed Waterway	1000	Lin. Feet	52.06	$8,450	$16.23
95	I	DGS-27-04-02	Grassed Waterway	500	Lin. Feet	37.19	$6,075	$16.34
96	I	DGS-27-04-03	Grassed Waterway	500	Lin. Feet	37.16	$6,075	$16.35
97	I	DGS-18-03-03	Grassed Waterway	2300	Lin. Feet	73.31	$12,025	$16.40
98	I	DGS-15-04-01	Grassed Waterway	780	Lin. Feet	40.61	$6,705	$16.51
99	II	DGS-10-04-02	Grassed Waterway	550	Lin. Feet	36.82	$6,188	$16.80
100	III	DGS-07-03-04	Grassed Waterway	900	Lin. Feet	47.81	$8,175	$17.10
101	II	DGS-15-01-01	Grassed Waterway	650	Lin. Feet	43.51	$7,488	$17.21
102	I	HAM-11-04-06	Water and Sediment Control Basin	1	Each	37.19	$6,450	$17.34

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
103	I	HAM-11-04-07	Water and Sediment Control Basin	1	Each	37.19	$6,450	$17.34
104	II	DGS-21-02-01	Water and Sediment Control Basin	1	Each	36.68	$6,450	$17.58
105	II	DGS-12-02-04	Grassed Waterway	300	Lin. Feet	31.88	$5,625	$17.64
106	II	HAM-13-01-08	Grassed Waterway	1450	Lin. Feet	53.92	$9,688	$17.97
107	I	DGS-18-02-02	Critical Area Planting	4.9	Acres	14.74	$2,650	$17.98
108	II	DGS-35-03-03	Grade Stabilization Structure	1	Each	114.75	$21,075	$18.37
109	II	HAM-10-02-04	Grassed Waterway	800	Lin. Feet	42.5	$7,900	$18.59
110	I	HAM-23-02-03	Grassed Waterway	2500	Lin. Feet	66.41	$12,575	$18.94
111	I	DGS-14-03-07	Grassed Waterway	650	Lin. Feet	33.84	$6,413	$18.95
112	II	HAM-11-01-01	Grassed Waterway	450	Lin. Feet	30.94	$5,963	$19.27
113	II	HAM-11-03-02	Water and Sediment Control Basin	1	Each	69.06	$13,325	$19.29
114	II	DGS-29-01-03	Filter Strip	2.2	Acres	9.31	$1,825	$19.60
115	II	DGS-35-02-04	Grassed Waterway	800	Lin. Feet	34	$6,750	$19.85
116	II	DGS-29-02-03	Grassed Waterway	400	Lin. Feet	34	$6,800	$20.00
117	II	HAM-11-03-03	Water and Sediment Control Basin	1	Each	31.88	$6,450	$20.23
118	II	HAM-13-01-03	Water and Sediment Control Basin	1	Each	31.88	$6,450	$20.23
119	II	HAM-13-01-04	Water and Sediment Control Basin	1	Each	31.88	$6,450	$20.23
120	I	DGS-17-01-03	Grassed Waterway	700	Lin. Feet	37.19	$7,625	$20.50
121	II	DGS-12-04-02	Grassed Waterway	300	Lin. Feet	31.24	$6,525	$20.89
122	II	DGS-17-01-01	Grassed Waterway	675	Lin. Feet	35.86	$7,556	$21.07
123	II	DGS-12-02-02	Water and Sediment Control Basin	1	Each	29.75	$6,450	$21.68
124	II	DGS-12-02-03	Water and Sediment Control Basin	1	Each	29.75	$6,450	$21.68
125	II	DGS-35-03-04	Grade Stabilization Structure	1	Each	95.63	$21,075	$22.04
126	I	DGS-21-01-01	Grassed Waterway	1900	Lin. Feet	49.03	$10,925	$22.28
127	I	DGS-17-02-02	Grassed Waterway	1250	Lin. Feet	39.84	$9,138	$22.94
128	II	DGS-12-01-02	Water and Sediment Control Basin	1	Each	57.75	$13,325	$23.07
129	II	DGS-12-01-07	Water and Sediment Control Basin	1	Each	57.75	$13,325	$23.07
130	II	DGS-15-03-02	Water and Sediment Control Basin	1	Each	57.75	$13,325	$23.07
131	II	DGS-22-03-08	Water and Sediment Control Basin	1	Each	57.75	$13,325	$23.07
132	II	DGS-28-01-02	Water and Sediment Control Basin	1	Each	27.5	$6,450	$23.45
133	III	DGS-36-03-01	Streambank and Shoreline Protection	100	Lin. Feet	136	$31,955	$23.50
134	I	DGS-18-02-06	Grassed Waterway	1200	Lin. Feet	38.25	$9,000	$23.53
135	I	DGS-14-03-04	Grassed Waterway	450	Lin. Feet	23.43	$5,963	$25.45
136	I	HAM-15-03-02	Grassed Waterway	350	Lin. Feet	26.03	$6,663	$25.60
137	III	DGS-22-04-04	Grassed Waterway	250	Lin. Feet	21.25	$5,513	$25.94
138	II	DGS-23-02-03	Grassed Waterway	250	Lin. Feet	21.25	$5,513	$25.94
139	I	DGS-16-04-04	Grassed Waterway	575	Lin. Feet	24.44	$6,450	$26.39
140	II	DGS-29-01-02	Grassed Waterway	800	Lin. Feet	29.75	$7,900	$26.55
141	II	DGS-21-01-03	Grassed Waterway	500	Lin. Feet	26.56	$7,075	$26.64
142	I	DGS-16-04-03	Grassed Waterway	550	Lin. Feet	23.38	$6,450	$27.59
143	I	HAM-14-03-01	Water and Sediment Control Basin	1	Each	47.81	$13,325	$27.87
144	I	DGS-21-01-02	Grassed Waterway	2800	Lin. Feet	47.89	$13,400	$27.98
145	II	DGS-35-02-11	Grassed Waterway	500	Lin. Feet	21.25	$6,075	$28.59
146	I	DGS-15-03-05	Grassed Waterway	950	Lin. Feet	24.73	$7,088	$28.66
147	I	DGS-20-03-02	Water and Sediment Control Basin	1	Each	45.16	$13,325	$29.51
148	I	DGS-20-03-04	Water and Sediment Control Basin	1	Each	45.16	$13,325	$29.51
149	II	HAM-11-03-05	Water and Sediment Control Basin	1	Each	45.16	$13,325	$29.51
150	II	DGS-22-01-04	Streambank and Shoreline Protection	950	Lin. Feet	365.75	$111,745	$30.55
151	I	DGS-34-01-02	Grassed Waterway	750	Lin. Feet	25.27	$7,763	$30.72
152	II	DGS-19-04-01	Water and Sediment Control Basin	1	Each	20.83	$6,450	$30.96
153	II	HAM-11-03-07	Water and Sediment Control Basin	1	Each	42.5	$13,325	$31.35
154	II	DGS-22-01-01	Grassed Waterway	350	Lin. Feet	18.22	$5,738	$31.49
155	II	DGS-22-01-02	Grassed Waterway	350	Lin. Feet	18.22	$5,738	$31.49

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
156	I	HAM-22-02-01	Grassed Waterway	1000	Lin. Feet	26.56	$8,450	$31.81
157	II	DGS-12-01-05	Water and Sediment Control Basin	1	Each	20.21	$6,450	$31.91
158	I	DGS-15-03-04	Grassed Waterway	800	Lin. Feet	20.83	$6,750	$32.41
159	I	DGS-16-04-05	Grassed Waterway	450	Lin. Feet	19.13	$6,450	$33.72
160	II	DGS-18-03-02	Water and Sediment Control Basin	1	Each	19.13	$6,450	$33.72
161	II	DGS-17-04-02	Grassed Waterway	375	Lin. Feet	19.92	$6,731	$33.79
162	II	DGS-34-01-03	Grassed Waterway	400	Lin. Feet	17	$5,850	$34.41
163	I	DGS-14-03-06	Grassed Waterway	100	Lin. Feet	17.33	$5,975	$34.48
164	I	HAM-14-02-01	Water and Sediment Control Basin	1	Each	18.65	$6,450	$34.58
165	II	DGS-12-01-01	Water and Sediment Control Basin	1	Each	38.5	$13,325	$34.61
166	II	DGS-12-01-03	Water and Sediment Control Basin	1	Each	38.5	$13,325	$34.61
167	II	DGS-12-01-06	Water and Sediment Control Basin	1	Each	38.5	$13,325	$34.61
168	II	DGS-15-03-01	Water and Sediment Control Basin	1	Each	38.5	$13,325	$34.61
169	II	HAM-11-02-01	Water and Sediment Control Basin	1	Each	37.19	$13,325	$35.83
170	II	HAM-13-02-01	Water and Sediment Control Basin	1	Each	17.63	$6,450	$36.59
171	II	DGS-07-03-02	Water and Sediment Control Basin	1	Each	17.55	$6,450	$36.75
172	II	DGS-29-01-04	Grassed Waterway	200	Lin. Feet	17	$6,250	$36.76
173	II	DGS-13-02-03	Grassed Waterway	500	Lin. Feet	16.52	$6,075	$36.77
174	I	HAM-23-02-01	Water and Sediment Control Basin	1	Each	17.19	$6,450	$37.52
175	I	HAM-23-02-02	Water and Sediment Control Basin	1	Each	17.19	$6,450	$37.52
176	I	HAM-24-01-03	Water and Sediment Control Basin	1	Each	17.15	$6,450	$37.61
177	II	DGS-29-02-02	Water and Sediment Control Basin	1	Each	16.97	$6,450	$38.01
178	I	HAM-12-03-01	Water and Sediment Control Basin	1	Each	16.5	$6,450	$39.09
179	I	DGS-16-01-01	Grassed Waterway	1050	Lin. Feet	21.59	$8,588	$39.78
180	II	DGS-22-03-06	Water and Sediment Control Basin	1	Each	33	$13,325	$40.38
181	II	DGS-22-03-07	Water and Sediment Control Basin	1	Each	33	$13,325	$40.38
182	II	DGS-12-01-04	Water and Sediment Control Basin	1	Each	15.62	$6,450	$41.29
183	I	DGS-14-03-02	Grassed Waterway	150	Lin. Feet	12.75	$5,288	$41.47
184	I	DGS-27-04-06	Grassed Waterway	250	Lin. Feet	13.02	$5,513	$42.34
185	II	DGS-34-02-01	Grassed Waterway	1200	Lin. Feet	17.85	$7,650	$42.86
186	II	HAM-13-01-02	Water and Sediment Control Basin	1	Each	14.99	$6,450	$43.03
187	II	DGS-13-02-04	Water and Sediment Control Basin	1	Each	14.87	$6,450	$43.38
188	II	DGS-27-03-03	Grassed Waterway	100	Lin. Feet	13.39	$5,975	$44.62
189	II	DGS-18-03-06	Water and Sediment Control Basin	1	Each	14.33	$6,450	$45.01
190	I	HAM-15-04-04	Grassed Waterway	1000	Lin. Feet	18.65	$8,450	$45.31
191	II	DGS-18-03-05	Water and Sediment Control Basin	1	Each	14.05	$6,450	$45.91
192	II	DGS-12-01-08	Water and Sediment Control Basin	1	Each	28.88	$13,325	$46.14
193	III	DGS-13-01-06	Water and Sediment Control Basin	1	Each	28.88	$13,325	$46.14
194	I	DGS-27-04-05	Grassed Waterway	225	Lin. Feet	11.71	$5,456	$46.59
195	II	DGS-35-03-01	Grassed Waterway	500	Lin. Feet	13.02	$6,075	$46.66
196	I	HAM-14-02-03	Water and Sediment Control Basin	1	Each	13.7	$6,450	$47.08
197	II	DGS-10-03-05	Critical Area Planting	4.6	Acres	5.31	$2,575	$48.49
198	I	HAM-12-03-02	Grassed Waterway	400	Lin. Feet	12.01	$5,850	$48.71
199	II	DGS-16-02-01	Water and Sediment Control Basin	1	Each	12.8	$6,450	$50.39
200	I	HAM-12-03-03	Water and Sediment Control Basin	1	Each	12.75	$6,450	$50.59
201	II	DGS-21-02-02	Grassed Waterway	950	Lin. Feet	16.25	$8,313	$51.15
202	II	HAM-12-01-01	Water and Sediment Control Basin	1	Each	26.03	$13,325	$51.19
203	I	HAM-22-01-04	Grassed Waterway	525	Lin. Feet	13.95	$7,144	$51.21
204	II	HAM-12-04-01	Grassed Waterway	350	Lin. Feet	11.16	$5,738	$51.41
205	I	DGS-15-04-03	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25
206	I	DGS-15-04-04	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25
207	II	DGS-23-03-01	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25
208	II	DGS-24-03-01	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
209	II	DGS-24-03-02	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25
210	I	DGS-16-04-01	Grassed Waterway	1200	Lin. Feet	12.34	$6,450	$52.27
211	II	DGS-18-04-02	Water and Sediment Control Basin	1	Each	25.26	$13,325	$52.75
212	I	HAM-22-01-03	Grassed Waterway	500	Lin. Feet	13.28	$7,075	$53.28
213	II	DGS-18-04-01	Water and Sediment Control Basin	1	Each	24.79	$13,325	$53.75
214	II	DGS-35-02-06	Grassed Waterway	240	Lin. Feet	10.2	$5,490	$53.82
215	II	DGS-07-01-02	Grassed Waterway	220	Lin. Feet	11.69	$6,305	$53.93
216	II	DGS-26-03-01	Grassed Waterway	500	Lin. Feet	13.02	$7,075	$54.34
217	I	HAM-15-01-02	Grassed Waterway	1450	Lin. Feet	17.77	$9,688	$54.52
218	II	DGS-26-01-02	Streambank and Shoreline Protection	125	Lin. Feet	37.19	$20,500	$55.12
219	II	DGS-19-04-02	Water and Sediment Control Basin	1	Each	23.91	$13,325	$55.73
220	II	HAM-11-03-04	Water and Sediment Control Basin	1	Each	23.91	$13,325	$55.73
221	II	HAM-11-03-06	Water and Sediment Control Basin	1	Each	23.91	$13,325	$55.73
222	I	HAM-14-02-02	Water and Sediment Control Basin	1	Each	10.96	$6,450	$58.85
223	II	DGS-10-03-01	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
224	II	DGS-10-03-02	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
225	II	DGS-10-03-03	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
226	II	DGS-10-03-04	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
227	I	DGS-11-02-01	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
228	I	DGS-11-02-02	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
229	I	DGS-09-03-01	Grassed Waterway	650	Lin. Feet	12.42	$7,488	$60.29
230	III	DGS-22-04-05	Grade Stabilization Structure	1	Each	22.31	$13,450	$60.29
231	II	HAM-13-01-01	Water and Sediment Control Basin	1	Each	10.53	$6,450	$61.25
232	II	DGS-26-01-01	Streambank and Shoreline Protection	350	Lin. Feet	55.78	$34,325	$61.54
233	I	DGS-28-02-03	Water and Sediment Control Basin	1	Each	21.25	$13,325	$62.71
234	I	HAM-10-02-02	Water and Sediment Control Basin	1	Each	21.25	$13,325	$62.71
235	II	DGS-13-02-01	Water and Sediment Control Basin	1	Each	10.11	$6,450	$63.80
236	II	DGS-28-04-01	Grassed Waterway	1500	Lin. Feet	15.39	$9,825	$63.84
237	I	DGS-19-02-02	Water and Sediment Control Basin	1	Each	20.63	$13,325	$64.59
238	I	DGS-19-02-03	Water and Sediment Control Basin	1	Each	20.63	$13,325	$64.59
239	I	HAM-22-01-02	Water and Sediment Control Basin	1	Each	19.92	$13,325	$66.89
240	II	HAM-13-03-01	Grassed Waterway	650	Lin. Feet	11.04	$7,488	$67.82
241	I	DGS-17-02-03	Grassed Waterway	300	Lin. Feet	9.56	$6,525	$68.25
242	III	DGS-36-04-01	Streambank and Shoreline Protection	140	Lin. Feet	53.9	$37,643	$69.84
243	II	DGS-07-03-03	Water and Sediment Control Basin	1	Each	9.23	$6,450	$69.88
244	II	DGS-35-02-07	Grassed Waterway	180	Lin. Feet	7.65	$5,355	$70.00
245	I	HAM-15-04-01	Water and Sediment Control Basin	1	Each	9.12	$6,450	$70.72
246	III	DGS-07-03-01	Water and Sediment Control Basin	1	Each	8.82	$6,450	$73.13
247	III	DGS-07-03-05	Water and Sediment Control Basin	1	Each	8.82	$6,450	$73.13
248	II	DGS-35-02-05	Grassed Waterway	170	Lin. Feet	7.23	$5,333	$73.76
249	I	HAM-24-01-01	Water and Sediment Control Basin	1	Each	8.56	$6,450	$75.35
250	I	HAM-15-04-05	Grassed Waterway	800	Lin. Feet	10.4	$7,900	$75.96
251	II	DGS-17-01-04	Grassed Waterway	150	Lin. Feet	7.97	$6,113	$76.69
252	I	HAM-11-04-01	Water and Sediment Control Basin	1	Each	17.27	$13,325	$77.16
253	I	HAM-10-04-01	Water and Sediment Control Basin	1	Each	7.97	$6,450	$80.93
254	II	DGS-34-02-02	Grassed Waterway	900	Lin. Feet	8.51	$6,975	$81.96
255	II	DGS-35-03-02	Water and Sediment Control Basin	1	Each	7.81	$6,450	$82.59
256	II	DGS-17-04-01	Grassed Waterway	1900	Lin. Feet	13.08	$10,925	$83.52
257	II	DGS-17-04-03	Grassed Waterway	1900	Lin. Feet	13.08	$10,925	$83.52
258	II	DGS-13-01-01	Water and Sediment Control Basin	1	Each	14.88	$13,325	$89.55
259	III	DGS-13-01-04	Water and Sediment Control Basin	1	Each	14.88	$13,325	$89.55
260	I	HAM-10-04-02	Water and Sediment Control Basin	1	Each	6.85	$6,450	$94.16
261	III	DGS-26-02-04	Streambank and Shoreline Protection	40	Lin. Feet	17.6	$16,787	$95.38

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
262	II	DGS-12-02-01	Water and Sediment Control Basin	1	Each	13.48	$13,325	$98.85
263	III	DGS-26-02-03	Streambank and Shoreline Protection	10	Lin. Feet	8.93	$8,887	$99.52
264	I	HAM-22-01-01	Water and Sediment Control Basin	1	Each	13.28	$13,325	$100.34
265	II	DGS-24-03-03	Water and Sediment Control Basin	1	Each	6.38	$6,450	$101.10
266	II	DGS-24-03-04	Water and Sediment Control Basin	1	Each	6.38	$6,450	$101.10
267	I	DGS-15-01-03	Grassed Waterway	380	Lin. Feet	5.65	$5,805	$102.74
268	II	DGS-07-01-01	Grassed Waterway	110	Lin. Feet	5.84	$6,003	$102.78
269	II	DGS-27-03-02	Grassed Waterway	450	Lin. Feet	6.69	$6,938	$103.70
270	III	DGS-27-01-03	Streambank and Shoreline Protection	75	Lin. Feet	22.31	$23,265	$104.28
271	I	DGS-15-04-02	Water and Sediment Control Basin	1	Each	12.75	$13,325	$104.51
272	II	DGS-27-01-01	Water and Sediment Control Basin	1	Each	12.75	$13,325	$104.51
273	II	DGS-27-02-01	Water and Sediment Control Basin	1	Each	12.75	$13,325	$104.51
274	II	DGS-27-02-02	Water and Sediment Control Basin	1	Each	12.75	$13,325	$104.51
275	I	HAM-13-02-03	Grassed Waterway	400	Lin. Feet	5.48	$5,850	$106.75
276	I	HAM-23-01-02	Grassed Waterway	800	Lin. Feet	7.33	$7,900	$107.78
277	I	DGS-26-04-01	Streambank and Shoreline Protection	30	Lin. Feet	13.2	$14,259	$108.02
278	I	HAM-13-02-02	Grassed Waterway	400	Lin. Feet	5.2	$5,850	$112.50
279	II	DGS-07-02-02	Grassed Waterway	100	Lin. Feet	5.31	$5,975	$112.52
280	I	DGS-36-02-02	Streambank and Shoreline Protection	100	Lin. Feet	39.6	$44,595	$112.61
281	I	DGS-11-04-01	Grassed Waterway	75	Lin. Feet	5.02	$5,906	$117.65
282	II	CNF-01-02-02	Streambank and Shoreline Protection	40	Lin. Feet	11	$12,995	$118.14
283	II	DGS-20-03-03	Grassed Waterway	1050	Lin. Feet	7.22	$8,588	$118.94
284	I	HAM-11-04-02	Water and Sediment Control Basin	1	Each	11.16	$13,325	$119.40
285	I	HAM-24-01-02	Water and Sediment Control Basin	1	Each	5.4	$6,450	$119.44
286	I	DGS-16-04-02	Grassed Waterway	375	Lin. Feet	5.33	$6,450	$121.01
287	III	DGS-13-01-05	Water and Sediment Control Basin	1	Each	11	$13,325	$121.14
288	II	DGS-22-03-03	Water and Sediment Control Basin	1	Each	11	$13,325	$121.14
289	II	DGS-22-03-04	Water and Sediment Control Basin	1	Each	11	$13,325	$121.14
290	II	DGS-22-03-05	Water and Sediment Control Basin	1	Each	11	$13,325	$121.14
291	II	DGS-35-02-03	Grassed Waterway	100	Lin. Feet	4.25	$5,175	$121.76
292	II	DGS-35-02-08	Grassed Waterway	100	Lin. Feet	4.25	$5,175	$121.76
293	II	DGS-18-02-05	Water and Sediment Control Basin	1	Each	10.63	$13,325	$125.35
294	I	DGS-28-02-02	Water and Sediment Control Basin	1	Each	10.63	$13,325	$125.35
295	II	HAM-10-02-03	Water and Sediment Control Basin	1	Each	10.63	$13,325	$125.35
296	I	DGS-14-01-02	Grassed Waterway	225	Lin. Feet	4.78	$6,319	$132.19
297	I	DGS-20-01-01	Water and Sediment Control Basin	1	Each	4.87	$6,450	$132.44
298	I	DGS-26-03-04	Streambank and Shoreline Protection	50	Lin. Feet	10.63	$14,575	$137.11
299	I	DGS-26-04-05	Streambank and Shoreline Protection	30	Lin. Feet	8.25	$11,415	$138.36
300	II	DGS-36-03-03	Streambank and Shoreline Protection	30	Lin. Feet	8.25	$11,415	$138.36
301	I	DGS-35-01-03	Streambank and Shoreline Protection	125	Lin. Feet	27.5	$38,275	$139.18
302	I	HAM-10-02-01	Water and Sediment Control Basin	1	Each	9.3	$13,325	$143.28
303	II	DGS-35-02-09	Grassed Waterway	80	Lin. Feet	3.4	$5,130	$150.88
304	I	DGS-26-04-03	Streambank and Shoreline Protection	150	Lin. Feet	16.5	$25,635	$155.36
305	III	DGS-13-01-02	Water and Sediment Control Basin	1	Each	8.5	$13,325	$156.76
306	III	DGS-13-01-03	Water and Sediment Control Basin	1	Each	8.5	$13,325	$156.76
307	I	DGS-36-02-01	Streambank and Shoreline Protection	120	Lin. Feet	13.2	$21,843	$165.48
308	II	DGS-20-04-01	Grassed Waterway	625	Lin. Feet	4.3	$7,419	$172.53
309	I	DGS-26-04-04	Streambank and Shoreline Protection	20	Lin. Feet	5.5	$9,835	$178.82
310	II	DGS-36-03-04	Streambank and Shoreline Protection	25	Lin. Feet	5.5	$9,835	$178.82
311	III	DGS-26-02-01	Streambank and Shoreline Protection	25	Lin. Feet	6.38	$11,415	$178.92
312	III	DGS-27-01-02	Streambank and Shoreline Protection	75	Lin. Feet	19.13	$35,115	$183.56
313	II	DGS-28-03-01	Grassed Waterway	300	Lin. Feet	3.02	$5,625	$186.26
314	I	HAM-13-01-06	Water and Sediment Control Basin	1	Each	3.37	$6,450	$191.39

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
315	II	DGS-18-02-03	Water and Sediment Control Basin	1	Each	6.91	$13,325	$192.84
316	II	DGS-18-02-04	Water and Sediment Control Basin	1	Each	6.91	$13,325	$192.84
317	I	DGS-17-02-01	Water and Sediment Control Basin	1	Each	3.24	$6,450	$199.07
318	I	HAM-15-04-02	Water and Sediment Control Basin	1	Each	3.19	$6,450	$202.19
319	II	DGS-28-03-02	Grassed Waterway	250	Lin. Feet	2.57	$5,513	$214.49
320	I	DGS-17-03-01	Water and Sediment Control Basin	1	Each	5.97	$13,325	$223.20
321	I	DGS-23-01-02	Water and Sediment Control Basin	1	Each	5.78	$13,325	$230.54
322	III	DGS-26-02-02	Streambank and Shoreline Protection	25	Lin. Feet	4.25	$9,835	$231.41
323	I	DGS-19-02-01	Water and Sediment Control Basin	1	Each	5.71	$13,325	$233.36
324	I	DGS-26-04-02	Streambank and Shoreline Protection	100	Lin. Feet	5.5	$12,995	$236.27
325	II	DGS-13-02-02	Water and Sediment Control Basin	1	Each	5.6	$13,325	$237.95
326	II	DGS-28-01-03	Water and Sediment Control Basin	1	Each	5.53	$13,325	$240.96
327	I	DGS-36-02-03	Streambank and Shoreline Protection	325	Lin. Feet	31.28	$78,565	$251.17
328	I	DGS-09-04-01	Grassed Waterway	125	Lin. Feet	2.39	$6,044	$252.88
329	III	DGS-26-03-03	Streambank and Shoreline Protection	75	Lin. Feet	6.38	$16,155	$253.21
330	I	HAM-15-03-01	Water and Sediment Control Basin	1	Each	5.26	$13,325	$253.33
331	II	DGS-35-01-01	Grade Stabilization Structure	1	Each	5.21	$13,450	$258.16
332	I	DGS-17-03-02	Water and Sediment Control Basin	1	Each	4.61	$13,325	$289.05
333	I	DGS-35-01-04	Streambank and Shoreline Protection	100	Lin. Feet	11	$31,955	$290.50
334	I	DGS-35-01-05	Streambank and Shoreline Protection	200	Lin. Feet	11	$31,955	$290.50
335	II	DGS-21-04-02	Water and Sediment Control Basin	1	Each	2.01	$6,450	$320.90
336	I	DGS-26-03-02	Streambank and Shoreline Protection	125	Lin. Feet	6.88	$22,475	$326.67
337	II	DGS-28-04-02	Grassed Waterway	500	Lin. Feet	1.6	$6,075	$379.69
338	II	DGS-28-04-04	Grassed Waterway	350	Lin. Feet	1.45	$5,738	$395.69
339	II	DGS-28-04-03	Grassed Waterway	600	Lin. Feet	1.54	$6,300	$409.09
340	I	HAM-12-04-02	Water and Sediment Control Basin	1	Each	3.21	$13,325	$415.11
341	I	DGS-20-01-02	Water and Sediment Control Basin	1	Each	1.5	$6,450	$430.00
342	II	DGS-21-04-01	Water and Sediment Control Basin	1	Each	1.34	$6,450	$481.34
343	II	HAM-13-01-07	Water and Sediment Control Basin	1	Each	1.29	$6,450	$500.00
344	I	DGS-23-01-01	Water and Sediment Control Basin	1	Each	2.23	$13,325	$597.53
345	II	DGS-35-02-02	Grassed Waterway	50	Lin. Feet	0.74	$5,063	$684.12
346	I	DGS-35-01-02	Streambank and Shoreline Protection	25	Lin. Feet	1.38	$9,835	$712.68

Document Overview

The Trout Brook Subwatershed Analysis (SWA) is a watershed management tool developed to proactively identify and prioritize potential BMP projects based on performance and cost effectiveness. This process is intended, ultimately, to assist local water management organizations and partner agencies in maximizing the value of each dollar spent.

The methods and analysis behind this document provide the ability to quickly assess subwatersheds for optimal locations for BMPs that are most appropriate and feasible based on actual site conditions. While this analysis is accurate and sufficient for that purpose, estimated final construction costs and pollutant removals will need to be refined once projects are selected for construction. Construction projects should be considered as only one part of an overall watershed restoration plan that includes, but is not limited to, educational outreach, upstream discharge reductions, and pollutant source control.

This document is organized into three sections including Methods, Cost/Benefit Analysis Ranking, and Project Profiles for the proposed BMP's. References used in the assessment protocol and appendices provide additional information relevant to the assessment. Each section is briefly described below:

Methods

The Methods section outlines the general procedures used when assessing the subwatershed. It details the processes of *Project Scoping, Desktop Analysis, Field Reconnaissance, and Cost/Treatment Analysis*. This protocol attempts to provide a sufficient level of detail to rapidly assess watersheds and catchments of variable scales and land uses. It provides the assessor defined project goals that aid in quickly narrowing down multiple potential sites to a point where the assessor can look critically at site-specific driven design options that affect BMP selection.

Cost/Benefit Analysis Ranking

Projects that are 1) most able to address the project goals, 2) are compatible with current land use and 3) appear to have reasonable design, installation and maintenance costs were chosen for a cost/benefit analysis and ranked (see Table 3). The list is sorted by cost per ton of sediment treated by the BMP over a duration (i.e. life-cycle) of 10 years, the typical minimum maintenance period for publicly-funded projects on private land. The final cost per ton of treatment value includes installation and maintenance costs. While sediment is used as the primary ranking tool, project priority would be very similar when projects are ranked for phosphorus reduction.

Project Profiles

Each BMP that was identified through the analysis was given its own unique identification code to coincide with the project location, type, and number. This identification code is used to reference each individual project. Within the *Project Profiles* section, BMPs are grouped by section, township, and range to most easily identify the physical location of each project.

A rendered aerial photo highlights the specific locations identified for each grouping. Additional field inspections will be required to verify project feasibility, but the most ideal locations for BMP project installations based on available data are identified here. Paired with each aerial photograph is a description of the typical land use, soil types, topography, and other relevant information for each section.

The Land Management Recommendation section describes cultural practices that are encouraged as part of ongoing land management. A BMP Cost Benefit Analysis table provides for the direct comparison of the expected amount of treatment within a section per invested dollar estimated. In most cases, several BMP's were reviewed with the most feasible ones recommended based on how it fits with current use of the land, efficiency of pollutant reduction and estimated cost.

Methods

Step #1: Project Scoping

Determining the resource of concern and the subsequent drainage area to analyze is the first step in the assessment process. Water quality monitoring data, inclusion on Minnesota's impaired waters list, availability of accurate GIS data, and availability of other plans or assessments are a few of the considerations in determining which waterbodies are a priority.

The Trout Brook watershed was targeted due to existing impairments, high value recreational areas within the system, and availability of existing monitoring and GIS data. The Trout Brook watershed is located within the Cannon River Watershed and the authority of the North Cannon River Watershed Management Organization (NCRWMO). Dakota County SWCD Staff coordinated with the NCRWMO Board in selection of the Trout Brook watershed for analysis.

The Trout Brook watershed consists of 18,111 acres in Southeast Dakota County on the western edge of the karst landscape. Trout Brook joins the Cannon River at the Dakota-Goodhue County line. Land use within the watershed is primarily agricultural but also includes two small towns, New Trier (pop. 113) in the western portion, and Miesville (pop. 126) in the northeastern portion. In the southeast portion of the watershed there is a golf course and there is also a large regional park, Miesville Ravine Park Reserve, operated by Dakota County. Nearly all of the Trout Brook drainage (95%) lies within Dakota County, with the remaining in Goodhue County. Only 8.8 miles of Trout Brook are defined as perennial stream. The lower reach of Trout Brook is a Minnesota DNR designated Trout Stream. Trout Brook can be a "flashy stream" when snowmelt or rain on the upper portions of the watershed causes the water to rise quickly. In the recent past, a number of severe rain events have happened over this area, further exacerbating erosion issues in the watershed.

Surface water monitoring data for Trout Brook is available for various years dating back to 1985. Since 2001, the NCRWMO has sponsored periodic water monitoring within the watershed. In 2011, the Minnesota Pollution Control Agency (MPCA) undertook an intensive watershed monitoring effort of the Cannon River Watershed's surface waters which included Trout Brook (MPCA 2014).

Water quality monitoring has revealed high turbidity and high nitrate concentrations and Trout Brook was placed on the list of impaired waters due to high turbidity (2006), high nitrates (2010), and biological impairment due to lack of sensitive macroinvertebrates (2014). Water clarity (turbidity) impairments are spread throughout indicating that too much sediment is moving through the system which impacts habitat quality. Elevated nitrate concentrations in Trout Brook are contributing stress on the macroinvertebrate community. (Cannon River Watershed Stressor Identification Report, MPCA, October 2015).

Sediment deposits in Trout Brook

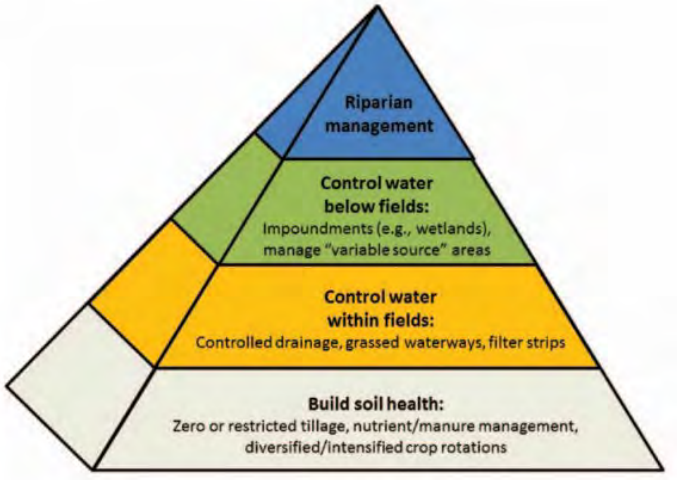
For this report, the Dakota County SWCD, in coordination with the NCRWMO, determined that the primary pollutant of focus is sediment. The assessment area is limited to the Dakota portion of the Trout Brook watershed due to a combination of factors that included limited vital data for Goodhue County portions, distance from Goodhue County portions to Trout Brook, and small portion of the watershed (5%) that is in Goodhue County.

Due to the close association between sediment and phosphorus, many of the identified BMPs would rank similarly when ranked by their cost-benefit ratio with regards to phosphorus reduction. Nitrate levels are also a priority within the watershed. However, understanding nitrate movement in karst landscapes is difficult as rate and direction of water movement underground can vary greatly from surface flow. Further delineation of springsheds would be needed before exact placement of Nitrate BMP's can be reliably prioritized. Even though BMPs were not focused on nitrate reduction, the Dakota County SWCD will continue to promote nitrate reduction BMPs such as nutrient management, cover crops, animal waste storage and management, etc. throughout the watershed.

Step #2: Desktop Analysis

The purpose of the desktop analysis is to narrow the amount of field reconnaissance and other time consuming tasks that would be needed to complete the SWA by identifying and prioritizing potential projects within the watershed which would likely yield the greatest pollutant (sediment) reductions. Desktop analysis was based on the Agricultural Conservation Planning Framework (ACPF) to identify potential priority locations for BMPs.

Conceptually, ACPF is based off of a conservation pyramid (right) that emphasizes soil conservation as the foundation to watershed management within an agricultural setting. The base of the pyramid is building soil health by protecting soils from erosion with zero or minimum tillage, limiting loss of excess nutrients to water resources through rates and timing of fertilizer and manure applications, and building soil organic matter and rejuvenating compacted soils with intensified crop rotations (Tomer et.al 2013).



It is important to note that ACPF does not specifically identify land management practices as an output of the framework. As stated in a report by the National Laboratory for Agriculture and the Environment:
"The [ACPF] does not explicitly prioritize practices that may be adopted within fields in order to build soil (e.g., cover crops), maintain residue cover (e.g., no-tillage), or improve nutrient use efficiency (e.g., manure management plans). These field practices are appropriate in virtually any field from farm management and soil health perspectives, and all farmers should be encouraged to

implement them. Nevertheless, these in-field practices may have greater measureable benefits for watershed water quality in fields prioritized by the runoff risk assessment" (Tomer 2014).

The ACPF tool uses landscape attributes to identify locations where potential BMPs could be installed. The outputs of the ACPF are not a set of recommendations but rather a planning resource to illustrate a range of BMP possibilities within the watershed. A further step of field verification and site-specific pollutant reduction calculations are needed before the specific practices are recommended or prioritized.

Dakota County SWCD collaborated with the Water Resource Center at Minnesota State University Mankato and with USDA/ARS National Laboratory for Agriculture and the Environment to complete the desktop analysis using the ACPF tool. The ACPF tool used data layers including a hydrologically corrected digital elevation model, field boundaries, land use (cropping rotation), and a Natural Resources Conservation Service (NRCS) SSURGO soils raster. Refinements within the ACPF tool were made to consider unique conditions within the Trout Brook watershed (e.g. minimal tile drainage). Outputs of the ACPF include a flow network, runoff risk potential, stream power index, riparian function assessment, potential locations for water and sediment control basins, grassed waterways, constructed wetlands for nutrient removal, farm ponds, and contour filter strips. Outputs from the tool where then combined with Dakota County SWCD data including an existing conservation BMP database, stream flow network, Dakota County parcel boundaries, the Minnesota Land Cover Classification System, and Dakota County aerial photography.

As a tool for the field reconnaissance, maps were created for each section showing the desktop identified BMPs with relevant information including 2014 aerial photos, parcel boundaries, landowner information, existing and previously installed BMPs, wetlands, and contour lines. Staff from the Dakota County SWCD office used the maps to verify the feasibility and effectiveness of each BMP.

Step #3: Field Reconnaissance

Using the created maps for each section as a guide, field investigations were conducted to evaluate as many sites as possible to test assumptions and identify site-limiting factors for BMP design. Site constraints were assessed to determine the most feasible BMP options as well as eliminate sites from consideration. The field investigation also revealed BMP opportunities that could have gone unnoticed using only a desktop analysis. During the investigation, the drainage area and other mapped data was verified. Public right-of-way and public land within priority catchments was used as a starting point for visual assessment. Potential BMP locations that were identified during the Desktop Analysis step but could not be seen from public areas were visited by contacting individual landowners and scheduling formal site visits.

Example of location identified for grassed waterway

Field reconnaissance was done in the spring when soil surfaces were visible and not obstructed by crops. BMPs

that were deemed feasible were recorded and appropriate information was gathered to calculate the size, pollutant removal potential, and cost of the BMP. Linear BMPs such as grass waterways that spanned across more than one parcel were split on parcel boundaries and identified as two separate practices. This was done to appropriately estimate installation costs as they would likely need coordination with multiple landowners with separate agreements and design documents. It is important to note that BMPs spanning multiple parcels are likely to be contingent upon up gradient or downgradient practices being installed on adjacent properties for each of the BMPs to be effective.

BMPs were selected from the NRCS practice standards. Sites identified during the field reconnaissance were determined to be the best locations for BMP installations for pollutant treatment based on professional knowledge and experience. Following field reconnaissance, field maps and recorded notes were digitized in preparation for the cost-benefit ranking. Staff identified 346 potential locations that would benefit from BMP installations. Table 1 illustrates pollution reduction practices that were considered for each site.

Example of location identified for streambank stabilization

Table 1. Pollution Reduction Practices

Practice & NRCS Code	Description
340 - Cover Crop	Grasses, legumes, and forbs planted for seasonal vegetative cover.
342 - Critical Area Planting (Native plants)	Planting of permanent native grasses, usually on a field with steep slopes over 6%.
393 - Filter Strip	Minimum of a 50 foot strip of perennial grasses and legumes planted along a stream, ditch, or wetland to capture sediment before it runs into the waterbody.
410 - Grade Stabilization Structure	A structure used to control the grade in natural or constructed channels to slow the flow of water, stabilize the channel, and reduce erosion.
412 - Grassed Waterway	A strip of grass in a crop field planted to reduce erosion where there is concentrated flow of water.
580 - Stream and Shoreline Protection	Treatments to stabilize and protect the banks of streams to prevent the loss of soil and reduce the offsite or downstream effects of sediment resulting from bank erosion.
638 - Water & Sediment Control Basin	An earthen embankment which traps water and sediment running off cropland upslope, thereby slowing the flow and allowing sediment to drop out of suspension.

Step #4: Cost/Treatment Analysis

After feasible BMP projects were identified, potential sediment reductions were calculated and preliminary cost estimates compiled. The projects were then ranked based on the cost per ton of sediment removal per year, over a 10 year life-cycle. The final value for the cost per pound of treatment includes construction and installation. The top ranking projects have the lowest cost per ton of sediment removal.

Treatment Analysis

Modeling of the sediment loading for each selected BMP, before and after project installation, was completed with the Board of Water and Soil Resources (BWSR) Pollution Reduction Estimator using inputs from RUSLE2. Distance to surface water was calculated based on distances between the project and identified watercourses from the Dakota County SWCD's Cannon River Wetland and Watercourse Inventory completed in 2006. The sediment reduction estimates associated with the installation of each project should be considered as pollutant reduction to watercourses within the Trout Brook watershed, but not necessarily pollutant load reductions to the Cannon River. It is important to note that reported treatment levels are dependent upon optimal site selection and sizing. Not all locations and sizes will yield the same results. The pollutant removal estimates may be used to prioritize practices within the Trout Brook watershed and for grant applications but in no case should this data be used to represent actual pollutant removal until after installation is complete and site-specific modeling and/or monitoring data is available.

Cost estimates

Each project was assigned estimated costs for construction and installation based on a recent analysis of values for similar projects installed in Dakota County from 2010 to 2015. The averaged values used in the calculations can be found in the Appendix. An annual cost per ton of sediment removal was then calculated for the 10 year life-cycle. In the final evaluation and ranking, the estimated project costs for each BMP are listed.

Cost/Benefit and Project Ranking Table

More detail regarding each specific project can be found in the *Project Profiles* pages of this report. In addition to ranking, a "Feasibility Code" was assigned to each project. Table-2 includes a column titled "Feasibility Code". The purpose of this code is to provide a basic indication of the feasibility or "reasonable likelihood" the listed project would be applied and installed by the landowner on a voluntary basis. The selected code is based on relative success SWCD staff has had in promoting the selected BMP project type through promotional and landowner engagement initiatives conducted in recent history.

The following criteria apply to each of the three codes used:

Table 2. Project Feasibility Codes

Code	Considerations
I	**High likelihood: practice is not dependent on installation of other practices or coordination with other landowners, the landowner has a history of cooperation with SWCD/NRCS, practice does not hinder farmability and/or installation cost is not prohibitive**
II	**Medium likelihood: practice may be dependent on installation of one or two other conservation practices and coordination with additional landowners, landowner is willing to work with SWCD/NRCS, practice does not severely hinder farmability and/or cost is not prohibitive**
III	**Low likelihood: project requires installation of other practices in order to be effective and coordination with multiple landowners, landowner has not previously worked with SWCD/NRCS, practice disrupts ability to farm the field and/or installation cost is prohibitive**

Table 3 summarizes the identified potential projects within the study area. Potential projects are listed from most cost effective to least, based on cost per ton of sediment removed over the life-cycle timeframe.

Cost estimates represent design and construction costs for each project installed on that particular site. Depending on complexity, additional project costs ranging from 25% to 50% of the construction cost should be added to account for project outreach and promotion. The reported treatment levels are dependent upon optimal siting and sizing which would be completed during the actual design phase of the proposed project, as well as obtaining landowner cooperation. Due to changing land use over time, these project profiles should be re-assessed periodically to update BMP suitability and priority ranking.

Table 3. Summary of Potential BMPs

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
1	I	DGS-14-02-01	Grassed Waterway	3000	Lin. Feet	1721.25	$13,950	$0.81
2	II	DGS-18-03-04	Filter Strip	2.5	Acres	219.21	$1,900	$0.87
3	I	DGS-14-02-02	Grassed Waterway	2300	Lin. Feet	1319.63	$12,025	$0.91
4	I	DGS-22-03-01	Grassed Waterway	2300	Lin. Feet	1207.5	$13,925	$1.15
5	I	DGS-22-04-03	Grade Stabilization Structure	1	Each	1718.8	$21,075	$1.23
6	I	DGS-22-04-02	Grade Stabilization Structure	1	Each	2062.5	$32,200	$1.56
7	II	DGS-12-01-09	Grassed Waterway	1320	Lin. Feet	504.9	$9,330	$1.85
8	I	DGS-15-02-02	Grassed Waterway	1200	Lin. Feet	459	$9,000	$1.96
9	II	DGS-22-02-01	Grassed Waterway	500	Lin. Feet	393.75	$8,075	$2.05
10	II	DGS-18-03-01	Filter Strip	2.3	Acres	90.05	$1,850	$2.05
11	I	DGS-14-01-01	Grassed Waterway	2600	Lin. Feet	522.11	$12,850	$2.46
12	II	DGS-29-01-01	Grassed Waterway	3400	Lin. Feet	578	$15,050	$2.60
13	I	DGS-22-03-02	Grassed Waterway	480	Lin. Feet	252	$8,010	$3.18
14	I	DGS-22-04-01	Grade Stabilization Structure	1	Each	3437.5	$111,700	$3.25
15	II	DGS-12-01-10	Grassed Waterway	1600	Lin. Feet	306	$10,100	$3.30
16	I	DGS-14-03-05	Grassed Waterway	1150	Lin. Feet	221.38	$7,538	$3.40
17	I	DGS-14-03-03	Grassed Waterway	750	Lin. Feet	251.02	$8,888	$3.54
18	I	DGS-08-03-01	Grassed Waterway	2100	Lin. Feet	357	$13,275	$3.72
19	I	DGS-15-03-03	Grassed Waterway	1250	Lin. Feet	185.94	$7,763	$4.17
20	II	DGS-12-04-03	Grassed Waterway	500	Lin. Feet	191.25	$8,075	$4.22
21	II	HAM-13-03-02	Filter Strip	1	Acres	34.62	$1,525	$4.40
22	III	HAM-14-01-01	Grassed Waterway	1300	Lin. Feet	138.13	$6,450	$4.67
23	I	DGS-15-02-01	Grassed Waterway	900	Lin. Feet	172.13	$8,175	$4.75
24	II	HAM-13-02-04	Filter Strip	1.8	Acres	35.31	$1,725	$4.89
25	II	DGS-36-03-02	Grassed Waterway	50	Lin. Feet	103.13	$5,063	$4.91
26	I	DGS-14-01-03	Grassed Waterway	800	Lin. Feet	160.65	$7,900	$4.92
27	II	DGS-35-02-01	Critical Area Planting	0.1	Acres	28.88	$1,450	$5.02
28	II	DGS-12-04-01	Grassed Waterway	1375	Lin. Feet	184.08	$9,481	$5.15
29	I	HAM-15-01-01	Grassed Waterway	1200	Lin. Feet	153	$9,000	$5.88
30	II	DGS-23-02-01	Grassed Waterway	950	Lin. Feet	141.31	$8,313	$5.88
31	I	DGS-27-04-04	Grassed Waterway	700	Lin. Feet	104.13	$6,525	$6.27
32	II	DGS-13-01-07	Grassed Waterway	1320	Lin. Feet	147.26	$9,330	$6.34
33	II	DGS-24-03-05	Grassed Waterway	670	Lin. Feet	99.66	$6,458	$6.48
34	I	HAM-10-04-03	Grassed Waterway	1200	Lin. Feet	127.5	$9,000	$7.06
35	I	DGS-07-04-01	Grassed Waterway	1000	Lin. Feet	106.25	$8,450	$7.95
36	II	DGS-29-02-01	Grassed Waterway	1400	Lin. Feet	119	$9,550	$8.03
37	I	DGS-11-04-02	Grassed Waterway	900	Lin. Feet	100.4	$8,175	$8.14
38	II	DGS-27-02-04	Grassed Waterway	2300	Lin. Feet	119.74	$10,125	$8.46
39	II	DGS-22-02-02	Grassed Waterway	350	Lin. Feet	67.38	$5,738	$8.52
40	II	DGS-28-01-01	Grassed Waterway	2100	Lin. Feet	133.88	$11,475	$8.57
41	I	DGS-11-03-02	Grassed Waterway	1200	Lin. Feet	103.95	$9,000	$8.66
42	I	HAM-10-01-01	Water and Sediment Control Basin	1	Each	74.38	$6,450	$8.67
43	I	HAM-10-04-04	Water and Sediment Control Basin	1	Each	74.38	$6,450	$8.67
44	I	HAM-13-04-01	Grassed Waterway	2700	Lin. Feet	172.13	$15,225	$8.85
45	I	DGS-08-03-03	Grassed Waterway	850	Lin. Feet	90.31	$8,038	$8.90
46	I	DGS-08-03-05	Grassed Waterway	850	Lin. Feet	90.31	$8,038	$8.90
47	I	HAM-10-03-02	Grassed Waterway	850	Lin. Feet	90.31	$8,038	$8.90
48	I	DGS-08-04-01	Grassed Waterway	650	Lin. Feet	82.88	$7,488	$9.03
49	II	DGS-34-02-03	Grassed Waterway	1100	Lin. Feet	81.81	$7,425	$9.08

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
50	II	HAM-10-03-01	Grassed Waterway	2700	Lin. Feet	143.44	$13,125	$9.15
51	I	DGS-20-03-01	Grassed Waterway	1400	Lin. Feet	104.13	$9,550	$9.17
52	I	DGS-34-01-01	Grassed Waterway	1400	Lin. Feet	104.13	$9,550	$9.17
53	I	DGS-08-03-04	Grassed Waterway	800	Lin. Feet	85	$7,900	$9.29
54	I	HAM-11-03-01	Water and Sediment Control Basin	1	Each	69.06	$6,450	$9.34
55	II	HAM-14-03-02	Grassed Waterway	1300	Lin. Feet	96.69	$9,275	$9.59
56	III	DGS-27-02-03	Grassed Waterway	1800	Lin. Feet	93.71	$9,000	$9.60
57	II	DGS-22-03-09	Grassed Waterway	1000	Lin. Feet	74.38	$7,200	$9.68
58	II	DGS-07-02-01	Grassed Waterway	750	Lin. Feet	79.69	$7,763	$9.74
59	I	HAM-11-04-04	Water and Sediment Control Basin	1	Each	63.75	$6,450	$10.12
60	II	HAM-11-03-08	Water and Sediment Control Basin	1	Each	61.09	$6,450	$10.56
61	I	HAM-13-04-02	Filter Strip	2.1	Acres	17.04	$1,800	$10.56
62	I	DGS-15-01-02	Grassed Waterway	880	Lin. Feet	65.45	$6,930	$10.59
63	I	DGS-27-03-01	Grassed Waterway	2000	Lin. Feet	104.13	$11,200	$10.76
64	I	DGS-11-03-01	Grassed Waterway	1000	Lin. Feet	66.94	$7,200	$10.76
65	II	DGS-12-03-01	Grassed Waterway	400	Lin. Feet	53.55	$5,850	$10.92
66	I	DGS-18-01-01	Water and Sediment Control Basin	1	Each	58.44	$6,450	$11.04
67	I	HAM-15-04-03	Grassed Waterway	1000	Lin. Feet	74.38	$8,450	$11.36
68	I	HAM-15-04-06	Grassed Waterway	1000	Lin. Feet	74.38	$8,450	$11.36
69	I	DGS-17-01-02	Grassed Waterway	1600	Lin. Feet	85	$10,100	$11.88
70	I	HAM-13-01-05	Water and Sediment Control Basin	1	Each	53.92	$6,450	$11.96
71	II	DGS-28-02-01	Grassed Waterway	2400	Lin. Feet	102	$12,300	$12.06
72	II	DGS-10-04-01	Grassed Waterway	850	Lin. Feet	56.9	$6,863	$12.06
73	I	DGS-12-03-02	Grassed Waterway	500	Lin. Feet	66.94	$8,075	$12.06
74	I	DGS-08-03-06	Water and Sediment Control Basin	1	Each	53.13	$6,450	$12.14
75	I	DGS-18-01-02	Water and Sediment Control Basin	1	Each	53.13	$6,450	$12.14
76	I	HAM-11-04-05	Water and Sediment Control Basin	1	Each	53.13	$6,450	$12.14
77	I	DGS-27-04-01	Grassed Waterway	700	Lin. Feet	52.06	$6,525	$12.53
78	II	DGS-16-02-02	Water and Sediment Control Basin	1	Each	51	$6,450	$12.65
79	II	DGS-22-01-03	Grassed Waterway	400	Lin. Feet	53.55	$6,800	$12.70
80	II	DGS-17-01-05	Grassed Waterway	1050	Lin. Feet	66.94	$8,588	$12.83
81	I	DGS-07-04-02	Critical Area Planting	16.3	Acres	42.64	$5,500	$12.90
82	II	DGS-27-02-05	Grassed Waterway	1100	Lin. Feet	57.27	$7,425	$12.96
83	II	DGS-23-04-01	Grassed Waterway	300	Lin. Feet	43.14	$5,625	$13.04
84	I	DGS-14-03-08	Grassed Waterway	275	Lin. Feet	40.91	$5,569	$13.61
85	I	DGS-08-04-02	Grassed Waterway	475	Lin. Feet	50.74	$7,006	$13.81
86	I	DGS-14-03-01	Grassed Waterway	1000	Lin. Feet	52.06	$7,200	$13.83
87	I	DGS-08-03-02	Grassed Waterway	450	Lin. Feet	47.81	$6,938	$14.51
88	I	DGS-20-03-05	Grassed Waterway	700	Lin. Feet	52.06	$7,625	$14.65
89	I	DGS-11-04-03	Grassed Waterway	800	Lin. Feet	53.55	$7,900	$14.75
90	I	DGS-11-02-03	Grassed Waterway	600	Lin. Feet	40.16	$6,300	$15.69
91	II	DGS-35-02-10	Grassed Waterway	1100	Lin. Feet	46.75	$7,425	$15.88
92	I	DGS-18-02-01	Critical Area Planting	2.4	Acres	12.63	$2,025	$16.03
93	I	HAM-23-01-01	Grassed Waterway	1400	Lin. Feet	59.5	$9,550	$16.05
94	II	DGS-23-02-02	Grassed Waterway	1000	Lin. Feet	52.06	$8,450	$16.23
95	I	DGS-27-04-02	Grassed Waterway	500	Lin. Feet	37.19	$6,075	$16.34
96	I	DGS-27-04-03	Grassed Waterway	500	Lin. Feet	37.16	$6,075	$16.35
97	I	DGS-18-03-03	Grassed Waterway	2300	Lin. Feet	73.31	$12,025	$16.40
98	I	DGS-15-04-01	Grassed Waterway	780	Lin. Feet	40.61	$6,705	$16.51
99	II	DGS-10-04-02	Grassed Waterway	550	Lin. Feet	36.82	$6,188	$16.80
100	III	DGS-07-03-04	Grassed Waterway	900	Lin. Feet	47.81	$8,175	$17.10
101	II	DGS-15-01-01	Grassed Waterway	650	Lin. Feet	43.51	$7,488	$17.21
102	I	HAM-11-04-06	Water and Sediment Control Basin	1	Each	37.19	$6,450	$17.34

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
103	I	HAM-11-04-07	Water and Sediment Control Basin	1	Each	37.19	$6,450	$17.34
104	II	DGS-21-02-01	Water and Sediment Control Basin	1	Each	36.68	$6,450	$17.58
105	II	DGS-12-02-04	Grassed Waterway	300	Lin. Feet	31.88	$5,625	$17.64
106	II	HAM-13-01-08	Grassed Waterway	1450	Lin. Feet	53.92	$9,688	$17.97
107	I	DGS-18-02-02	Critical Area Planting	4.9	Acres	14.74	$2,650	$17.98
108	II	DGS-35-03-03	Grade Stabilization Structure	1	Each	114.75	$21,075	$18.37
109	II	HAM-10-02-04	Grassed Waterway	800	Lin. Feet	42.5	$7,900	$18.59
110	I	HAM-23-02-03	Grassed Waterway	2500	Lin. Feet	66.41	$12,575	$18.94
111	I	DGS-14-03-07	Grassed Waterway	650	Lin. Feet	33.84	$6,413	$18.95
112	II	HAM-11-01-01	Grassed Waterway	450	Lin. Feet	30.94	$5,963	$19.27
113	II	HAM-11-03-02	Water and Sediment Control Basin	1	Each	69.06	$13,325	$19.29
114	II	DGS-29-01-03	Filter Strip	2.2	Acres	9.31	$1,825	$19.60
115	II	DGS-35-02-04	Grassed Waterway	800	Lin. Feet	34	$6,750	$19.85
116	II	DGS-29-02-03	Grassed Waterway	400	Lin. Feet	34	$6,800	$20.00
117	II	HAM-11-03-03	Water and Sediment Control Basin	1	Each	31.88	$6,450	$20.23
118	II	HAM-13-01-03	Water and Sediment Control Basin	1	Each	31.88	$6,450	$20.23
119	II	HAM-13-01-04	Water and Sediment Control Basin	1	Each	31.88	$6,450	$20.23
120	I	DGS-17-01-03	Grassed Waterway	700	Lin. Feet	37.19	$7,625	$20.50
121	II	DGS-12-04-02	Grassed Waterway	300	Lin. Feet	31.24	$6,525	$20.89
122	II	DGS-17-01-01	Grassed Waterway	675	Lin. Feet	35.86	$7,556	$21.07
123	II	DGS-12-02-02	Water and Sediment Control Basin	1	Each	29.75	$6,450	$21.68
124	II	DGS-12-02-03	Water and Sediment Control Basin	1	Each	29.75	$6,450	$21.68
125	II	DGS-35-03-04	Grade Stabilization Structure	1	Each	95.63	$21,075	$22.04
126	I	DGS-21-01-01	Grassed Waterway	1900	Lin. Feet	49.03	$10,925	$22.28
127	I	DGS-17-02-02	Grassed Waterway	1250	Lin. Feet	39.84	$9,138	$22.94
128	II	DGS-12-01-02	Water and Sediment Control Basin	1	Each	57.75	$13,325	$23.07
129	II	DGS-12-01-07	Water and Sediment Control Basin	1	Each	57.75	$13,325	$23.07
130	II	DGS-15-03-02	Water and Sediment Control Basin	1	Each	57.75	$13,325	$23.07
131	II	DGS-22-03-08	Water and Sediment Control Basin	1	Each	57.75	$13,325	$23.07
132	II	DGS-28-01-02	Water and Sediment Control Basin	1	Each	27.5	$6,450	$23.45
133	III	DGS-36-03-01	Streambank and Shoreline Protection	100	Lin. Feet	136	$31,955	$23.50
134	I	DGS-18-02-06	Grassed Waterway	1200	Lin. Feet	38.25	$9,000	$23.53
135	I	DGS-14-03-04	Grassed Waterway	450	Lin. Feet	23.43	$5,963	$25.45
136	I	HAM-15-03-02	Grassed Waterway	350	Lin. Feet	26.03	$6,663	$25.60
137	III	DGS-22-04-04	Grassed Waterway	250	Lin. Feet	21.25	$5,513	$25.94
138	II	DGS-23-02-03	Grassed Waterway	250	Lin. Feet	21.25	$5,513	$25.94
139	I	DGS-16-04-04	Grassed Waterway	575	Lin. Feet	24.44	$6,450	$26.39
140	II	DGS-29-01-02	Grassed Waterway	800	Lin. Feet	29.75	$7,900	$26.55
141	II	DGS-21-01-03	Grassed Waterway	500	Lin. Feet	26.56	$7,075	$26.64
142	I	DGS-16-04-03	Grassed Waterway	550	Lin. Feet	23.38	$6,450	$27.59
143	I	HAM-14-03-01	Water and Sediment Control Basin	1	Each	47.81	$13,325	$27.87
144	I	DGS-21-01-02	Grassed Waterway	2800	Lin. Feet	47.89	$13,400	$27.98
145	II	DGS-35-02-11	Grassed Waterway	500	Lin. Feet	21.25	$6,075	$28.59
146	I	DGS-15-03-05	Grassed Waterway	950	Lin. Feet	24.73	$7,088	$28.66
147	I	DGS-20-03-02	Water and Sediment Control Basin	1	Each	45.16	$13,325	$29.51
148	I	DGS-20-03-04	Water and Sediment Control Basin	1	Each	45.16	$13,325	$29.51
149	II	HAM-11-03-05	Water and Sediment Control Basin	1	Each	45.16	$13,325	$29.51
150	II	DGS-22-01-04	Streambank and Shoreline Protection	950	Lin. Feet	365.75	$111,745	$30.55
151	I	DGS-34-01-02	Grassed Waterway	750	Lin. Feet	25.27	$7,763	$30.72
152	II	DGS-19-04-01	Water and Sediment Control Basin	1	Each	20.83	$6,450	$30.96
153	II	HAM-11-03-07	Water and Sediment Control Basin	1	Each	42.5	$13,325	$31.35
154	II	DGS-22-01-01	Grassed Waterway	350	Lin. Feet	18.22	$5,738	$31.49
155	II	DGS-22-01-02	Grassed Waterway	350	Lin. Feet	18.22	$5,738	$31.49

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
156	I	HAM-22-02-01	Grassed Waterway	1000	Lin. Feet	26.56	$8,450	$31.81
157	II	DGS-12-01-05	Water and Sediment Control Basin	1	Each	20.21	$6,450	$31.91
158	I	DGS-15-03-04	Grassed Waterway	800	Lin. Feet	20.83	$6,750	$32.41
159	I	DGS-16-04-05	Grassed Waterway	450	Lin. Feet	19.13	$6,450	$33.72
160	II	DGS-18-03-02	Water and Sediment Control Basin	1	Each	19.13	$6,450	$33.72
161	II	DGS-17-04-02	Grassed Waterway	375	Lin. Feet	19.92	$6,731	$33.79
162	II	DGS-34-01-03	Grassed Waterway	400	Lin. Feet	17	$5,850	$34.41
163	I	DGS-14-03-06	Grassed Waterway	100	Lin. Feet	17.33	$5,975	$34.48
164	I	HAM-14-02-01	Water and Sediment Control Basin	1	Each	18.65	$6,450	$34.58
165	II	DGS-12-01-01	Water and Sediment Control Basin	1	Each	38.5	$13,325	$34.61
166	II	DGS-12-01-03	Water and Sediment Control Basin	1	Each	38.5	$13,325	$34.61
167	II	DGS-12-01-06	Water and Sediment Control Basin	1	Each	38.5	$13,325	$34.61
168	II	DGS-15-03-01	Water and Sediment Control Basin	1	Each	38.5	$13,325	$34.61
169	II	HAM-11-02-01	Water and Sediment Control Basin	1	Each	37.19	$13,325	$35.83
170	II	HAM-13-02-01	Water and Sediment Control Basin	1	Each	17.63	$6,450	$36.59
171	II	DGS-07-03-02	Water and Sediment Control Basin	1	Each	17.55	$6,450	$36.75
172	II	DGS-29-01-04	Grassed Waterway	200	Lin. Feet	17	$6,250	$36.76
173	II	DGS-13-02-03	Grassed Waterway	500	Lin. Feet	16.52	$6,075	$36.77
174	I	HAM-23-02-01	Water and Sediment Control Basin	1	Each	17.19	$6,450	$37.52
175	I	HAM-23-02-02	Water and Sediment Control Basin	1	Each	17.19	$6,450	$37.52
176	I	HAM-24-01-03	Water and Sediment Control Basin	1	Each	17.15	$6,450	$37.61
177	II	DGS-29-02-02	Water and Sediment Control Basin	1	Each	16.97	$6,450	$38.01
178	I	HAM-12-03-01	Water and Sediment Control Basin	1	Each	16.5	$6,450	$39.09
179	I	DGS-16-01-01	Grassed Waterway	1050	Lin. Feet	21.59	$8,588	$39.78
180	II	DGS-22-03-06	Water and Sediment Control Basin	1	Each	33	$13,325	$40.38
181	II	DGS-22-03-07	Water and Sediment Control Basin	1	Each	33	$13,325	$40.38
182	II	DGS-12-01-04	Water and Sediment Control Basin	1	Each	15.62	$6,450	$41.29
183	I	DGS-14-03-02	Grassed Waterway	150	Lin. Feet	12.75	$5,288	$41.47
184	I	DGS-27-04-06	Grassed Waterway	250	Lin. Feet	13.02	$5,513	$42.34
185	II	DGS-34-02-01	Grassed Waterway	1200	Lin. Feet	17.85	$7,650	$42.86
186	II	HAM-13-01-02	Water and Sediment Control Basin	1	Each	14.99	$6,450	$43.03
187	II	DGS-13-02-04	Water and Sediment Control Basin	1	Each	14.87	$6,450	$43.38
188	II	DGS-27-03-03	Grassed Waterway	100	Lin. Feet	13.39	$5,975	$44.62
189	II	DGS-18-03-06	Water and Sediment Control Basin	1	Each	14.33	$6,450	$45.01
190	I	HAM-15-04-04	Grassed Waterway	1000	Lin. Feet	18.65	$8,450	$45.31
191	II	DGS-18-03-05	Water and Sediment Control Basin	1	Each	14.05	$6,450	$45.91
192	II	DGS-12-01-08	Water and Sediment Control Basin	1	Each	28.88	$13,325	$46.14
193	III	DGS-13-01-06	Water and Sediment Control Basin	1	Each	28.88	$13,325	$46.14
194	I	DGS-27-04-05	Grassed Waterway	225	Lin. Feet	11.71	$5,456	$46.59
195	II	DGS-35-03-01	Grassed Waterway	500	Lin. Feet	13.02	$6,075	$46.66
196	I	HAM-14-02-03	Water and Sediment Control Basin	1	Each	13.7	$6,450	$47.08
197	II	DGS-10-03-05	Critical Area Planting	4.6	Acres	5.31	$2,575	$48.49
198	I	HAM-12-03-02	Grassed Waterway	400	Lin. Feet	12.01	$5,850	$48.71
199	II	DGS-16-02-01	Water and Sediment Control Basin	1	Each	12.8	$6,450	$50.39
200	I	HAM-12-03-03	Water and Sediment Control Basin	1	Each	12.75	$6,450	$50.59
201	II	DGS-21-02-02	Grassed Waterway	950	Lin. Feet	16.25	$8,313	$51.15
202	II	HAM-12-01-01	Water and Sediment Control Basin	1	Each	26.03	$13,325	$51.19
203	I	HAM-22-01-04	Grassed Waterway	525	Lin. Feet	13.95	$7,144	$51.21
204	II	HAM-12-04-01	Grassed Waterway	350	Lin. Feet	11.16	$5,738	$51.41
205	I	DGS-15-04-03	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25
206	I	DGS-15-04-04	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25
207	II	DGS-23-03-01	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25
208	II	DGS-24-03-01	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
209	II	DGS-24-03-02	Water and Sediment Control Basin	1	Each	25.5	$13,325	$52.25
210	I	DGS-16-04-01	Grassed Waterway	1200	Lin. Feet	12.34	$6,450	$52.27
211	II	DGS-18-04-02	Water and Sediment Control Basin	1	Each	25.26	$13,325	$52.75
212	I	HAM-22-01-03	Grassed Waterway	500	Lin. Feet	13.28	$7,075	$53.28
213	II	DGS-18-04-01	Water and Sediment Control Basin	1	Each	24.79	$13,325	$53.75
214	II	DGS-35-02-06	Grassed Waterway	240	Lin. Feet	10.2	$5,490	$53.82
215	II	DGS-07-01-02	Grassed Waterway	220	Lin. Feet	11.69	$6,305	$53.93
216	II	DGS-26-03-01	Grassed Waterway	500	Lin. Feet	13.02	$7,075	$54.34
217	I	HAM-15-01-02	Grassed Waterway	1450	Lin. Feet	17.77	$9,688	$54.52
218	II	DGS-26-01-02	Streambank and Shoreline Protection	125	Lin. Feet	37.19	$20,500	$55.12
219	II	DGS-19-04-02	Water and Sediment Control Basin	1	Each	23.91	$13,325	$55.73
220	II	HAM-11-03-04	Water and Sediment Control Basin	1	Each	23.91	$13,325	$55.73
221	II	HAM-11-03-06	Water and Sediment Control Basin	1	Each	23.91	$13,325	$55.73
222	I	HAM-14-02-02	Water and Sediment Control Basin	1	Each	10.96	$6,450	$58.85
223	II	DGS-10-03-01	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
224	II	DGS-10-03-02	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
225	II	DGS-10-03-03	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
226	II	DGS-10-03-04	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
227	I	DGS-11-02-01	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
228	I	DGS-11-02-02	Water and Sediment Control Basin	1	Each	22.31	$13,325	$59.73
229	I	DGS-09-03-01	Grassed Waterway	650	Lin. Feet	12.42	$7,488	$60.29
230	III	DGS-22-04-05	Grade Stabilization Structure	1	Each	22.31	$13,450	$60.29
231	II	HAM-13-01-01	Water and Sediment Control Basin	1	Each	10.53	$6,450	$61.25
232	II	DGS-26-01-01	Streambank and Shoreline Protection	350	Lin. Feet	55.78	$34,325	$61.54
233	I	DGS-28-02-03	Water and Sediment Control Basin	1	Each	21.25	$13,325	$62.71
234	I	HAM-10-02-02	Water and Sediment Control Basin	1	Each	21.25	$13,325	$62.71
235	II	DGS-13-02-01	Water and Sediment Control Basin	1	Each	10.11	$6,450	$63.80
236	II	DGS-28-04-01	Grassed Waterway	1500	Lin. Feet	15.39	$9,825	$63.84
237	I	DGS-19-02-02	Water and Sediment Control Basin	1	Each	20.63	$13,325	$64.59
238	I	DGS-19-02-03	Water and Sediment Control Basin	1	Each	20.63	$13,325	$64.59
239	I	HAM-22-01-02	Water and Sediment Control Basin	1	Each	19.92	$13,325	$66.89
240	II	HAM-13-03-01	Grassed Waterway	650	Lin. Feet	11.04	$7,488	$67.82
241	I	DGS-17-02-03	Grassed Waterway	300	Lin. Feet	9.56	$6,525	$68.25
242	III	DGS-36-04-01	Streambank and Shoreline Protection	140	Lin. Feet	53.9	$37,643	$69.84
243	II	DGS-07-03-03	Water and Sediment Control Basin	1	Each	9.23	$6,450	$69.88
244	II	DGS-35-02-07	Grassed Waterway	180	Lin. Feet	7.65	$5,355	$70.00
245	I	HAM-15-04-01	Water and Sediment Control Basin	1	Each	9.12	$6,450	$70.72
246	III	DGS-07-03-01	Water and Sediment Control Basin	1	Each	8.82	$6,450	$73.13
247	III	DGS-07-03-05	Water and Sediment Control Basin	1	Each	8.82	$6,450	$73.13
248	II	DGS-35-02-05	Grassed Waterway	170	Lin. Feet	7.23	$5,333	$73.76
249	I	HAM-24-01-01	Water and Sediment Control Basin	1	Each	8.56	$6,450	$75.35
250	I	HAM-15-04-05	Grassed Waterway	800	Lin. Feet	10.4	$7,900	$75.96
251	II	DGS-17-01-04	Grassed Waterway	150	Lin. Feet	7.97	$6,113	$76.69
252	I	HAM-11-04-01	Water and Sediment Control Basin	1	Each	17.27	$13,325	$77.16
253	I	HAM-10-04-01	Water and Sediment Control Basin	1	Each	7.97	$6,450	$80.93
254	II	DGS-34-02-02	Grassed Waterway	900	Lin. Feet	8.51	$6,975	$81.96
255	II	DGS-35-03-02	Water and Sediment Control Basin	1	Each	7.81	$6,450	$82.59
256	II	DGS-17-04-01	Grassed Waterway	1900	Lin. Feet	13.08	$10,925	$83.52
257	II	DGS-17-04-03	Grassed Waterway	1900	Lin. Feet	13.08	$10,925	$83.52
258	II	DGS-13-01-01	Water and Sediment Control Basin	1	Each	14.88	$13,325	$89.55
259	III	DGS-13-01-04	Water and Sediment Control Basin	1	Each	14.88	$13,325	$89.55
260	I	HAM-10-04-02	Water and Sediment Control Basin	1	Each	6.85	$6,450	$94.16
261	III	DGS-26-02-04	Streambank and Shoreline Protection	40	Lin. Feet	17.6	$16,787	$95.38

Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
262	II	DGS-12-02-01	Water and Sediment Control Basin	1	Each	13.48	$13,325	$98.85
263	III	DGS-26-02-03	Streambank and Shoreline Protection	10	Lin. Feet	8.93	$8,887	$99.52
264	I	HAM-22-01-01	Water and Sediment Control Basin	1	Each	13.28	$13,325	$100.34
265	II	DGS-24-03-03	Water and Sediment Control Basin	1	Each	6.38	$6,450	$101.10
266	II	DGS-24-03-04	Water and Sediment Control Basin	1	Each	6.38	$6,450	$101.10
267	I	DGS-15-01-03	Grassed Waterway	380	Lin. Feet	5.65	$5,805	$102.74
268	II	DGS-07-01-01	Grassed Waterway	110	Lin. Feet	5.84	$6,003	$102.78
269	II	DGS-27-03-02	Grassed Waterway	450	Lin. Feet	6.69	$6,938	$103.70
270	III	DGS-27-01-03	Streambank and Shoreline Protection	75	Lin. Feet	22.31	$23,265	$104.28
271	I	DGS-15-04-02	Water and Sediment Control Basin	1	Each	12.75	$13,325	$104.51
272	II	DGS-27-01-01	Water and Sediment Control Basin	1	Each	12.75	$13,325	$104.51
273	II	DGS-27-02-01	Water and Sediment Control Basin	1	Each	12.75	$13,325	$104.51
274	II	DGS-27-02-02	Water and Sediment Control Basin	1	Each	12.75	$13,325	$104.51
275	I	HAM-13-02-03	Grassed Waterway	400	Lin. Feet	5.48	$5,850	$106.75
276	I	HAM-23-01-02	Grassed Waterway	800	Lin. Feet	7.33	$7,900	$107.78
277	I	DGS-26-04-01	Streambank and Shoreline Protection	30	Lin. Feet	13.2	$14,259	$108.02
278	I	HAM-13-02-02	Grassed Waterway	400	Lin. Feet	5.2	$5,850	$112.50
279	II	DGS-07-02-02	Grassed Waterway	100	Lin. Feet	5.31	$5,975	$112.52
280	I	DGS-36-02-02	Streambank and Shoreline Protection	100	Lin. Feet	39.6	$44,595	$112.61
281	I	DGS-11-04-01	Grassed Waterway	75	Lin. Feet	5.02	$5,906	$117.65
282	II	CNF-01-02-02	Streambank and Shoreline Protection	40	Lin. Feet	11	$12,995	$118.14
283	II	DGS-20-03-03	Grassed Waterway	1050	Lin. Feet	7.22	$8,588	$118.94
284	I	HAM-11-04-02	Water and Sediment Control Basin	1	Each	11.16	$13,325	$119.40
285	I	HAM-24-01-02	Water and Sediment Control Basin	1	Each	5.4	$6,450	$119.44
286	I	DGS-16-04-02	Grassed Waterway	375	Lin. Feet	5.33	$6,450	$121.01
287	III	DGS-13-01-05	Water and Sediment Control Basin	1	Each	11	$13,325	$121.14
288	II	DGS-22-03-03	Water and Sediment Control Basin	1	Each	11	$13,325	$121.14
289	II	DGS-22-03-04	Water and Sediment Control Basin	1	Each	11	$13,325	$121.14
290	II	DGS-22-03-05	Water and Sediment Control Basin	1	Each	11	$13,325	$121.14
291	II	DGS-35-02-03	Grassed Waterway	100	Lin. Feet	4.25	$5,175	$121.76
292	II	DGS-35-02-08	Grassed Waterway	100	Lin. Feet	4.25	$5,175	$121.76
293	II	DGS-18-02-05	Water and Sediment Control Basin	1	Each	10.63	$13,325	$125.35
294	I	DGS-28-02-02	Water and Sediment Control Basin	1	Each	10.63	$13,325	$125.35
295	II	HAM-10-02-03	Water and Sediment Control Basin	1	Each	10.63	$13,325	$125.35
296	I	DGS-14-01-02	Grassed Waterway	225	Lin. Feet	4.78	$6,319	$132.19
297	I	DGS-20-01-01	Water and Sediment Control Basin	1	Each	4.87	$6,450	$132.44
298	I	DGS-26-03-04	Streambank and Shoreline Protection	50	Lin. Feet	10.63	$14,575	$137.11
299	I	DGS-26-04-05	Streambank and Shoreline Protection	30	Lin. Feet	8.25	$11,415	$138.36
300	II	DGS-36-03-03	Streambank and Shoreline Protection	30	Lin. Feet	8.25	$11,415	$138.36
301	I	DGS-35-01-03	Streambank and Shoreline Protection	125	Lin. Feet	27.5	$38,275	$139.18
302	I	HAM-10-02-01	Water and Sediment Control Basin	1	Each	9.3	$13,325	$143.28
303	II	DGS-35-02-09	Grassed Waterway	80	Lin. Feet	3.4	$5,130	$150.88
304	I	DGS-26-04-03	Streambank and Shoreline Protection	150	Lin. Feet	16.5	$25,635	$155.36
305	III	DGS-13-01-02	Water and Sediment Control Basin	1	Each	8.5	$13,325	$156.76
306	III	DGS-13-01-03	Water and Sediment Control Basin	1	Each	8.5	$13,325	$156.76
307	I	DGS-36-02-01	Streambank and Shoreline Protection	120	Lin. Feet	13.2	$21,843	$165.48
308	II	DGS-20-04-01	Grassed Waterway	625	Lin. Feet	4.3	$7,419	$172.53
309	I	DGS-26-04-04	Streambank and Shoreline Protection	20	Lin. Feet	5.5	$9,835	$178.82
310	II	DGS-36-03-04	Streambank and Shoreline Protection	25	Lin. Feet	5.5	$9,835	$178.82
311	III	DGS-26-02-01	Streambank and Shoreline Protection	25	Lin. Feet	6.38	$11,415	$178.92
312	III	DGS-27-01-02	Streambank and Shoreline Protection	75	Lin. Feet	19.13	$35,115	$183.56
313	II	DGS-28-03-01	Grassed Waterway	300	Lin. Feet	3.02	$5,625	$186.26
314	I	HAM-13-01-06	Water and Sediment Control Basin	1	Each	3.37	$6,450	$191.39

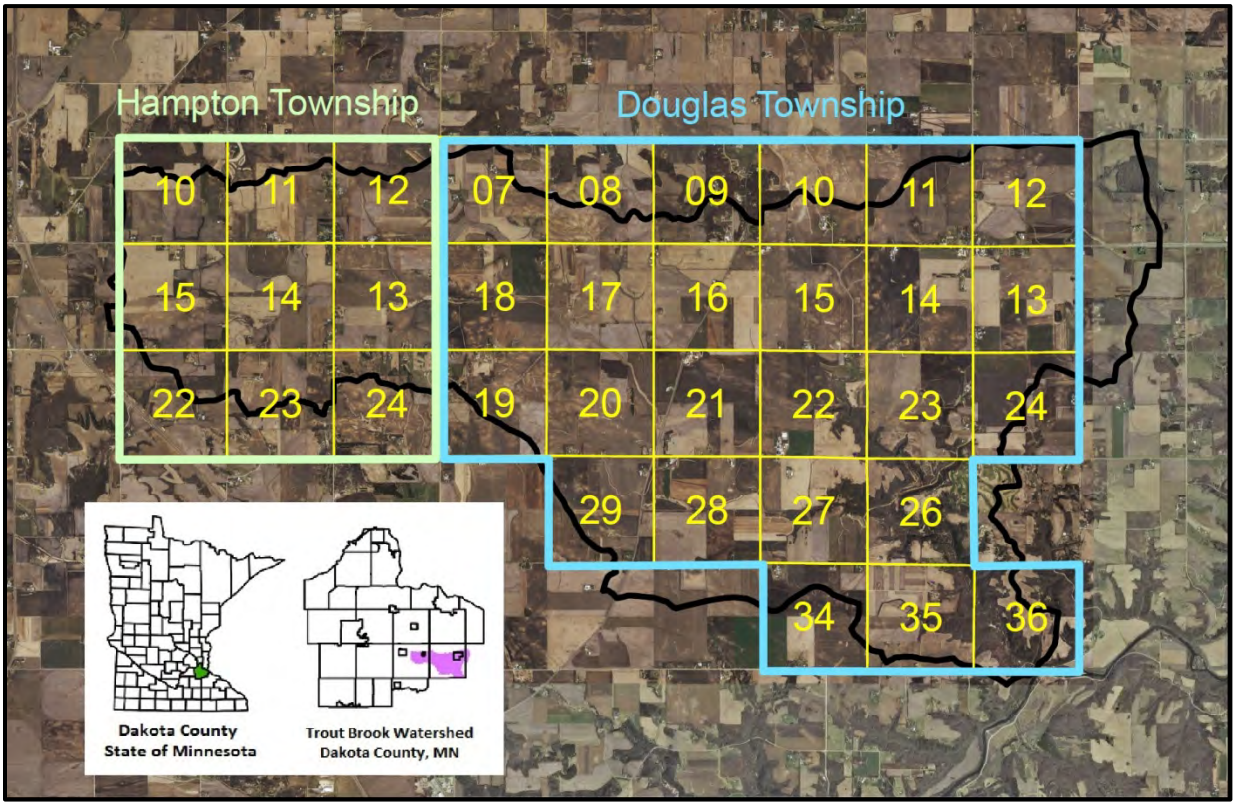
Rank	Feasi-bility Code	Feature ID (Township-section-1/4-#)	BMP Type	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
315	II	DGS-18-02-03	Water and Sediment Control Basin	1	Each	6.91	$13,325	$192.84
316	II	DGS-18-02-04	Water and Sediment Control Basin	1	Each	6.91	$13,325	$192.84
317	I	DGS-17-02-01	Water and Sediment Control Basin	1	Each	3.24	$6,450	$199.07
318	I	HAM-15-04-02	Water and Sediment Control Basin	1	Each	3.19	$6,450	$202.19
319	II	DGS-28-03-02	Grassed Waterway	250	Lin. Feet	2.57	$5,513	$214.49
320	I	DGS-17-03-01	Water and Sediment Control Basin	1	Each	5.97	$13,325	$223.20
321	I	DGS-23-01-02	Water and Sediment Control Basin	1	Each	5.78	$13,325	$230.54
322	III	DGS-26-02-02	Streambank and Shoreline Protection	25	Lin. Feet	4.25	$9,835	$231.41
323	I	DGS-19-02-01	Water and Sediment Control Basin	1	Each	5.71	$13,325	$233.36
324	I	DGS-26-04-02	Streambank and Shoreline Protection	100	Lin. Feet	5.5	$12,995	$236.27
325	II	DGS-13-02-02	Water and Sediment Control Basin	1	Each	5.6	$13,325	$237.95
326	II	DGS-28-01-03	Water and Sediment Control Basin	1	Each	5.53	$13,325	$240.96
327	I	DGS-36-02-03	Streambank and Shoreline Protection	325	Lin. Feet	31.28	$78,565	$251.17
328	I	DGS-09-04-01	Grassed Waterway	125	Lin. Feet	2.39	$6,044	$252.88
329	III	DGS-26-03-03	Streambank and Shoreline Protection	75	Lin. Feet	6.38	$16,155	$253.21
330	I	HAM-15-03-01	Water and Sediment Control Basin	1	Each	5.26	$13,325	$253.33
331	II	DGS-35-01-01	Grade Stabilization Structure	1	Each	5.21	$13,450	$258.16
332	I	DGS-17-03-02	Water and Sediment Control Basin	1	Each	4.61	$13,325	$289.05
333	I	DGS-35-01-04	Streambank and Shoreline Protection	100	Lin. Feet	11	$31,955	$290.50
334	I	DGS-35-01-05	Streambank and Shoreline Protection	200	Lin. Feet	11	$31,955	$290.50
335	II	DGS-21-04-02	Water and Sediment Control Basin	1	Each	2.01	$6,450	$320.90
336	I	DGS-26-03-02	Streambank and Shoreline Protection	125	Lin. Feet	6.88	$22,475	$326.67
337	II	DGS-28-04-02	Grassed Waterway	500	Lin. Feet	1.6	$6,075	$379.69
338	II	DGS-28-04-04	Grassed Waterway	350	Lin. Feet	1.45	$5,738	$395.69
339	II	DGS-28-04-03	Grassed Waterway	600	Lin. Feet	1.54	$6,300	$409.09
340	I	HAM-12-04-02	Water and Sediment Control Basin	1	Each	3.21	$13,325	$415.11
341	I	DGS-20-01-02	Water and Sediment Control Basin	1	Each	1.5	$6,450	$430.00
342	II	DGS-21-04-01	Water and Sediment Control Basin	1	Each	1.34	$6,450	$481.34
343	II	HAM-13-01-07	Water and Sediment Control Basin	1	Each	1.29	$6,450	$500.00
344	I	DGS-23-01-01	Water and Sediment Control Basin	1	Each	2.23	$13,325	$597.53
345	II	DGS-35-02-02	Grassed Waterway	50	Lin. Feet	0.74	$5,063	$684.12
346	I	DGS-35-01-02	Streambank and Shoreline Protection	25	Lin. Feet	1.38	$9,835	$712.68

Project Profiles

The following pages provide definition and detailed assessments for each of the projects identified through the field reconnaissance and subsequent evaluation of each BMP. For organizational purposes the selected projects are grouped by section, as shown below. The one mile sections are identified by the township name and section number within the township. Sections that did not contain any identified BMPs were not included in the Project Profiles section of this assessment. Projects are displayed with 2015 aerial imagery and Dakota County parcel boundaries. Individual projects are identified by a unique number and project specific information is included in the BMP Cost Benefit Analysis table.

The Project Profiles are part of the subwatershed analysis and should be retained with the document to provide context for identified BMPs. The drawings are neither legally recorded maps nor surveys and are not intended to be used as such. The drawings are a compilation of records, information, and data located in various City, County, and State Offices and other sources, affecting the areas shown, and are to be used for reference purposes only. Dakota County SWCD is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact the Dakota County Soil and Water Conservation District at 651-480-7777.

Project Profile Reference Sections



Hampton Township, Section 10

Description:

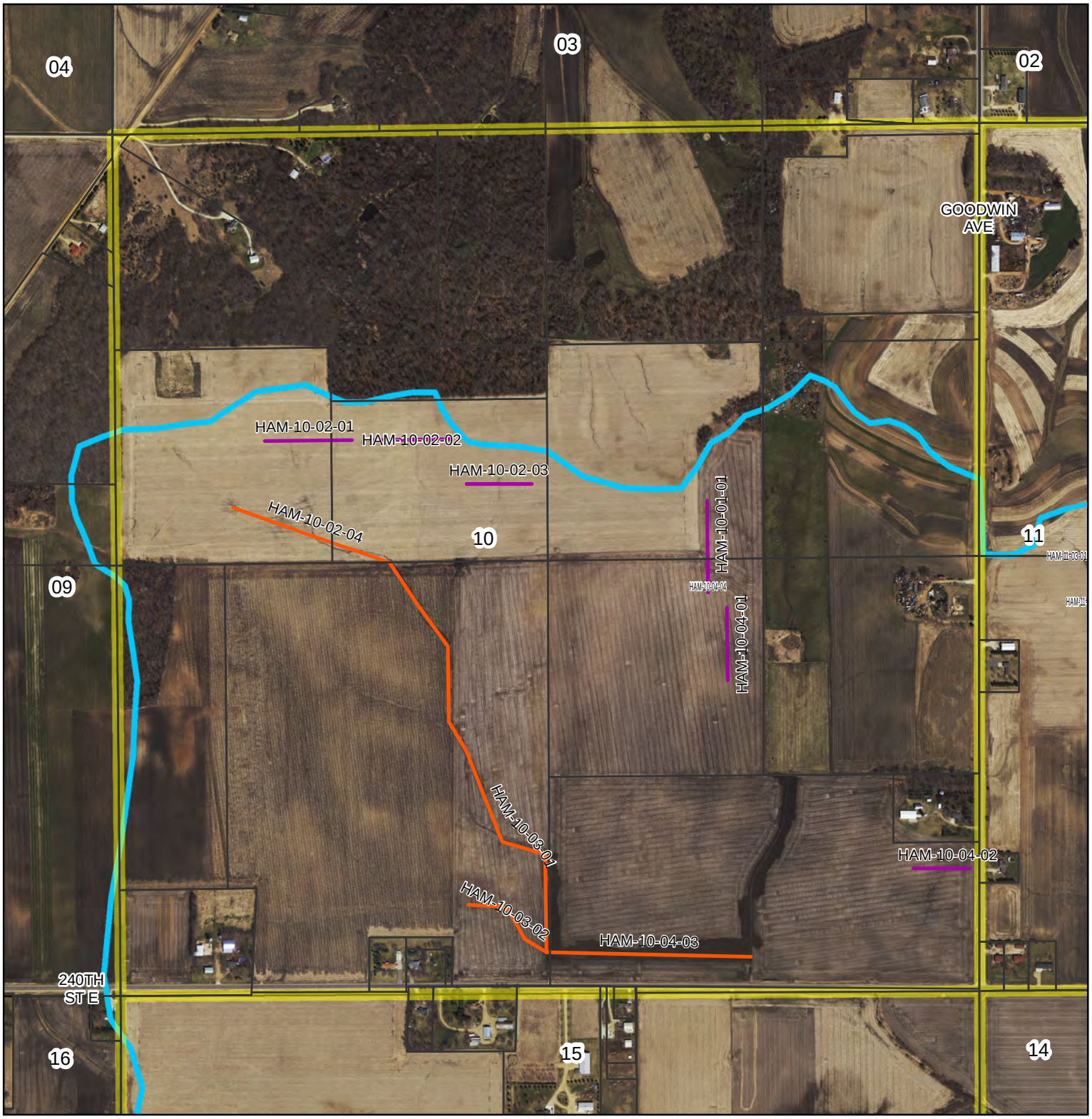
The area of the Trout Brook watershed that lies within Section 10 of Hampton Township is approximately 412.5 acres. It consists primarily of agricultural cropland with some pasture and deciduous trees. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices and contour strips utilized on steeper slopes. Klinger silt loam with slopes of 1% - 5%, Maxfield silty clay loam, Marshan silty clay loam, and Ostrander-Carmi loams with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-10-04-03	412 - Grassed Waterway - complex 20' design	1200	Lin. Feet	127.5	$9,000	$7.06
HAM-10-01-01	638 - Water & Sediment Control Basin(narrow)	1	Each	74.38	$6,450	$8.67
HAM-10-04-04	638 - Water & Sediment Control Basin(narrow)	1	Each	74.38	$6,450	$8.67
HAM-10-03-02	412 - Grassed Waterway - complex 20' design	850	Lin. Feet	90.31	$8,038	$8.90
HAM-10-03-01	412 - Grassed Waterway - complex 20' design	2700	Lin. Feet	143.44	$13,125	$9.15
HAM-10-02-04	412 - Grassed Waterway - complex 20' design	800	Lin. Feet	42.5	$7,900	$18.59
HAM-10-02-02	638 - Water & Sediment Control Basin(wide)	1	Each	21.25	$13,325	$62.71
HAM-10-04-01	638 - Water & Sediment Control Basin(narrow)	1	Each	7.97	$6,450	$80.93
HAM-10-04-02	638 - Water & Sediment Control Basin(narrow)	1	Each	6.85	$6,450	$94.16
HAM-10-02-03	638 - Water & Sediment Control Basin(wide)	1	Each	10.63	$13,325	$125.35
HAM-10-02-01	638 - Water & Sediment Control Basin(wide)	1	Each	9.3	$13,325	$143.28



Source: (Aerial) Dakota County 2015

Hampton Township, Section 10

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Hampton Township, Section 11

Description:

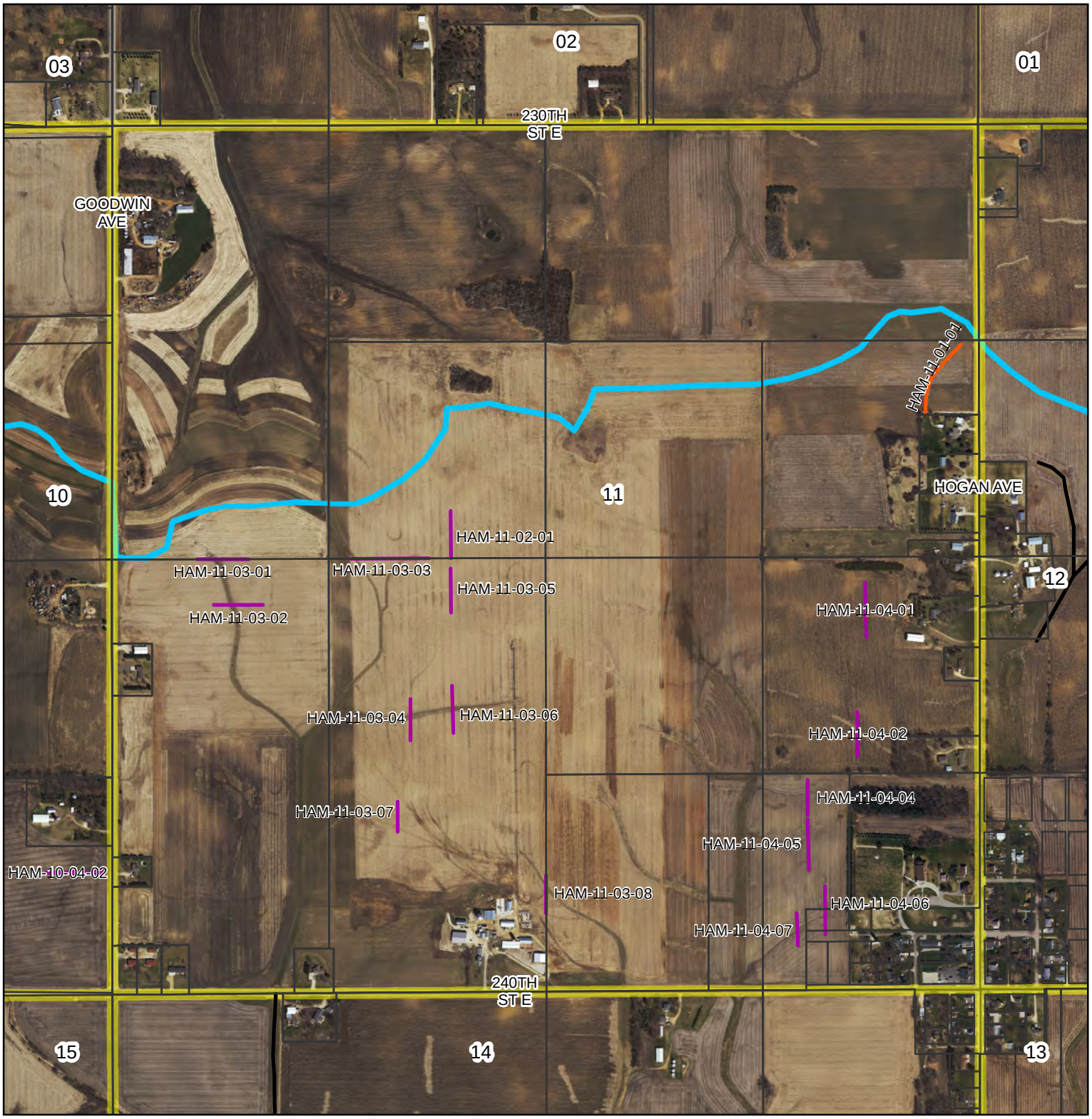
The area of the Trout Brook watershed that lies within Section 11 of Hampton Township is approximately 418.3 acres. It consists primarily of agricultural cropland with a portion of the village of New Trier in the southeast corner of the section. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Nearly a third of the section consists of Timula-Bold silt loams with a slope of 6% - 12% (eroded). Burkhardt sandy loam with slopes of 6% - 12%, Tallula silt loam and Wadena loam with slopes of 2% - 6% are the other predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-11-03-01	638 - Water & Sediment Control Basin(narrow)	1	Each	69.06	$6,450	$9.34
HAM-11-04-04	638 - Water & Sediment Control Basin(narrow)	1	Each	63.75	$6,450	$10.12
HAM-11-03-08	638 - Water & Sediment Control Basin(narrow)	1	Each	61.09	$6,450	$10.56
HAM-11-04-05	638 - Water & Sediment Control Basin(narrow)	1	Each	53.13	$6,450	$12.14
HAM-11-04-06	638 - Water & Sediment Control Basin(narrow)	1	Each	37.19	$6,450	$17.34
HAM-11-04-07	638 - Water & Sediment Control Basin(narrow)	1	Each	37.19	$6,450	$17.34
HAM-11-01-01	412 - Grassed Waterway - simple design	450	Lin. Feet	30.94	$5,963	$19.27
HAM-11-03-02	638 - Water & Sediment Control Basin(wide)	1	Each	69.06	$13,325	$19.29
HAM-11-03-03	638 - Water & Sediment Control Basin(narrow)	1	Each	31.88	$6,450	$20.23
HAM-11-03-05	638 - Water & Sediment Control Basin(wide)	1	Each	45.16	$13,325	$29.51
HAM-11-03-07	638 - Water & Sediment Control Basin(wide)	1	Each	42.5	$13,325	$31.35
HAM-11-02-01	638 - Water & Sediment Control Basin(wide)	1	Each	37.19	$13,325	$35.83
HAM-11-03-04	638 - Water & Sediment Control Basin(wide)	1	Each	23.91	$13,325	$55.73
HAM-11-03-06	638 - Water & Sediment Control Basin(wide)	1	Each	23.91	$13,325	$55.73
HAM-11-04-01	638 - Water & Sediment Control Basin(wide)	1	Each	17.27	$13,325	$77.16
HAM-11-04-02	638 - Water & Sediment Control Basin(wide)	1	Each	11.16	$13,325	$119.40



Source: (Aerial) Dakota County 2015

Hampton Township, Section 11

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15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Hampton Township, Section 12

Description:

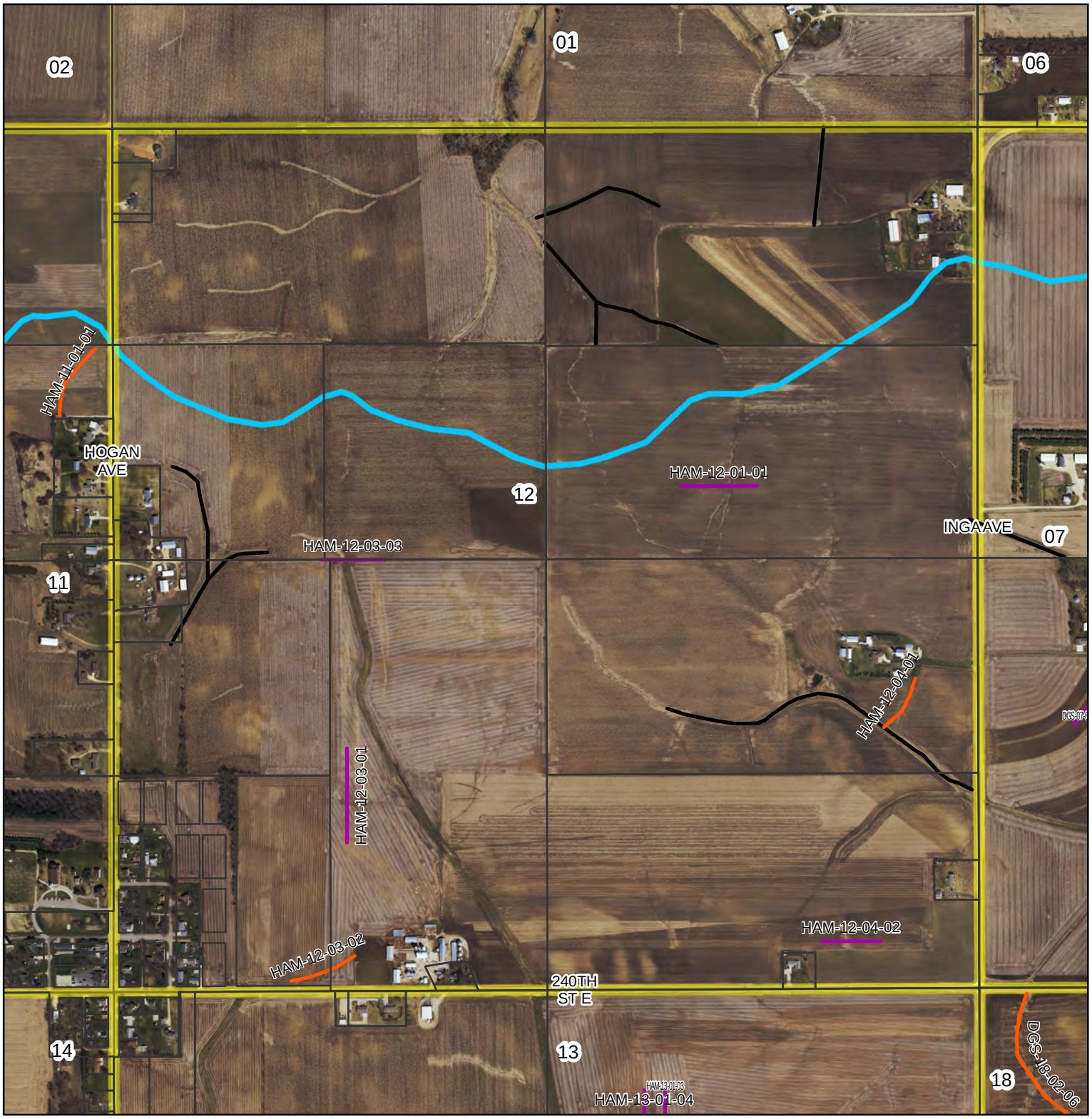
The area of the Trout Brook watershed that lies within Section 12 of Hampton Township is approximately 439.3 acres. It consists primarily of agricultural cropland with a portion of the village of New Trier in the southwest corner of the section. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Ostrander loam with slopes of 1% - 6%, and Dickinson sandy loam and Ostrander-Carmi loams with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

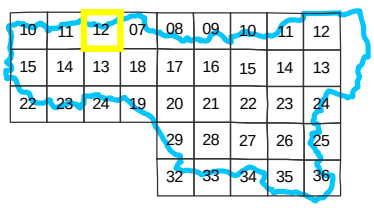
BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-12-03-01	638 - Water & Sediment Control Basin(narrow)	1	Each	16.5	$6,450	$39.09
HAM-12-03-02	412 - Grassed Waterway - simple design	400	Lin. Feet	12.01	$5,850	$48.71
HAM-12-03-03	638 - Water & Sediment Control Basin(narrow)	1	Each	12.75	$6,450	$50.59
HAM-12-01-01	638 - Water & Sediment Control Basin(wide)	1	Each	26.03	$13,325	$51.19
HAM-12-04-01	412 - Grassed Waterway - simple design	350	Lin. Feet	11.16	$5,738	$51.41
HAM-12-04-02	638 - Water & Sediment Control Basin(wide)	1	Each	3.21	$13,325	$415.11



Source: (Aerial) Dakota County 2015

Hampton Township, Section 12



Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Hampton Township, Section 13

Description:

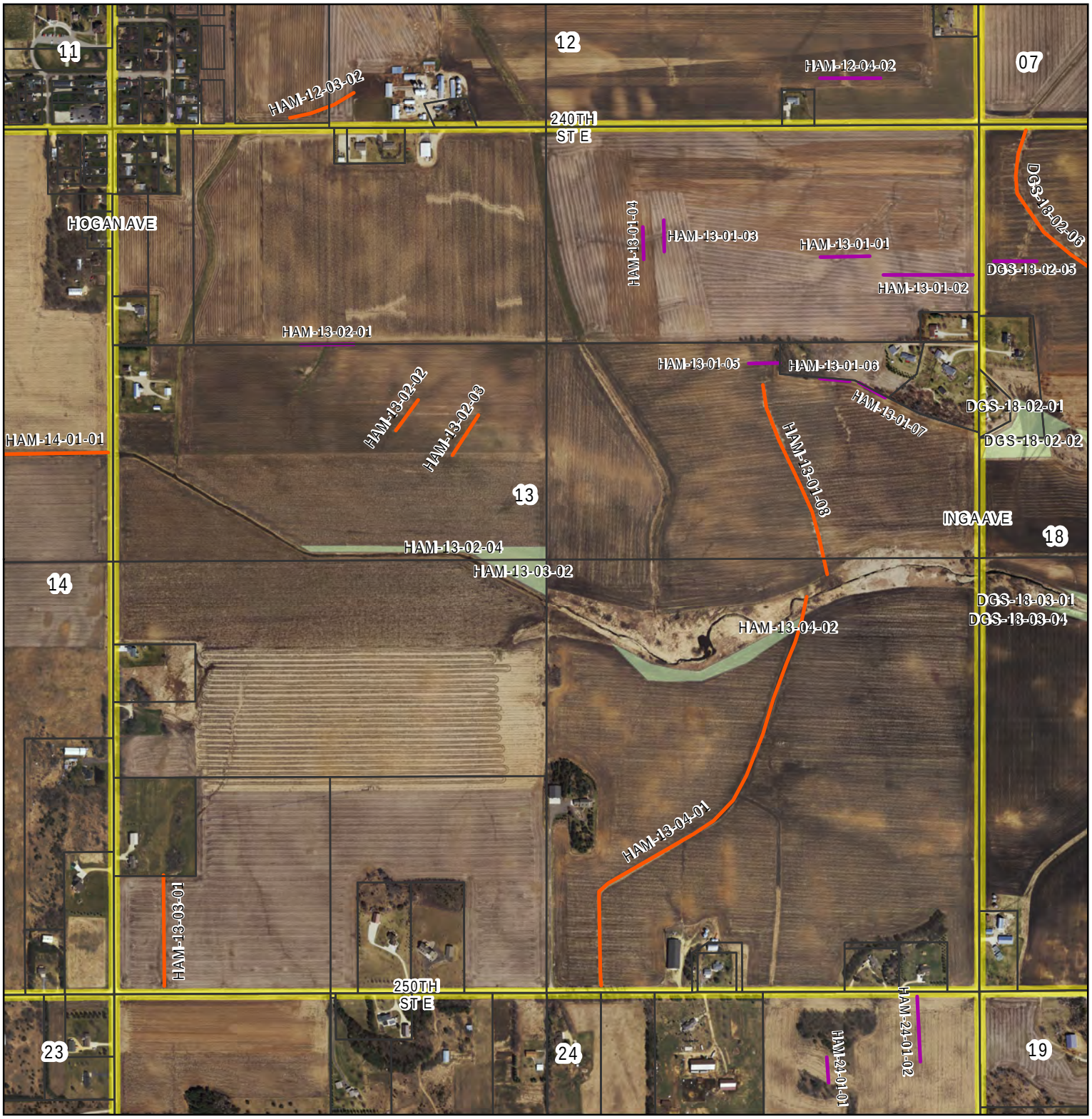
All 640 acres of Hampton Township, Section 13, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with a portion of the village of New Trier in the northwest corner of the section. A ditched portion of Trout Brook runs through a wetland in the center of the section, flowing west to east. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Wadena loam, Tallula silt loam, Cylinder loam, and Estherville sandy loam with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-13-03-02	393 - Filter Strip	1	Acres	34.62	$1,525	$4.40
HAM-13-02-04	393 - Filter Strip	1.8	Acres	35.31	$1,725	$4.89
HAM-13-04-01	412 - Grassed Waterway- complex 30' design	2700	Lin. Feet	172.13	$15,225	$8.85
HAM-13-04-02	393 - Filter Strip	2.1	Acres	17.04	$1,800	$10.56
HAM-13-01-05	638 - Water & Sediment Control Basin(narrow)	1	Each	53.92	$6,450	$11.96
HAM-13-01-08	412 - Grassed Waterway - complex 20' design	1450	Lin. Feet	53.92	$9,688	$17.97
HAM-13-01-03	638 - Water & Sediment Control Basin(narrow)	1	Each	31.88	$6,450	$20.23
HAM-13-01-04	638 - Water & Sediment Control Basin(narrow)	1	Each	31.88	$6,450	$20.23
HAM-13-02-01	638 - Water & Sediment Control Basin(narrow)	1	Each	17.63	$6,450	$36.59
HAM-13-01-02	638 - Water & Sediment Control Basin(narrow)	1	Each	14.99	$6,450	$43.03
HAM-13-01-01	638 - Water & Sediment Control Basin(narrow)	1	Each	10.53	$6,450	$61.25
HAM-13-03-01	412 - Grassed Waterway - complex 20' design	650	Lin. Feet	11.04	$7,488	$67.82
HAM-13-02-03	412 - Grassed Waterway - simple design	400	Lin. Feet	5.48	$5,850	$106.75
HAM-13-02-02	412 - Grassed Waterway - simple design	400	Lin. Feet	5.2	$5,850	$112.50
HAM-13-01-06	638 - Water & Sediment Control Basin(narrow)	1	Each	3.37	$6,450	$191.39
HAM-13-01-07	638 - Water & Sediment Control Basin(narrow)	1	Each	1.29	$6,450	$500.00



Source: (Aerial) Dakota County 2015

Hampton Township, Section 13

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15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Hampton Township, Section 14

Description:

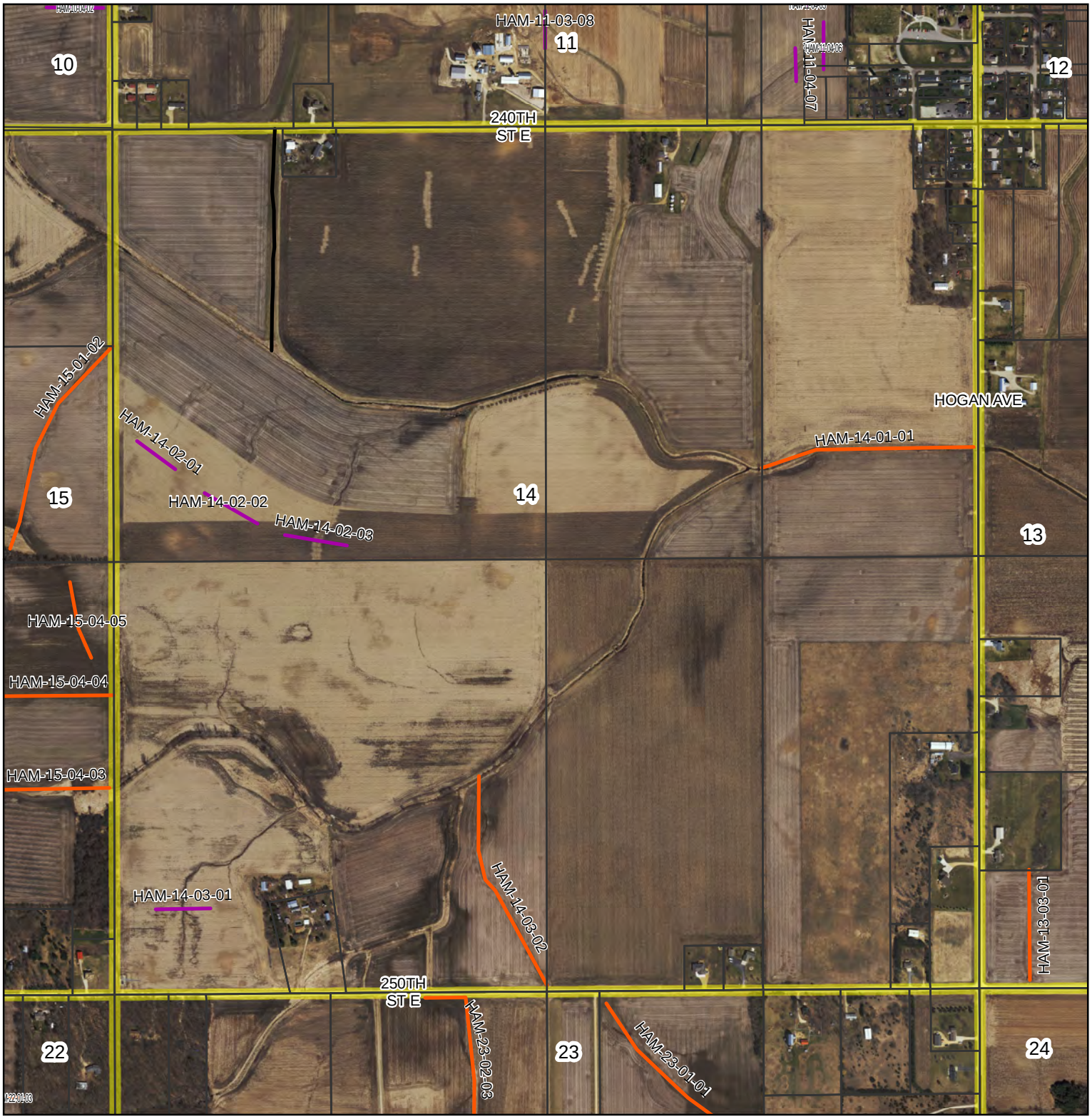
All 640 acres of Hampton Township, Section 14, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with a portion of the village of New Trier in the northeast corner of the section. Two branches of a Trout Brook, which have been ditched, run through the center of the section, flowing west to east. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Wadena loam with slopes of 2% - 6%, Marshan silty clay loam, and Cylinder loam are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-14-01-01	412 - Grassed Waterway- complex 30' design	1300	Lin. Feet	138.13	$6,450	$4.67
HAM-14-03-02	412 - Grassed Waterway - complex 20' design	1300	Lin. Feet	96.69	$9,275	$9.59
HAM-14-03-01	638 - Water & Sediment Control Basin(wide)	1	Each	47.81	$13,325	$27.87
HAM-14-02-01	638 - Water & Sediment Control Basin(narrow)	1	Each	18.65	$6,450	$34.58
HAM-14-02-03	638 - Water & Sediment Control Basin(narrow)	1	Each	13.7	$6,450	$47.08
HAM-14-02-02	638 - Water & Sediment Control Basin(narrow)	1	Each	10.96	$6,450	$58.85



Source: (Aerial) Dakota County 2015

Hampton Township, Section 14

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Hampton Township, Section 15

Description:

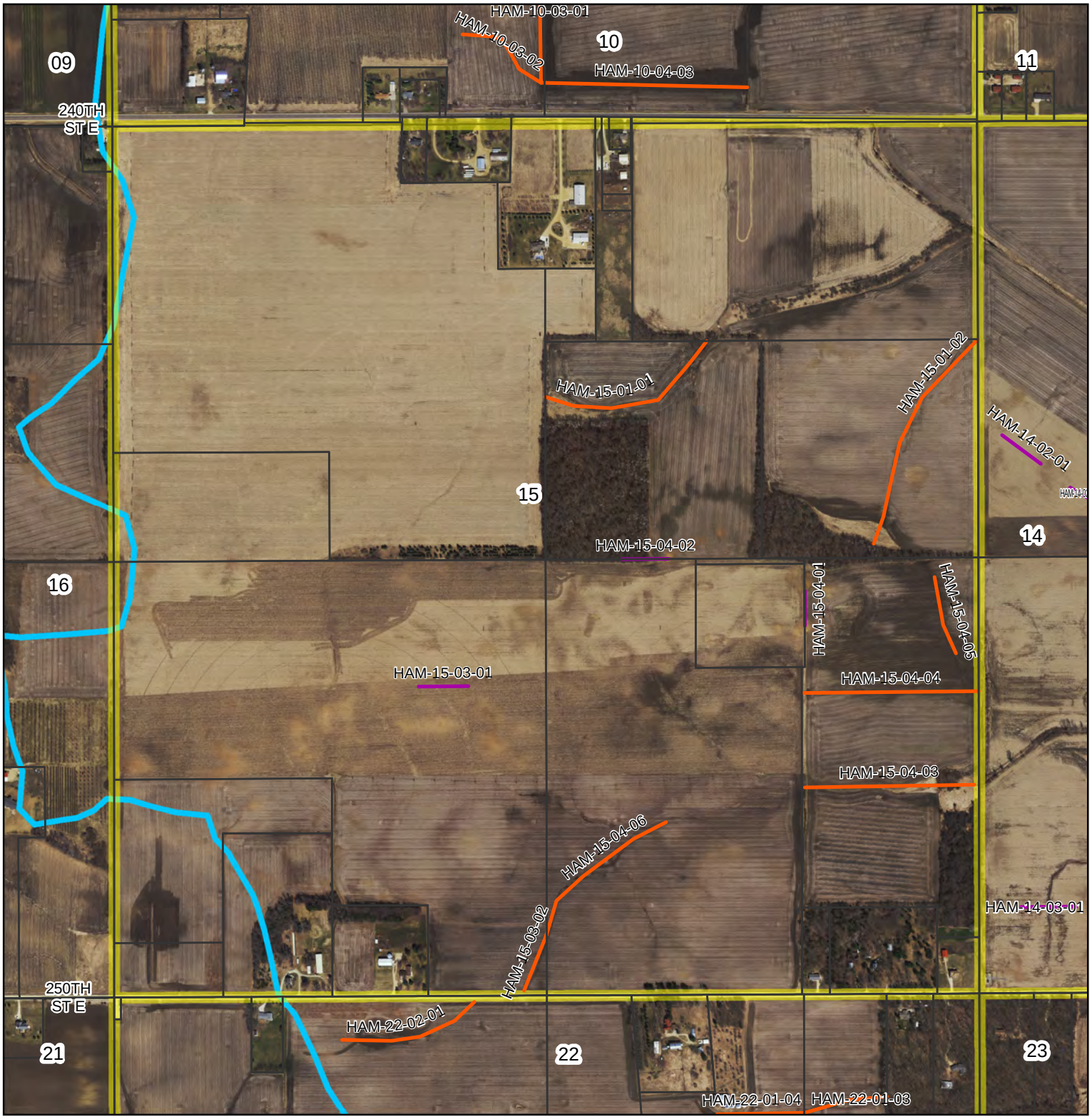
The area of the Trout Brook watershed that lies within Section 15 of Hampton Township is approximately 609.9 acres. It consists primarily of agricultural cropland with some pasture and deciduous trees. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Klinger silt loam with slopes of 1% - 5%, Marshan silty clay loam, Maxfield silty clay loam, and Cylinder loam are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-15-01-01	412 - Grassed Waterway - complex 20' design	1200	Lin. Feet	153	$9,000	$5.88
HAM-15-04-03	412 - Grassed Waterway - complex 20' design	1000	Lin. Feet	74.38	$8,450	$11.36
HAM-15-04-06	412 - Grassed Waterway - complex 20' design	1000	Lin. Feet	74.38	$8,450	$11.36
HAM-15-03-02	412 - Grassed Waterway - complex 20' design	350	Lin. Feet	26.03	$6,663	$25.60
HAM-15-04-04	412 - Grassed Waterway - complex 20' design	1000	Lin. Feet	18.65	$8,450	$45.31
HAM-15-01-02	412 - Grassed Waterway - complex 20' design	1450	Lin. Feet	17.77	$9,688	$54.52
HAM-15-04-01	638 - Water & Sediment Control Basin(narrow)	1	Each	9.12	$6,450	$70.72
HAM-15-04-05	412 - Grassed Waterway - complex 20' design	800	Lin. Feet	10.4	$7,900	$75.96
HAM-15-04-02	638 - Water & Sediment Control Basin(narrow)	1	Each	3.19	$6,450	$202.19
HAM-15-03-01	638 - Water & Sediment Control Basin(wide)	1	Each	5.26	$13,325	$253.33



Source: (Aerial) Dakota County 2015

Hampton Township, Section 15

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15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Hampton Township, Section 22

Description:

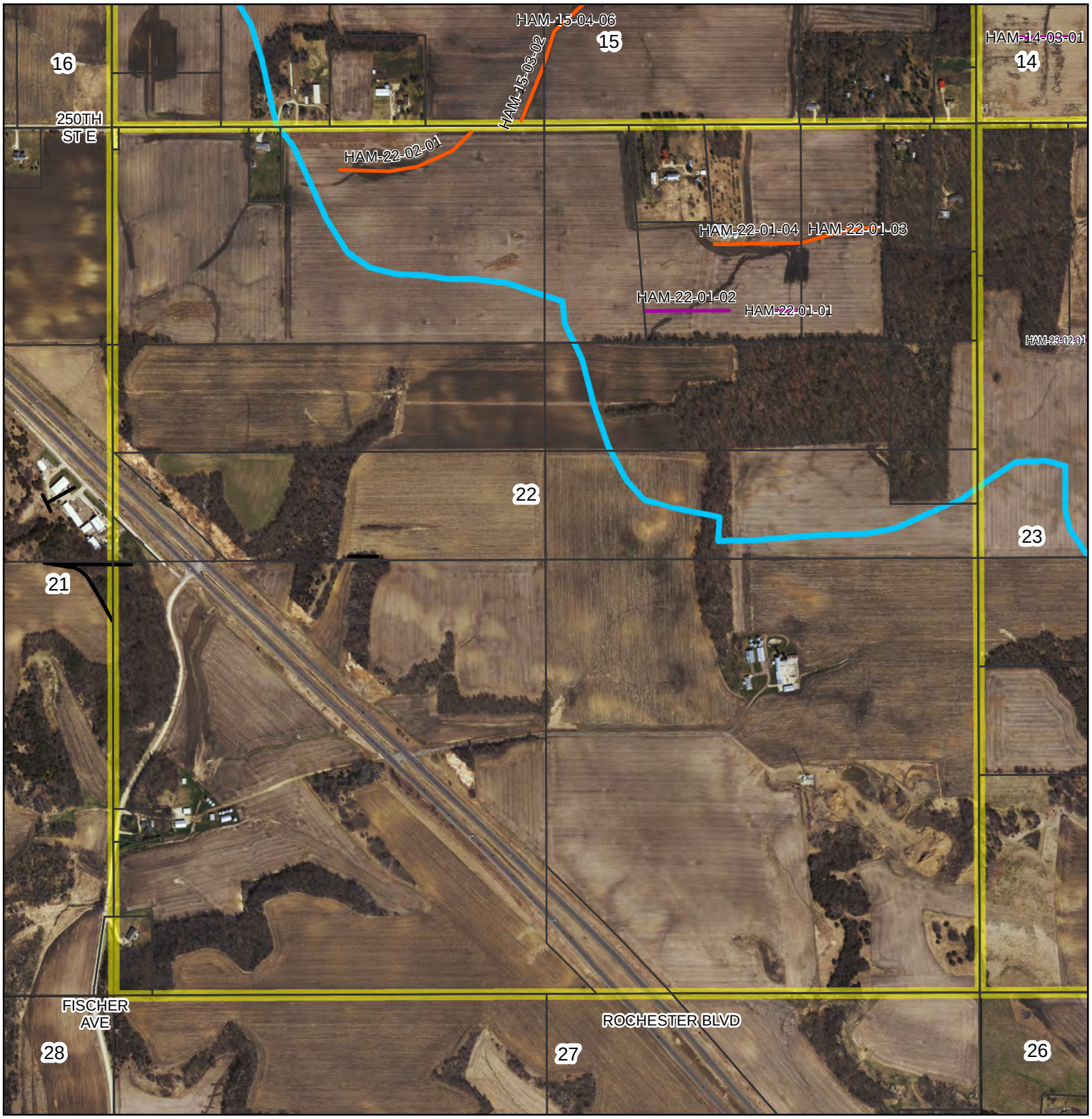
The area of the Trout Brook watershed that lies within Section 22 of Hampton Township is approximately 164.1 acres. This area lies in the northeast corner of the section and consists of both agricultural cropland and deciduous forest. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Wadena loam with slopes of 2% - 6%, Klinger silt loam with slopes of 1% - 5%, Ostrander loam with slopes of 1% - 6%, and Maxfield silty clay loam are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-22-02-01	412 - Grassed Waterway - complex 20' design	1000	Lin. Feet	26.56	$8,450	$31.81
HAM-22-01-04	412 - Grassed Waterway - complex 20' design	525	Lin. Feet	13.95	$7,144	$51.21
HAM-22-01-03	412 - Grassed Waterway - complex 20' design	500	Lin. Feet	13.28	$7,075	$53.28
HAM-22-01-02	638 - Water & Sediment Control Basin(wide)	1	Each	19.92	$13,325	$66.89
HAM-22-01-01	638 - Water & Sediment Control Basin(wide)	1	Each	13.28	$13,325	$100.34



Source: (Aerial) Dakota County 2015

Hampton Township, Section 22

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Hampton Township, Section 23

Description:

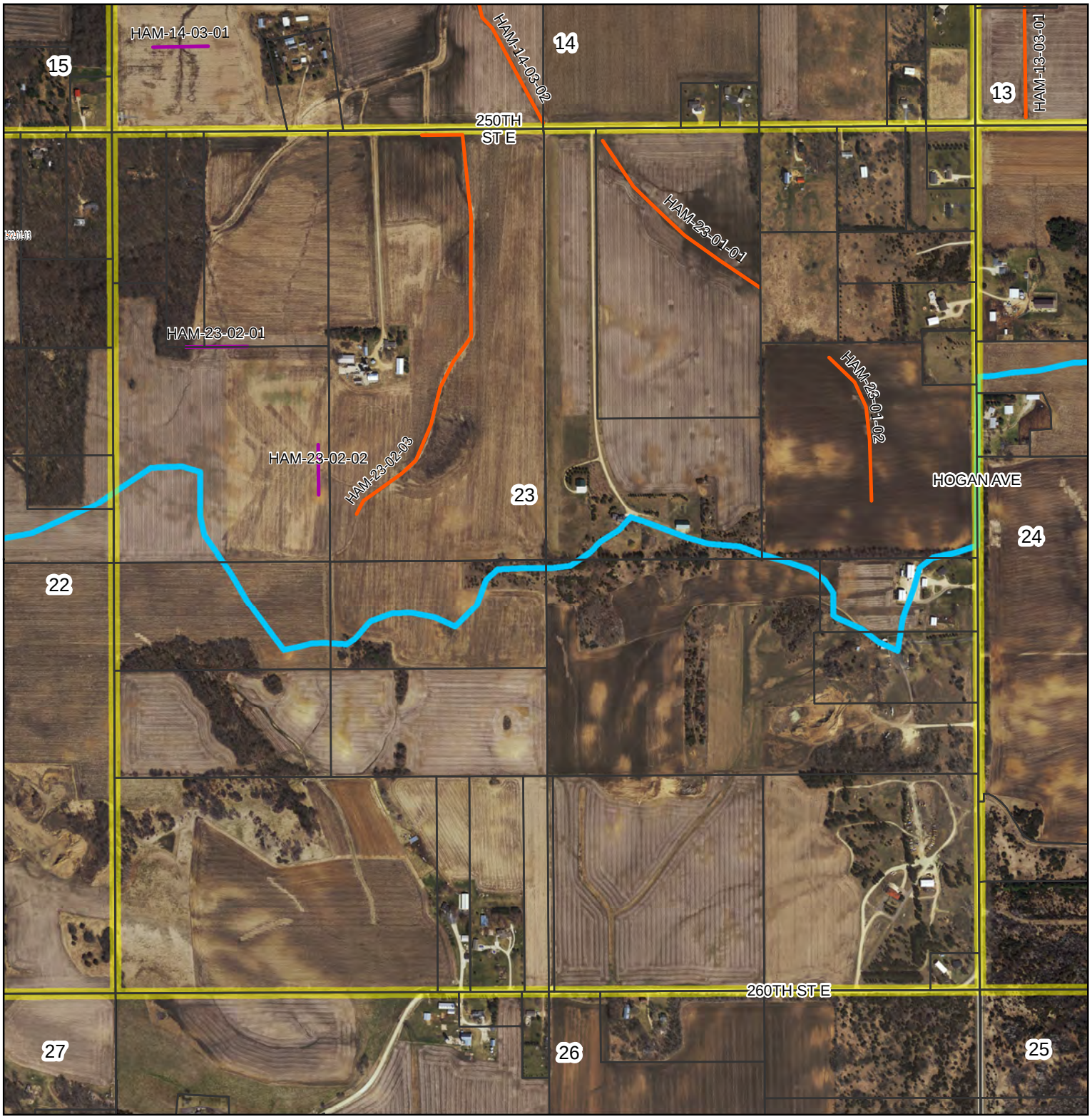
The area of the Trout Brook watershed that lies within Section 23 of Hampton Township is approximately 329.3 acres. This area lies in the northern portion of the section and consists primarily of agricultural cropland with some areas in deciduous forest, grassland with sparse mixed trees, and pasture. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Wadena loam and Estherville sandy loam with slopes of 2% - 6% and Marshan silty clay loam are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-23-01-01	412 - Grassed Waterway - complex 20' design	1400	Lin. Feet	59.5	$9,550	$16.05
HAM-23-02-03	412 - Grassed Waterway - complex 20' design	2500	Lin. Feet	66.41	$12,575	$18.94
HAM-23-02-01	638 - Water & Sediment Control Basin(narrow)	1	Each	17.19	$6,450	$37.52
HAM-23-02-02	638 - Water & Sediment Control Basin(narrow)	1	Each	17.19	$6,450	$37.52
HAM-23-01-02	412 - Grassed Waterway - complex 20' design	800	Lin. Feet	7.33	$7,900	$107.78



Source: (Aerial) Dakota County 2015

Hampton Township, Section 23

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Hampton Township, Section 24

Description:

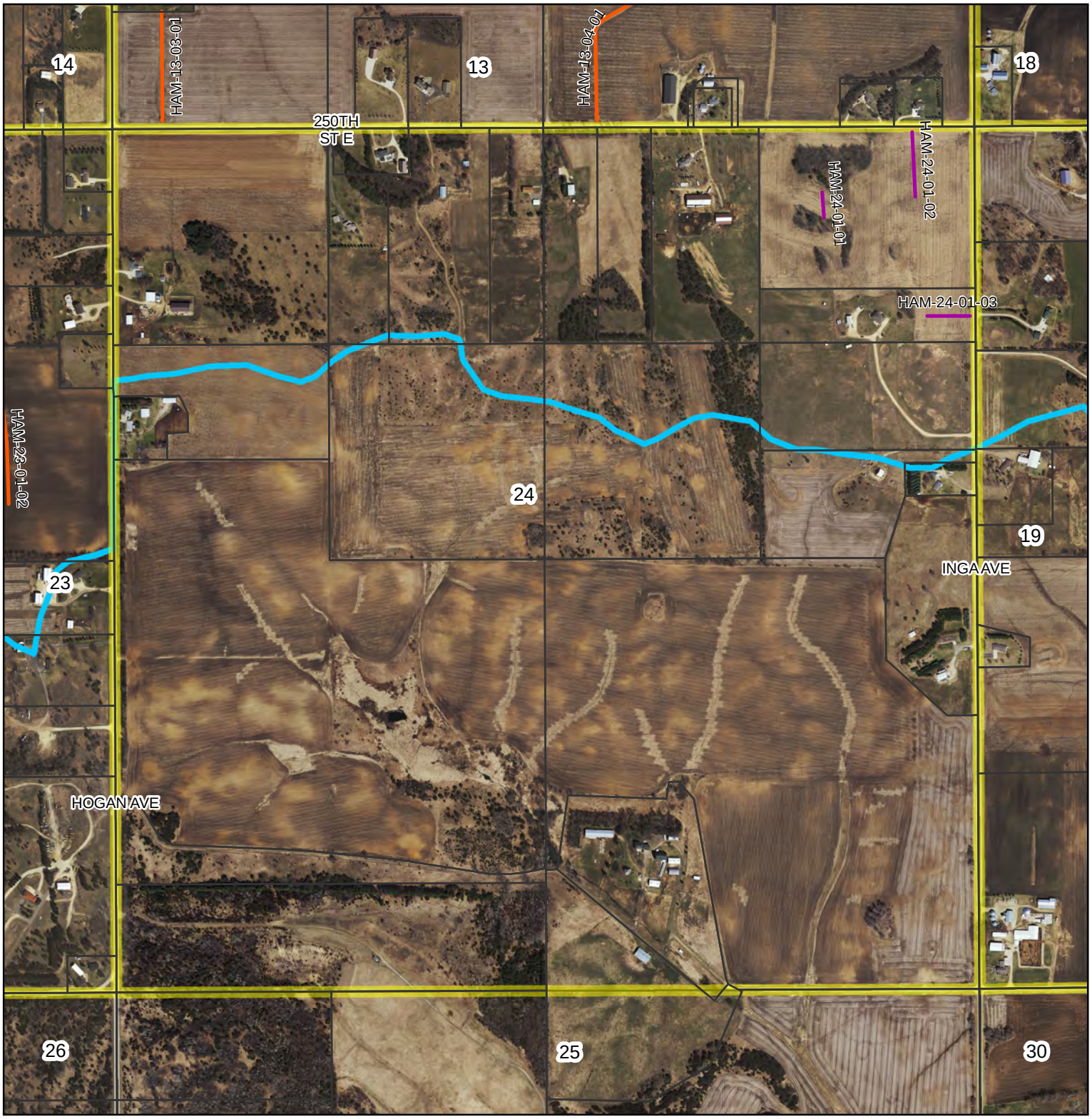
The area of the Trout Brook watershed that lies within Section 24 of Hampton Township is approximately 203.9 acres. This area lies in the northern portion of the section and consists primarily of grazed pasture, grassland with sparse mixed trees, and a small portion in agricultural cropland. Conventional tillage practices are utilized on the majority of the cropland. Burkhardt sandy loam with slopes of 6% - 18% and Wadena loam with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
HAM-24-01-03	638 - Water & Sediment Control Basin(narrow)	1	Each	17.15	$6,450	$37.61
HAM-24-01-01	638 - Water & Sediment Control Basin(narrow)	1	Each	8.56	$6,450	$75.35
HAM-24-01-02	638 - Water & Sediment Control Basin(narrow)	1	Each	5.4	$6,450	$119.44



Source: (Aerial) Dakota County 2015

Hampton Township, Section 24

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 7

Description:

The area of the Trout Brook watershed that lies within Section 7 of Douglas Township is approximately 476.0 acres. This area comprises all but the north and northeastern portion of the section and consists primarily of agricultural cropland with some areas in pasture and grassland with sparse deciduous trees. Conservation tillage practices are utilized on the majority of the cropland with some conventional tillage farming practices utilized. Ostrander-Carmi loams and Tallula silt loam with slopes of 2% - 6% as well as Lindstrom silt loam with slopes of 1% - 4% are the predominant soils. Approximately 8% of this area is also covered by Etter-Brodale complex and Frontenac silt loam soils with steep slopes of 25% - 60%.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-07-04-01	412 - Grassed Waterway - complex 20' design	1000	Lin. Feet	106.25	$8,450	$7.95
DGS-07-02-01	412 - Grassed Waterway - complex 20' design	750	Lin. Feet	79.69	$7,763	$9.74
DGS-07-04-02	342 - Critical Area Planting (Native)	16.3	Acres	42.64	$5,500	$12.90
DGS-07-03-04	412 - Grassed Waterway - complex 20' design	900	Lin. Feet	47.81	$8,175	$17.10
DGS-07-03-02	638 - Water & Sediment Control Basin(narrow)	1	Each	17.55	$6,450	$36.75
DGS-07-01-02	412 - Grassed Waterway - complex 20' design	220	Lin. Feet	11.69	$6,305	$53.93
DGS-07-03-03	638 - Water & Sediment Control Basin(narrow)	1	Each	9.23	$6,450	$69.88
DGS-07-03-01	638 - Water & Sediment Control Basin(narrow)	1	Each	8.82	$6,450	$73.13
DGS-07-03-05	638 - Water & Sediment Control Basin(narrow)	1	Each	8.82	$6,450	$73.13
DGS-07-01-01	412 - Grassed Waterway - complex 20' design	110	Lin. Feet	5.84	$6,003	$102.78
DGS-07-02-02	412 - Grassed Waterway - complex 20' design	100	Lin. Feet	5.31	$5,975	$112.52

Source: (Aerial) Dakota County 2015

Douglas Township, Section 07

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 8

Description:

The area of the Trout Brook watershed that lies within Section 8 of Douglas Township is approximately 208.8 acres. This area lies in the southern portion of the section and consists almost entirely of agricultural cropland. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Tallula silt loam with slopes of 2% - 12% and Timula-Bold silt loams with slopes of 6% - 18% (eroded) are the predominant soils.

Land Management Recommendations:

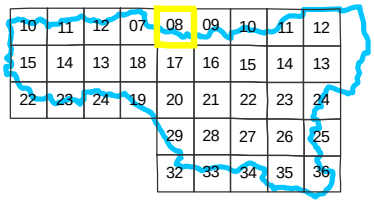
The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-08-03-01	412 - Grassed Waterway- complex 30' design	2100	Lin. Feet	357	$13,275	$3.72
DGS-08-03-03	412 - Grassed Waterway - complex 20' design	850	Lin. Feet	90.31	$8,038	$8.90
DGS-08-03-05	412 - Grassed Waterway - complex 20' design	850	Lin. Feet	90.31	$8,038	$8.90
DGS-08-04-01	412 - Grassed Waterway - complex 20' design	650	Lin. Feet	82.88	$7,488	$9.03
DGS-08-03-04	412 - Grassed Waterway - complex 20' design	800	Lin. Feet	85	$7,900	$9.29
DGS-08-03-06	638 - Water & Sediment Control Basin(narrow)	1	Each	53.13	$6,450	$12.14
DGS-08-04-02	412 - Grassed Waterway - complex 20' design	475	Lin. Feet	50.74	$7,006	$13.81
DGS-08-03-02	412 - Grassed Waterway - complex 20' design	450	Lin. Feet	47.81	$6,938	$14.51

Source: (Aerial) Dakota County 2015

Douglas Township, Section 08



Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Douglas Township, Section 9

Description:

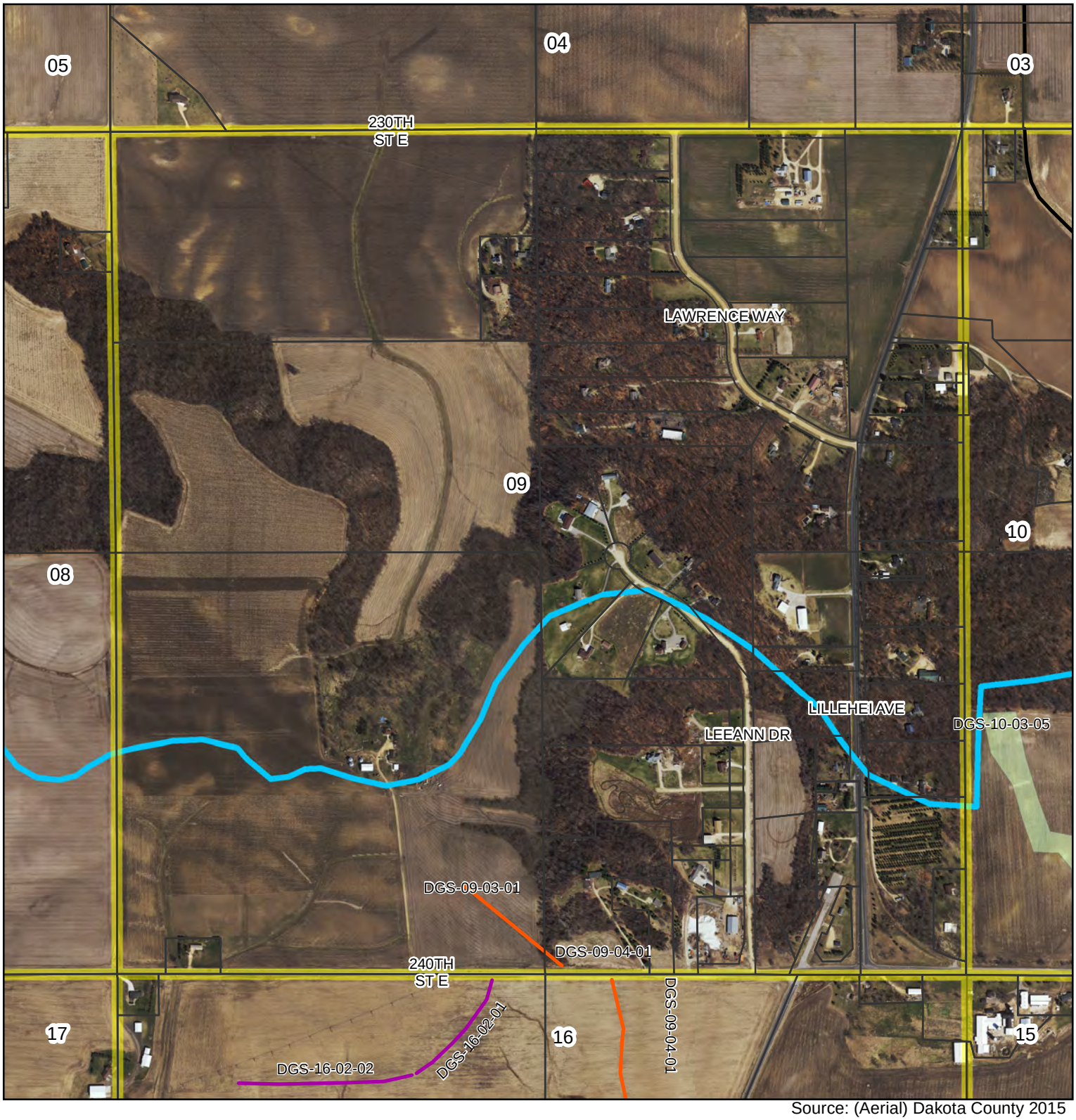
The area of the Trout Brook watershed that lies within Section 9 of Douglas Township is approximately 195.7 acres. This area lies in the southern portion of the section and consists of low density residential, deciduous forest, grassland with sparse mixed trees, and agricultural cropland. Conventional tillage practices are utilized on the majority of the cropland. Timula-Bold silt loams with slopes of 6% - 12% and 18% - 25%, Etter fine sandy loam with slopes of 2% - 6%, and Lindstrom silt loam with slopes of 1% - 4% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is a combination of agriculture, natural areas, and parkland. Land management practices recommended for agricultural portions of this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Much of the natural areas and parkland are in perennial forest or grassland cover and land management practices in this portion include the management of invasive species and promotion of robust native vegetation. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-09-03-01	412 - Grassed Waterway - complex 20' design	650	Lin. Feet	12.42	$7,488	$60.29
DGS-09-04-01	412 - Grassed Waterway - complex 20' design	125	Lin. Feet	2.39	$6,044	$252.88



Source: (Aerial) Dakota County 2015

Douglas Township, Section 09

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Douglas Township, Section 10

Description:

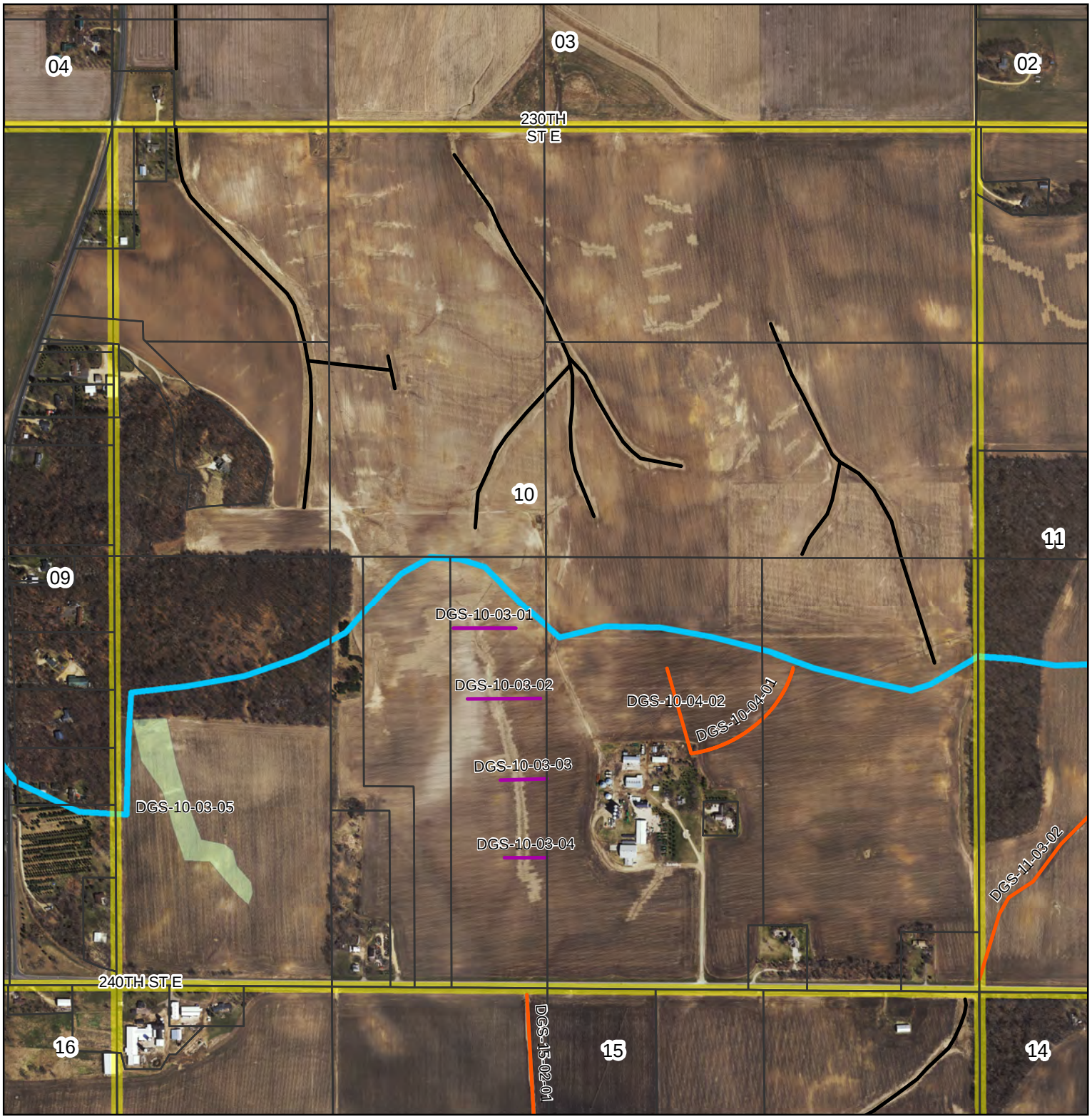
The area of the Trout Brook watershed that lies within Section 10 of Douglas Township is approximately 254.9 acres. This area lies in the southern portion of the section and consists primarily of agricultural cropland with some forest and grassland with sparse deciduous trees. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Wadena loam, Etter fine sandy loam, and Dickinson sandy loam with slopes of 2 - 6% as well as Carmi loam with slopes of 2% - 8% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

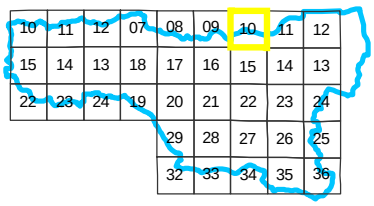
BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-10-04-01	412 - Grassed Waterway - simple design	850	Lin. Feet	56.9	$6,863	$12.06
DGS-10-04-02	412 - Grassed Waterway - simple design	550	Lin. Feet	36.82	$6,188	$16.80
DGS-10-03-05	342 - Critical Area Planting (Native)	4.6	Acres	5.31	$2,575	$48.49
DGS-10-03-01	638 - Water & Sediment Control Basin(wide)	1	Each	22.31	$13,325	$59.73
DGS-10-03-02	638 - Water & Sediment Control Basin(wide)	1	Each	22.31	$13,325	$59.73
DGS-10-03-03	638 - Water & Sediment Control Basin(wide)	1	Each	22.31	$13,325	$59.73
DGS-10-03-04	638 - Water & Sediment Control Basin(wide)	1	Each	22.31	$13,325	$59.73



Source: (Aerial) Dakota County 2015

Douglas Township, Section 10



Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 11

Description:

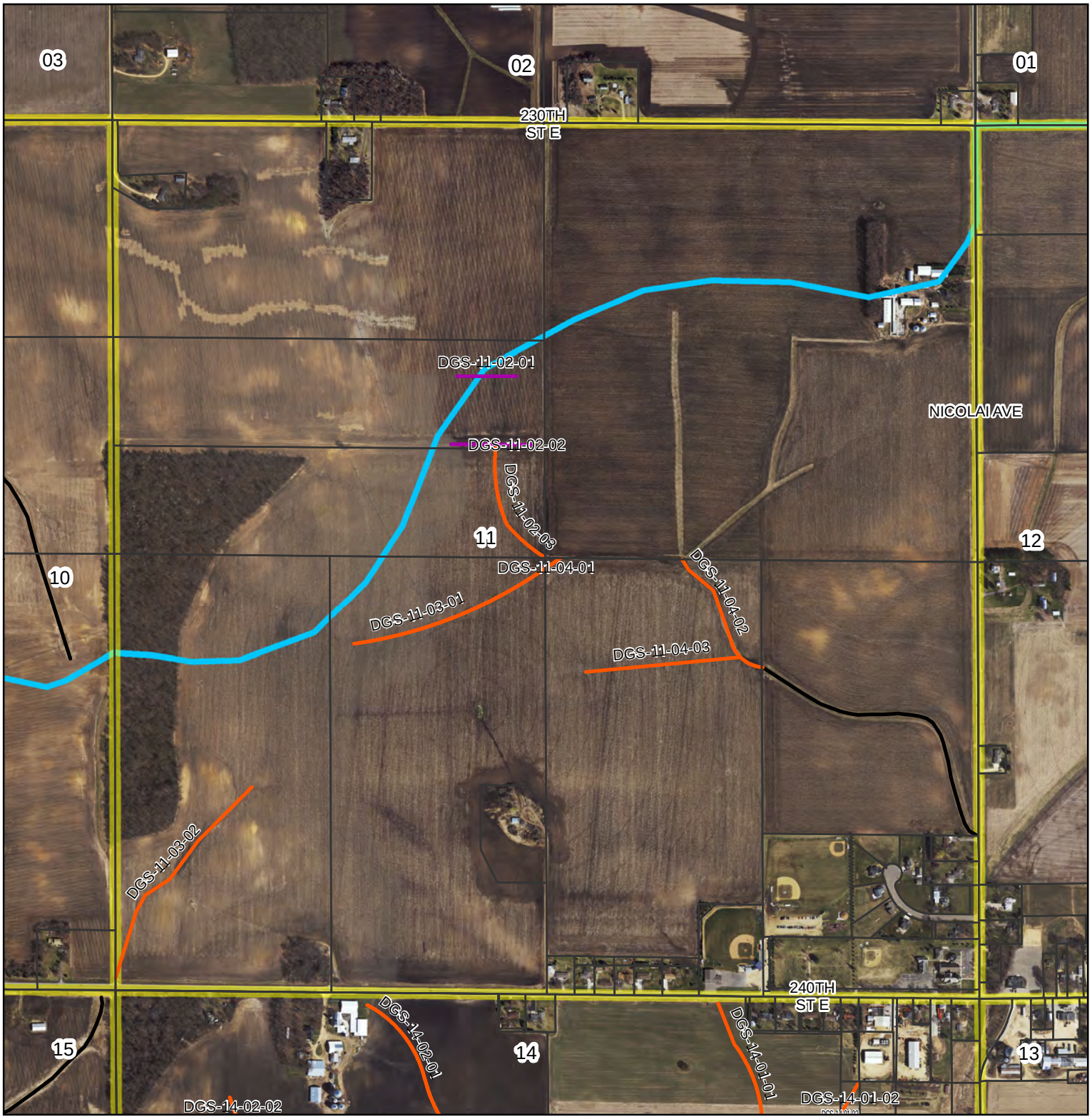
The area of the Trout Brook watershed that lies within Section 11 of Douglas Township is approximately 419.0 acres. It consists primarily of agricultural cropland with a small portion in forest and the village of Miesville in the southeast corner of the section. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Ostrander loam with slopes of 1% - 6% comprises over half of the area with Klinger silt loam with slopes of 1% - 5% and Etter fine sandy loam with slopes of 2% - 6% also predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-11-04-02	412 - Grassed Waterway - complex 20' design	900	Lin. Feet	100.4	$8,175	$8.14
DGS-11-03-02	412 - Grassed Waterway - complex 20' design	1200	Lin. Feet	103.95	$9,000	$8.66
DGS-11-03-01	412 - Grassed Waterway - simple design	1000	Lin. Feet	66.94	$7,200	$10.76
DGS-11-04-03	412 - Grassed Waterway - complex 20' design	800	Lin. Feet	53.55	$7,900	$14.75
DGS-11-02-03	412 - Grassed Waterway - simple design	600	Lin. Feet	40.16	$6,300	$15.69
DGS-11-02-01	638 - Water & Sediment Control Basin(wide)	1	Each	22.31	$13,325	$59.73
DGS-11-02-02	638 - Water & Sediment Control Basin(wide)	1	Each	22.31	$13,325	$59.73
DGS-11-04-01	412 - Grassed Waterway - complex 20' design	75	Lin. Feet	5.02	$5,906	$117.65



Source: (Aerial) Dakota County 2015

Douglas Township, Section 11

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Douglas Township, Section 12

Description:

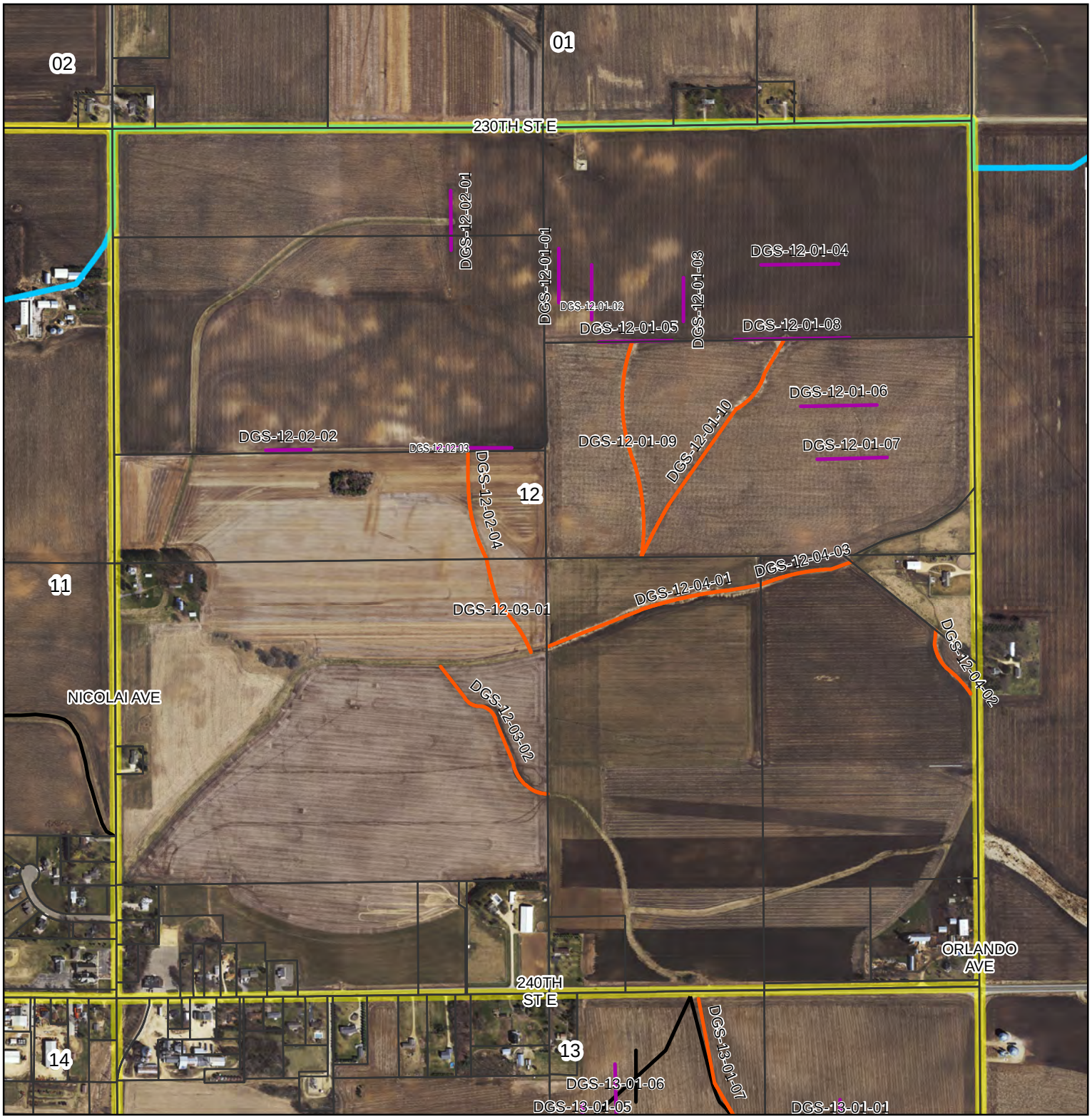
The area of the Trout Brook watershed that lies within Section 12 of Douglas Township is approximately 609.8 acres. This area comprises all but the northern edge of the section and consists primarily of agricultural cropland, a small portion in pasture, and the village of Miesville in the southwest corner. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Dickinson sandy loam and Ostrander-Carmi loams with slopes of 2% - 6%, Ostrander loam with slopes of 1% - 6%, and Klinger silt loam with slopes of 1% - 5% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-12-01-09	412 - Grassed Waterway - complex 20' design	1320	Lin. Feet	504.9	$9,330	$1.85
DGS-12-01-10	412 - Grassed Waterway - complex 20' design	1600	Lin. Feet	306	$10,100	$3.30
DGS-12-04-03	412 - Grassed Waterway- complex 30' design	500	Lin. Feet	191.25	$8,075	$4.22
DGS-12-04-01	412 - Grassed Waterway - complex 20' design	1375	Lin. Feet	184.08	$9,481	$5.15
DGS-12-03-01	412 - Grassed Waterway - simple design	400	Lin. Feet	53.55	$5,850	$10.92
DGS-12-03-02	412 - Grassed Waterway- complex 30' design	500	Lin. Feet	66.94	$8,075	$12.06
DGS-12-02-04	412 - Grassed Waterway - simple design	300	Lin. Feet	31.88	$5,625	$17.64
DGS-12-04-02	412 - Grassed Waterway - complex 20' design	300	Lin. Feet	31.24	$6,525	$20.89
DGS-12-02-02	638 - Water & Sediment Control Basin(narrow)	1	Each	29.75	$6,450	$21.68
DGS-12-02-03	638 - Water & Sediment Control Basin(narrow)	1	Each	29.75	$6,450	$21.68
DGS-12-01-02	638 - Water & Sediment Control Basin(wide)	1	Each	57.75	$13,325	$23.07
DGS-12-01-07	638 - Water & Sediment Control Basin(wide)	1	Each	57.75	$13,325	$23.07
DGS-12-01-05	638 - Water & Sediment Control Basin(narrow)	1	Each	20.21	$6,450	$31.91
DGS-12-01-01	638 - Water & Sediment Control Basin(wide)	1	Each	38.5	$13,325	$34.61
DGS-12-01-03	638 - Water & Sediment Control Basin(wide)	1	Each	38.5	$13,325	$34.61
DGS-12-01-06	638 - Water & Sediment Control Basin(wide)	1	Each	38.5	$13,325	$34.61
DGS-12-01-04	638 - Water & Sediment Control Basin(narrow)	1	Each	15.62	$6,450	$41.29
DGS-12-01-08	638 - Water & Sediment Control Basin(wide)	1	Each	28.88	$13,325	$46.14
DGS-12-02-01	638 - Water & Sediment Control Basin(wide)	1	Each	13.48	$13,325	$98.85



Source: (Aerial) Dakota County 2015

Douglas Township, Section 12

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 13

Description:

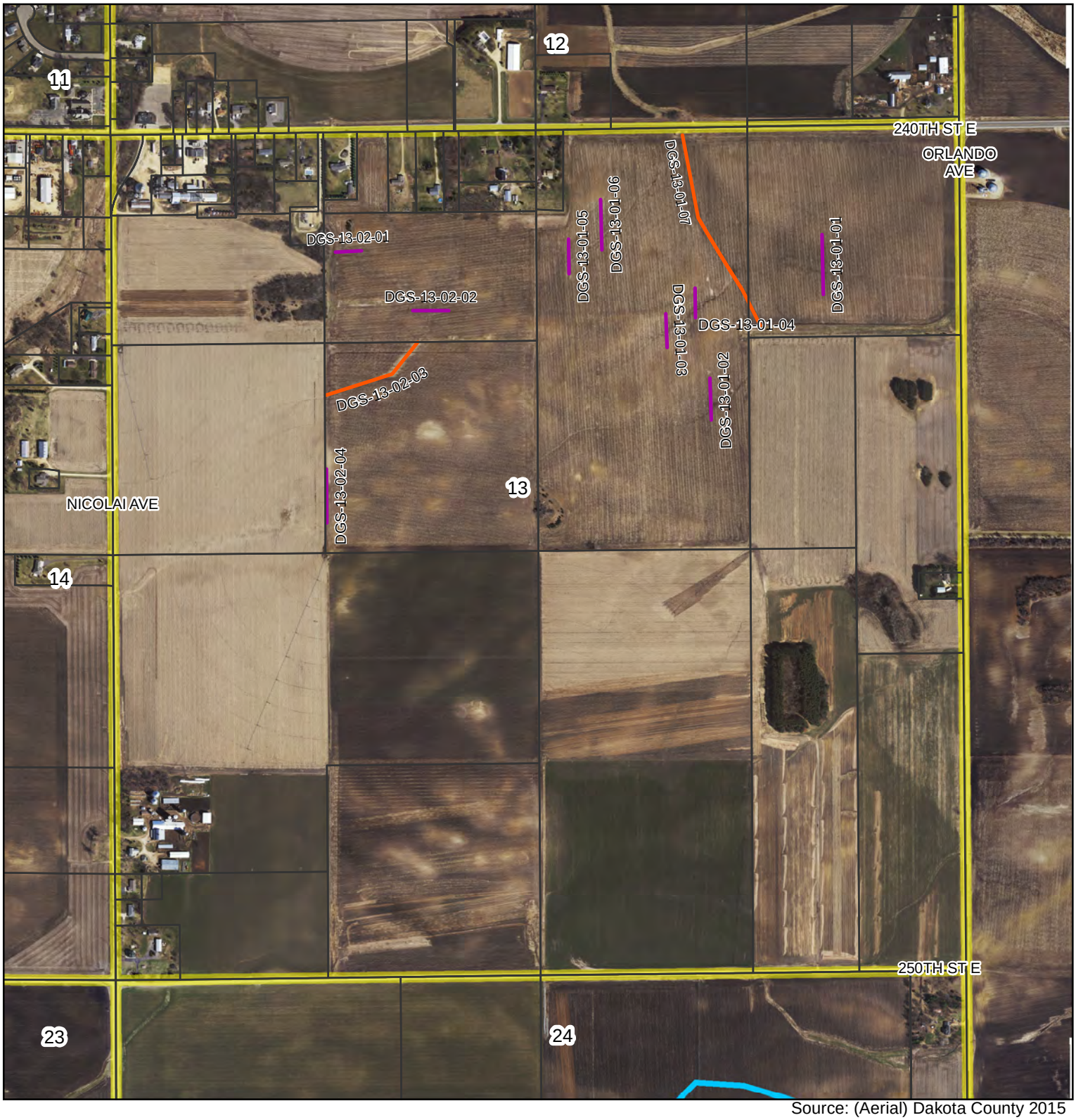
All 640 acres of Douglas Township, Section 13, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with some areas of coniferous and deciduous trees and the village of Miesville in the northwest corner. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Etter fine sandy loam and Wadena loam with slopes of 2% - 6% as well as Waukegan silt loam with slopes of 0% - 1% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-13-01-07	412 - Grassed Waterway - complex 20' design	1320	Lin. Feet	147.26	$9,330	$6.34
DGS-13-02-03	412 - Grassed Waterway - simple design	500	Lin. Feet	16.52	$6,075	$36.77
DGS-13-02-04	638 - Water & Sediment Control Basin(narrow)	1	Each	14.87	$6,450	$43.38
DGS-13-01-06	638 - Water & Sediment Control Basin(wide)	1	Each	28.88	$13,325	$46.14
DGS-13-02-01	638 - Water & Sediment Control Basin(narrow)	1	Each	10.11	$6,450	$63.80
DGS-13-01-01	638 - Water & Sediment Control Basin(wide)	1	Each	14.88	$13,325	$89.55
DGS-13-01-04	638 - Water & Sediment Control Basin(wide)	1	Each	14.88	$13,325	$89.55
DGS-13-01-05	638 - Water & Sediment Control Basin(wide)	1	Each	11	$13,325	$121.14
DGS-13-01-02	638 - Water & Sediment Control Basin(wide)	1	Each	8.5	$13,325	$156.76
DGS-13-01-03	638 - Water & Sediment Control Basin(wide)	1	Each	8.5	$13,325	$156.76
DGS-13-02-02	638 - Water & Sediment Control Basin(wide)	1	Each	5.6	$13,325	$237.95



Source: (Aerial) Dakota County 2015

Douglas Township, Section 13

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Douglas Township, Section 14

Description:

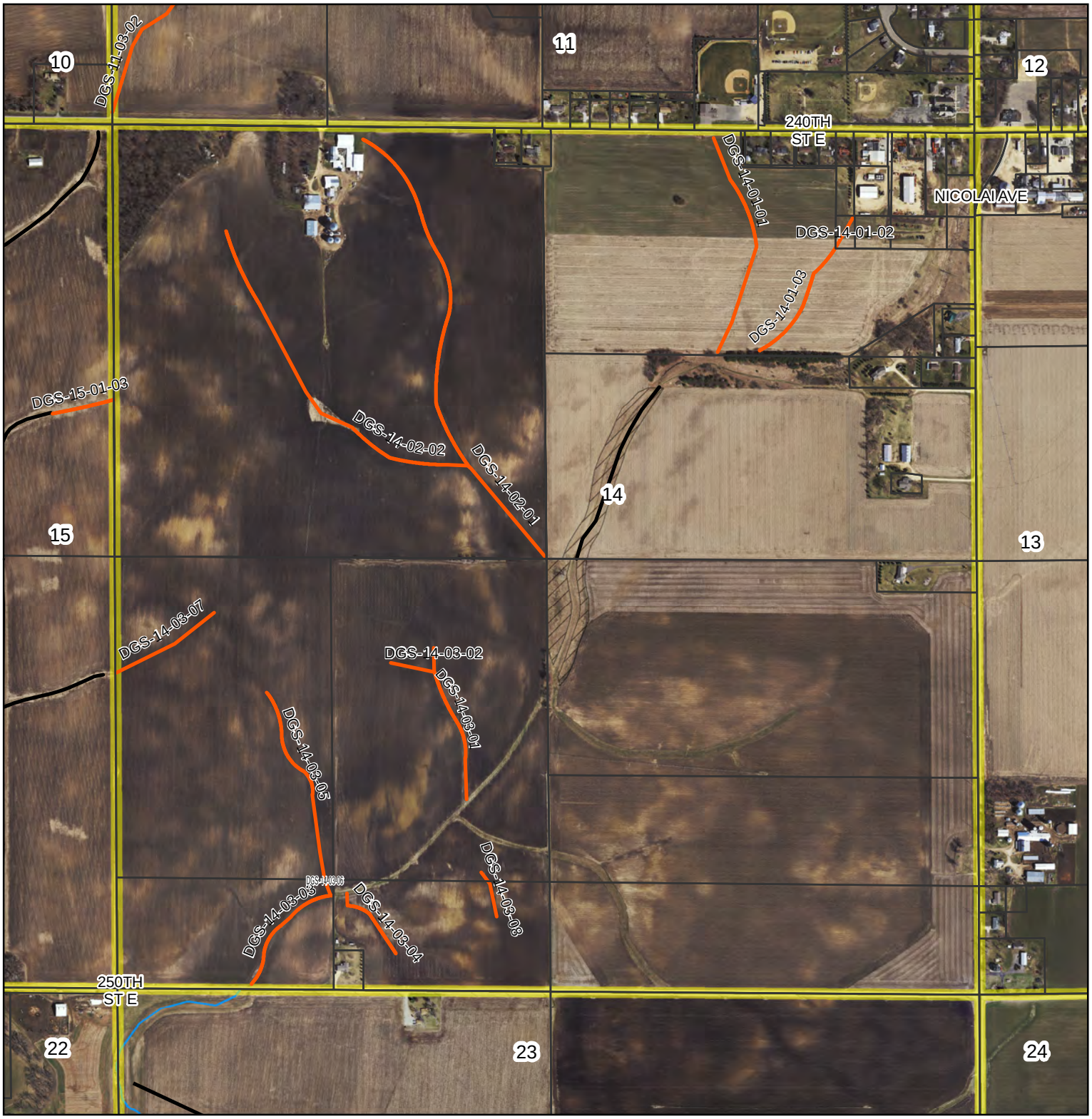
All 640 acres of Douglas Township, Section 14, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with some deciduous trees and the village of Miesville in the northeast corner. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Etter fine sandy loam and Wadena loam with slopes of 2% - 6% as well as Waukegan silt loam with slopes of 0% - 1% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-14-02-01	412 - Grassed Waterway - complex 20' design	3000	Lin. Feet	1721.25	$13,950	$0.81
DGS-14-02-02	412 - Grassed Waterway - complex 20' design	2300	Lin. Feet	1319.63	$12,025	$0.91
DGS-14-01-01	412 - Grassed Waterway - complex 20' design	2600	Lin. Feet	522.11	$12,850	$2.46
DGS-14-03-05	412 - Grassed Waterway - simple design	1150	Lin. Feet	221.38	$7,538	$3.40
DGS-14-03-03	412 - Grassed Waterway- complex 30' design	750	Lin. Feet	251.02	$8,888	$3.54
DGS-14-01-03	412 - Grassed Waterway - complex 20' design	800	Lin. Feet	160.65	$7,900	$4.92
DGS-14-03-08	412 - Grassed Waterway - simple design	275	Lin. Feet	40.91	$5,569	$13.61
DGS-14-03-01	412 - Grassed Waterway - simple design	1000	Lin. Feet	52.06	$7,200	$13.83
DGS-14-03-07	412 - Grassed Waterway - simple design	650	Lin. Feet	33.84	$6,413	$18.95
DGS-14-03-04	412 - Grassed Waterway - simple design	450	Lin. Feet	23.43	$5,963	$25.45
DGS-14-03-06	412 - Grassed Waterway - complex 20' design	100	Lin. Feet	17.33	$5,975	$34.48
DGS-14-03-02	412 - Grassed Waterway - simple design	150	Lin. Feet	12.75	$5,288	$41.47
DGS-14-01-02	412 - Grassed Waterway - complex 20' design	225	Lin. Feet	4.78	$6,319	$132.19



Source: (Aerial) Dakota County 2015

Douglas Township, Section 14

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Douglas Township, Section 15

Description:

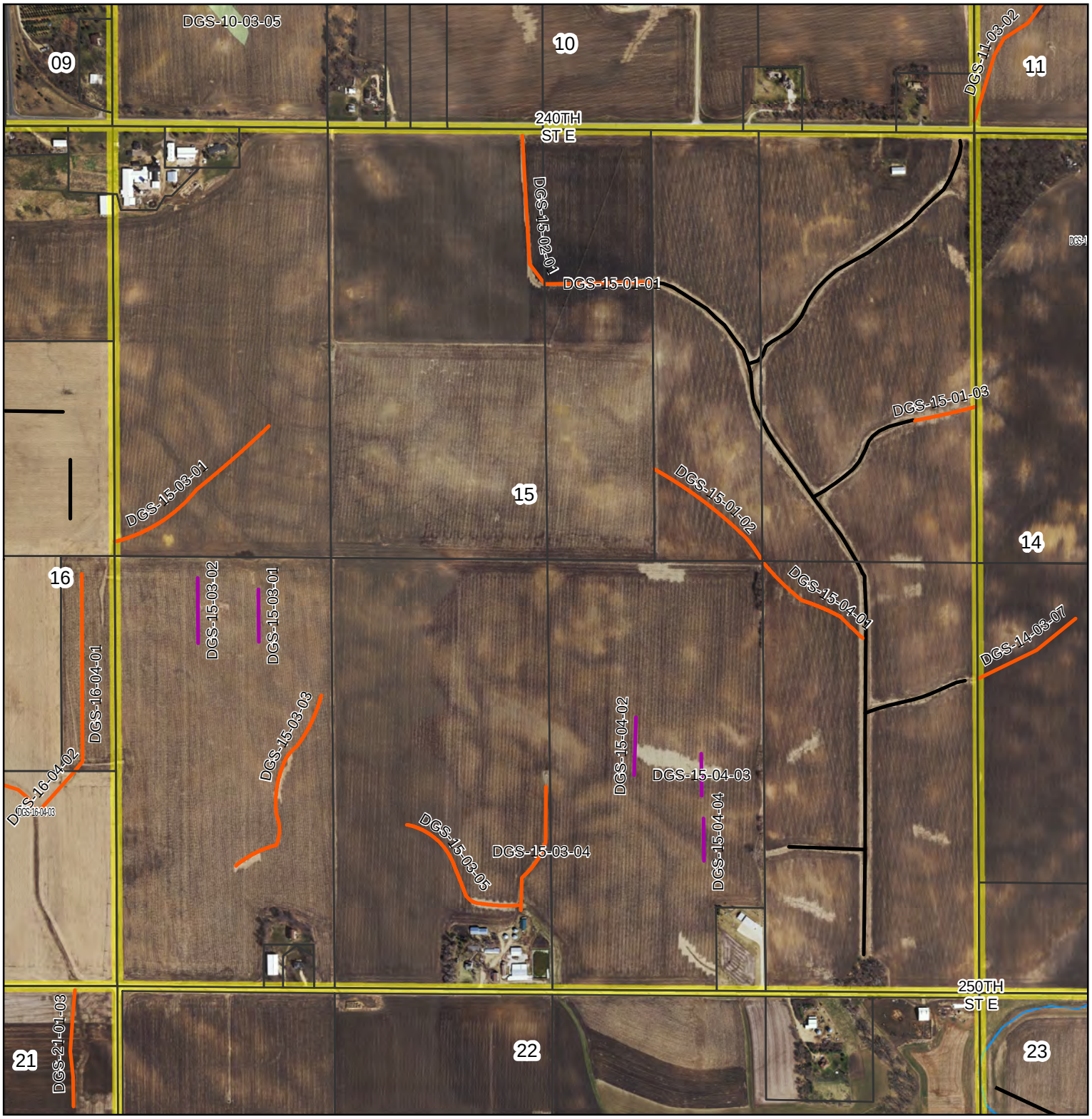
All 640 acres of Douglas Township, Section 15, are within the Trout Brook watershed. The area consists primarily of agricultural cropland. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Wadena loam with slopes of 0% - 2% as well as Tallula silt loam, Dickinson sandy loam, and Etter fine sandy loam with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-15-02-02	412 - Grassed Waterway - complex 20' design	1200	Lin. Feet	459	$9,000	$1.96
DGS-15-03-03	412 - Grassed Waterway - simple design	1250	Lin. Feet	185.94	$7,763	$4.17
DGS-15-02-01	412 - Grassed Waterway - complex 20' design	900	Lin. Feet	172.13	$8,175	$4.75
DGS-15-01-02	412 - Grassed Waterway - simple design	880	Lin. Feet	65.45	$6,930	$10.59
DGS-15-04-01	412 - Grassed Waterway - simple design	780	Lin. Feet	40.61	$6,705	$16.51
DGS-15-01-01	412 - Grassed Waterway - complex 20' design	650	Lin. Feet	43.51	$7,488	$17.21
DGS-15-03-02	638 - Water & Sediment Control Basin(wide)	1	Each	57.75	$13,325	$23.07
DGS-15-03-05	412 - Grassed Waterway - simple design	950	Lin. Feet	24.73	$7,088	$28.66
DGS-15-03-04	412 - Grassed Waterway - simple design	800	Lin. Feet	20.83	$6,750	$32.41
DGS-15-03-01	638 - Water & Sediment Control Basin(wide)	1	Each	38.5	$13,325	$34.61
DGS-15-04-03	638 - Water & Sediment Control Basin(wide)	1	Each	25.5	$13,325	$52.25
DGS-15-04-04	638 - Water & Sediment Control Basin(wide)	1	Each	25.5	$13,325	$52.25
DGS-15-01-03	412 - Grassed Waterway - simple design	380	Lin. Feet	5.65	$5,805	$102.74
DGS-15-04-02	638 - Water & Sediment Control Basin(wide)	1	Each	12.75	$13,325	$104.51



Source: (Aerial) Dakota County 2015

Douglas Township, Section 15

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 16

Description:

All 640 acres of Douglas Township, Section 16, are within the Trout Brook watershed. The area consists primarily of agricultural cropland. Conventional and conservation tillage practices are utilized on the cropland with the conservation tillage farming practices utilized on steeper slopes. Tallula silt loam with slopes of 2% - 6% and 6% - 12% (eroded), Lindstrom silt loam with slopes of 1% - 4%, and Timula-Bold silt loams with slopes of 6% - 12% (eroded) are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-16-02-02	638 - Water & Sediment Control Basin(narrow)	1	Each	51	$6,450	$12.65
DGS-16-04-04	415 - Grassed Waterway - complex 20' design	575	Lin. Feet	24.44	$6,450	$26.39
DGS-16-04-03	414 - Grassed Waterway - complex 20' design	550	Lin. Feet	23.38	$6,450	$27.59
DGS-16-04-05	415 - Grassed Waterway - complex 20' design	450	Lin. Feet	19.13	$6,450	$33.72
DGS-16-01-01	412 - Grassed Waterway - complex 20' design	1050	Lin. Feet	21.59	$8,588	$39.78
DGS-16-02-01	638 - Water & Sediment Control Basin(narrow)	1	Each	12.8	$6,450	$50.39
DGS-16-04-01	412 - Grassed Waterway - complex 20' design	1200	Lin. Feet	12.34	$6,450	$52.27
DGS-16-04-02	413 - Grassed Waterway - complex 20' design	375	Lin. Feet	5.33	$6,450	$121.01

Source: (Aerial) Dakota County 2015

Douglas Township, Section 16

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

N

Douglas Township, Section 17

Description:

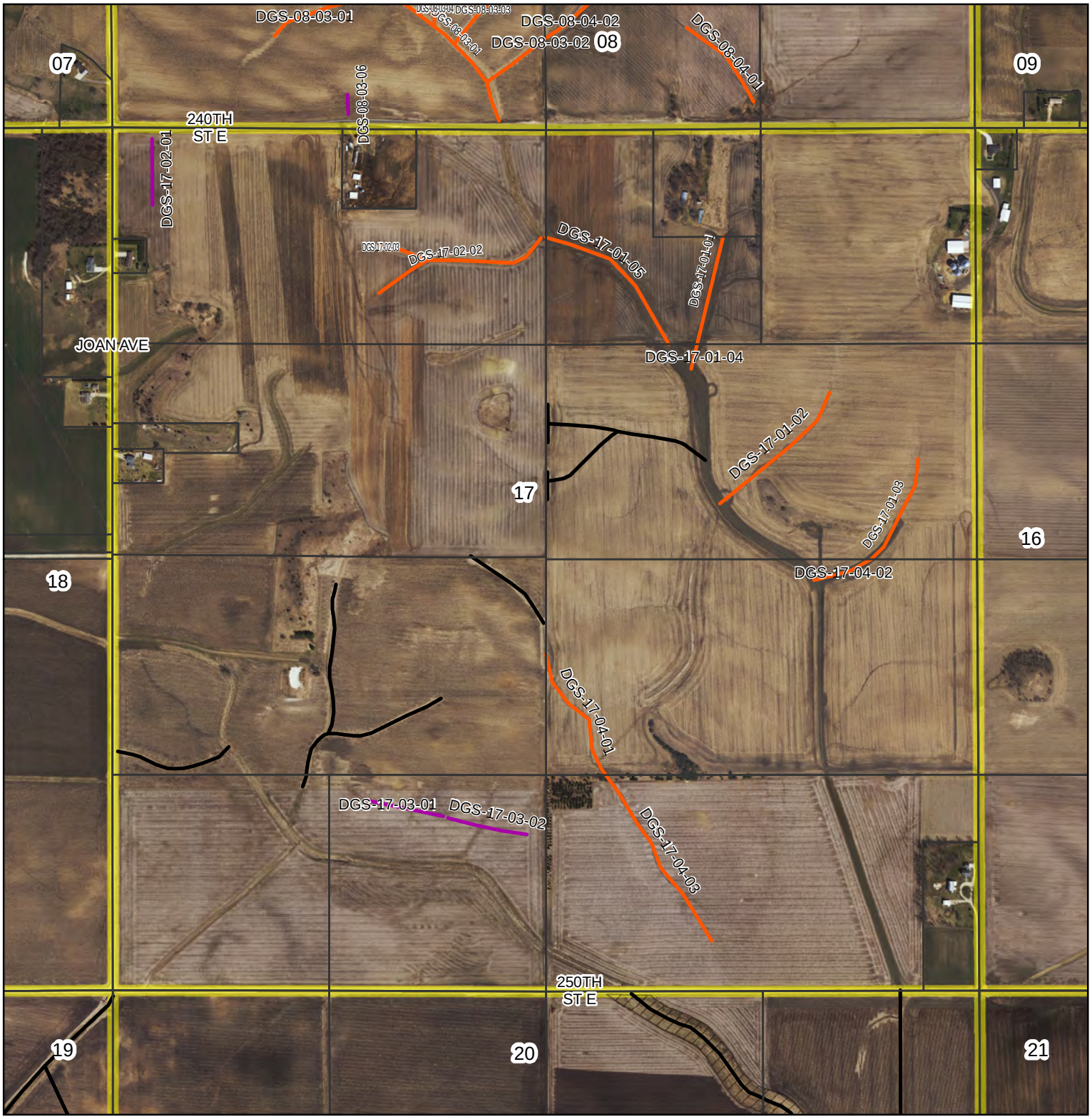
All 640 acres of Douglas Township, Section 17, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with some areas in grassland with sparse mixed trees. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Tallula silt loam with slopes of 2% - 12% (eroded), Timula-Bold silt loams with slopes of 12% - 18% (eroded), and Lindstrom silt loam with slopes of 1% - 4% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-17-01-02	412 - Grassed Waterway - complex 20' design	1600	Lin. Feet	85	$10,100	$11.88
DGS-17-01-05	412 - Grassed Waterway - complex 20' design	1050	Lin. Feet	66.94	$8,588	$12.83
DGS-17-01-03	412 - Grassed Waterway - complex 20' design	700	Lin. Feet	37.19	$7,625	$20.50
DGS-17-01-01	412 - Grassed Waterway - complex 20' design	675	Lin. Feet	35.86	$7,556	$21.07
DGS-17-02-02	412 - Grassed Waterway - complex 20' design	1250	Lin. Feet	39.84	$9,138	$22.94
DGS-17-04-02	412 - Grassed Waterway - complex 20' design	375	Lin. Feet	19.92	$6,731	$33.79
DGS-17-02-03	412 - Grassed Waterway - complex 20' design	300	Lin. Feet	9.56	$6,525	$68.25
DGS-17-01-04	412 - Grassed Waterway - complex 20' design	150	Lin. Feet	7.97	$6,113	$76.69
DGS-17-04-01	412 - Grassed Waterway - complex 20' design	1900	Lin. Feet	13.08	$10,925	$83.52
DGS-17-04-03	412 - Grassed Waterway - complex 20' design	1900	Lin. Feet	13.08	$10,925	$83.52
DGS-17-02-01	638 - Water & Sediment Control Basin(narrow)	1	Each	3.24	$6,450	$199.07
DGS-17-03-01	638 - Water & Sediment Control Basin(wide)	1	Each	5.97	$13,325	$223.20
DGS-17-03-02	638 - Water & Sediment Control Basin(wide)	1	Each	4.61	$13,325	$289.05



Source: (Aerial) Dakota County 2015

Douglas Township, Section 17

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Douglas Township, Section 18

Description:

All 640 acres of Douglas Township, Section 18, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with some areas in grassland with sparse mixed trees. An open water portion of Trout Brook runs through the center of the section, which transitions to intermittent flow going west to east. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. There is a large variety of soil types present in this section. Waukegan silt loam with slopes of 0% - 1%, Lindstrom silt loam with slopes of 1% - 4%, Burkhardt sandy loam with slopes of 6% - 12%, and Cylinder loam are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-18-03-04	393 - Filter Strip	2.5	Acres	219.21	$1,900	$0.87
DGS-18-03-01	393 - Filter Strip	2.3	Acres	90.05	$1,850	$2.05
DGS-18-01-01	638 - Water & Sediment Control Basin(narrow)	1	Each	58.44	$6,450	$11.04
DGS-18-01-02	638 - Water & Sediment Control Basin(narrow)	1	Each	53.13	$6,450	$12.14
DGS-18-02-01	342 - Critical Area Planting (Native)	2.4	Acres	12.63	$2,025	$16.03
DGS-18-03-03	412 - Grassed Waterway - complex 20' design	2300	Lin. Feet	73.31	$12,025	$16.40
DGS-18-02-02	342 - Critical Area Planting (Native)	4.9	Acres	14.74	$2,650	$17.98
DGS-18-02-06	412 - Grassed Waterway - complex 20' design	1200	Lin. Feet	38.25	$9,000	$23.53
DGS-18-03-02	638 - Water & Sediment Control Basin(narrow)	1	Each	19.13	$6,450	$33.72
DGS-18-03-06	638 - Water & Sediment Control Basin(narrow)	1	Each	14.33	$6,450	$45.01
DGS-18-03-05	638 - Water & Sediment Control Basin(narrow)	1	Each	14.05	$6,450	$45.91
DGS-18-04-02	638 - Water & Sediment Control Basin(wide)	1	Each	25.26	$13,325	$52.75
DGS-18-04-01	638 - Water & Sediment Control Basin(wide)	1	Each	24.79	$13,325	$53.75
DGS-18-02-05	638 - Water & Sediment Control Basin(wide)	1	Each	10.63	$13,325	$125.35
DGS-18-02-03	638 - Water & Sediment Control Basin(wide)	1	Each	6.91	$13,325	$192.84
DGS-18-02-04	638 - Water & Sediment Control Basin(wide)	1	Each	6.91	$13,325	$192.84

Source: (Aerial) Dakota County 2015

Douglas Township, Section 18

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
			29	28	27	26	25	
			32	33	34	35	36	

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 19

Description:

The area of the Trout Brook watershed that lies within Section 19 of Douglas Township is approximately 410.7 acres. This area lies in the northeastern portion of the section and consists primarily of agricultural cropland as well as some areas in pasture and grassland with sparse mixed trees. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Burkhardt sandy loam with slopes of 6% - 18%, Terril loam with slopes of 4% - 12%, and Estherville sandy loam with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

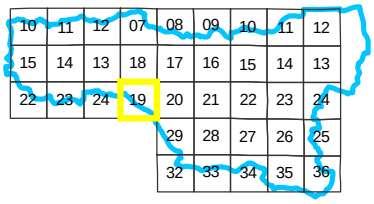
The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-19-04-01	638 - Water & Sediment Control Basin(narrow)	1	Each	20.83	$6,450	$30.96
DGS-19-04-02	638 - Water & Sediment Control Basin(wide)	1	Each	23.91	$13,325	$55.73
DGS-19-02-02	638 - Water & Sediment Control Basin(wide)	1	Each	20.63	$13,325	$64.59
DGS-19-02-03	638 - Water & Sediment Control Basin(wide)	1	Each	20.63	$13,325	$64.59
DGS-19-02-01	638 - Water & Sediment Control Basin(wide)	1	Each	5.71	$13,325	$233.36

Source: (Aerial) Dakota County 2015

Douglas Township, Section 19



Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

N

Douglas Township, Section 20

Description:

All 640 acres of Douglas Township, Section 20, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with a small portion in coniferous trees as well as grassland with sparse deciduous trees. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Wadena Loam with slopes of 0% - 6% as well as Tallula silt loam, Dickinson sandy loam, and Estherville sandy loam with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is a combination of agriculture, natural areas, and parkland. Land management practices recommended for agricultural portions of this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Much of the natural areas and parkland are in perennial forest or grassland cover and land management practices in this portion include the management of invasive species and promotion of robust native vegetation. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-20-03-01	412 - Grassed Waterway - complex 20' design	1400	Lin. Feet	104.13	$9,550	$9.17
DGS-20-03-05	412 - Grassed Waterway - complex 20' design	700	Lin. Feet	52.06	$7,625	$14.65
DGS-20-03-02	638 - Water & Sediment Control Basin(wide)	1	Each	45.16	$13,325	$29.51
DGS-20-03-04	638 - Water & Sediment Control Basin(wide)	1	Each	45.16	$13,325	$29.51
DGS-20-03-03	412 - Grassed Waterway - complex 20' design	1050	Lin. Feet	7.22	$8,588	$118.94
DGS-20-01-01	638 - Water & Sediment Control Basin(narrow)	1	Each	4.87	$6,450	$132.44
DGS-20-04-01	412 - Grassed Waterway - complex 20' design	625	Lin. Feet	4.3	$7,419	$172.53
DGS-20-01-02	638 - Water & Sediment Control Basin(narrow)	1	Each	1.5	$6,450	$430.00

Source: (Aerial) Dakota County 2015

Douglas Township, Section 20

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 21

Description:

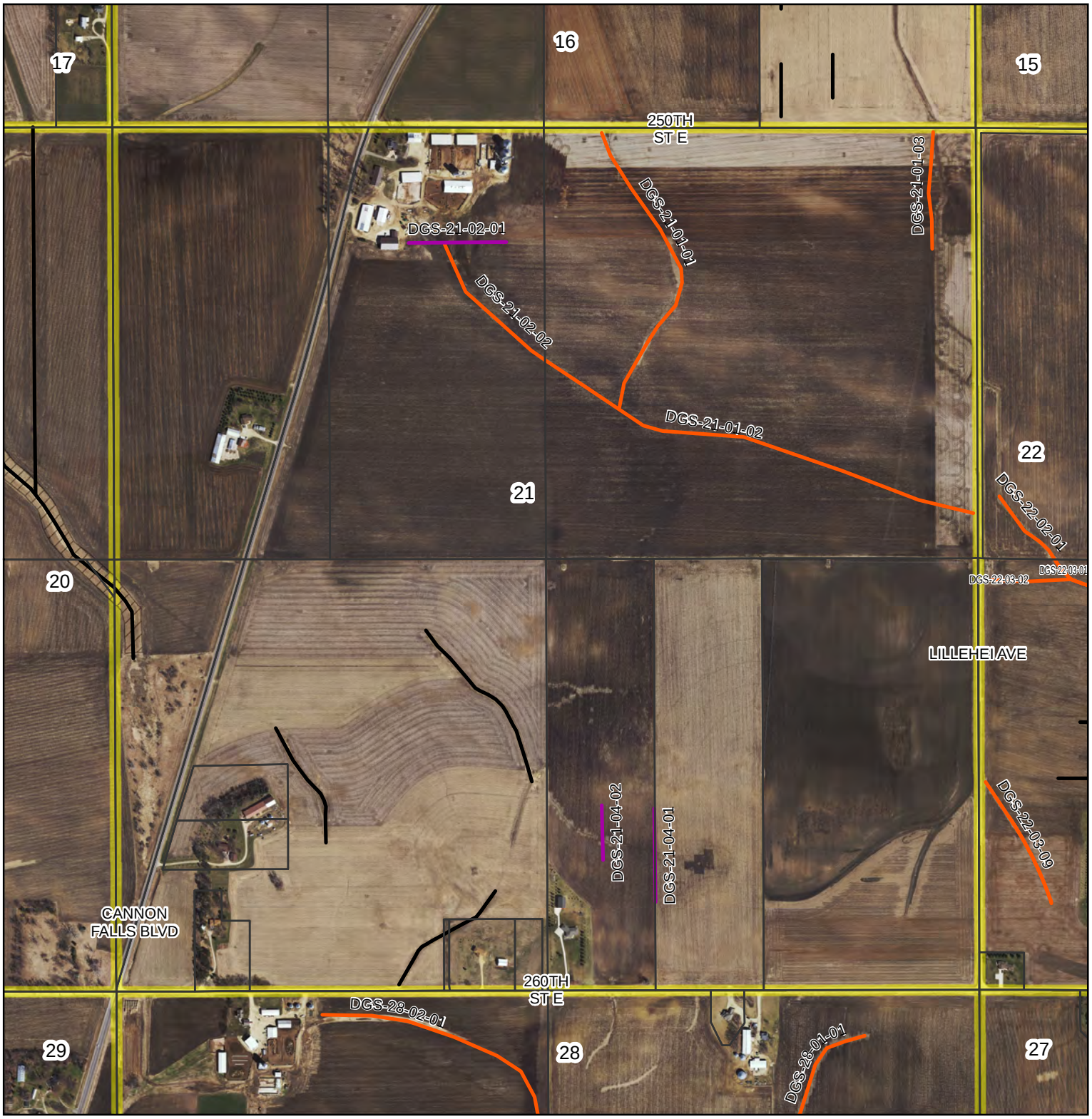
All 640 acres of Douglas Township, Section 21, are within the Trout Brook watershed. The area consists primarily of agricultural cropland as well as a small area of grassland with mixed trees. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Ostrander loam with slopes of 1% - 6%, Dickinson sandy loam with slopes of 2% - 6%, and Kanaranzi loam with slopes of 0% - 2% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-21-02-01	638 - Water & Sediment Control Basin(narrow)	1	Each	36.68	$6,450	$17.58
DGS-21-01-01	412 - Grassed Waterway - complex 20' design	1900	Lin. Feet	49.03	$10,925	$22.28
DGS-21-01-03	412 - Grassed Waterway - complex 20' design	500	Lin. Feet	26.56	$7,075	$26.64
DGS-21-01-02	412 - Grassed Waterway - complex 20' design	2800	Lin. Feet	47.89	$13,400	$27.98
DGS-21-02-02	412 - Grassed Waterway - complex 20' design	950	Lin. Feet	16.25	$8,313	$51.15
DGS-21-04-02	638 - Water & Sediment Control Basin(narrow)	1	Each	2.01	$6,450	$320.90
DGS-21-04-01	638 - Water & Sediment Control Basin(narrow)	1	Each	1.34	$6,450	$481.34



Source: (Aerial) Dakota County 2015

Douglas Township, Section 21

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 22

Description:

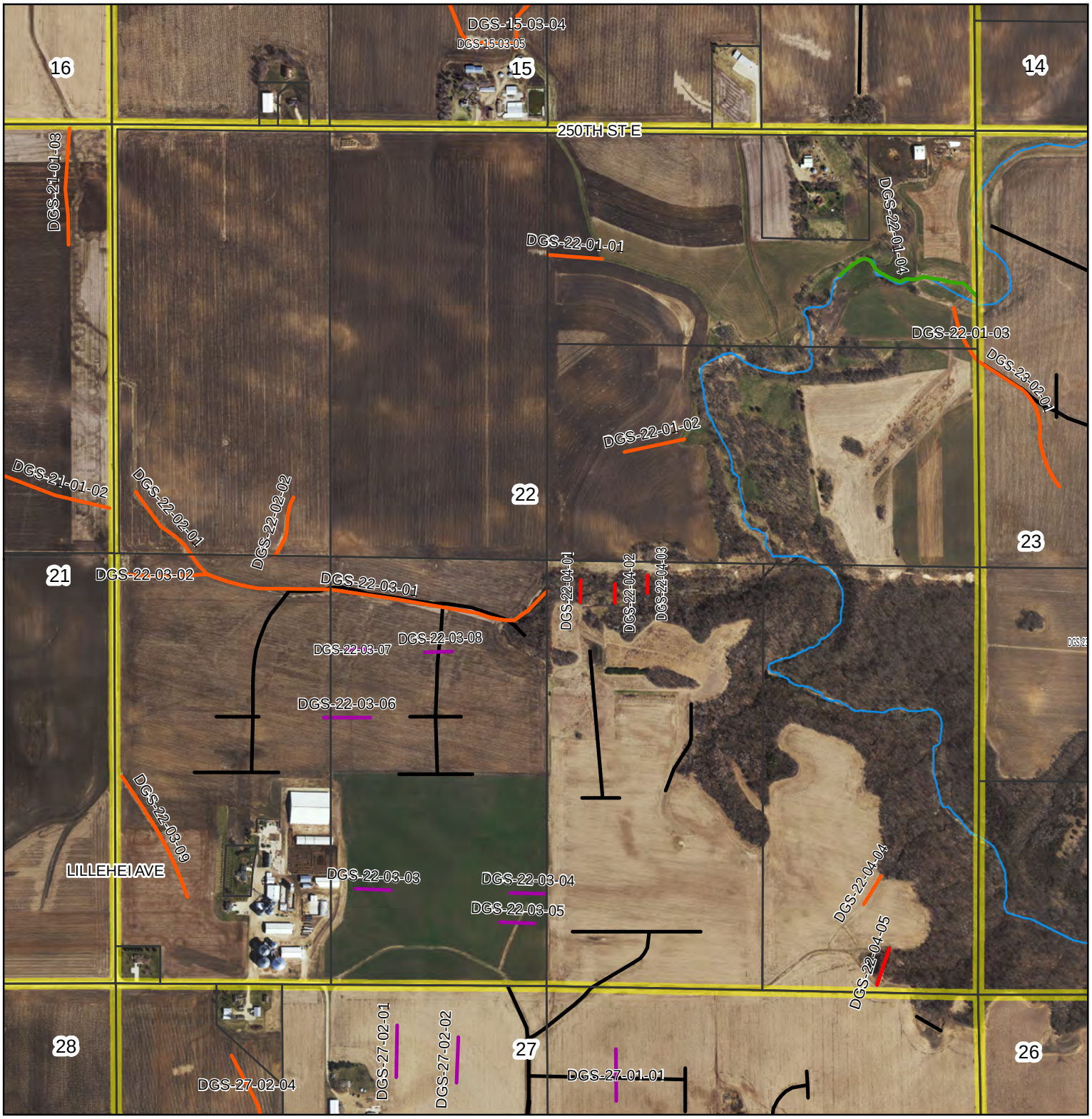
All 640 acres of Douglas Township, Section 22 are within the Trout Brook watershed. The area consists primarily of agricultural cropland with portions in pasture or deciduous forest. The East ½ of the SE ¼ is part of the Miesville Ravine Park Reserve. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes along with cover crops. Tallula silt loam, Dickinson sandy loam, and Rockton loam with slopes of 2% - 6% and Zumbro fine sandy loam are the predominant soils.

Land Management Recommendations:

The primary land use within this section is a combination of agriculture, natural areas, and parkland. Land management practices recommended for agricultural portions of this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Much of the natural areas and parkland are in perennial forest or grassland cover and land management practices in this portion include the management of invasive species and promotion of robust native vegetation. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-22-03-01	412 - Grassed Waterway- complex 30' design	2300	Lin. Feet	1207.5	$13,925	$1.15
DGS-22-04-03	410 - Grade Stabilization Structure 10-100ac	1	Each	1718.8	$21,075	$1.23
DGS-22-04-02	410 - Grade Stabilization Structure 100-250ac	1	Each	2062.5	$32,200	$1.56
DGS-22-02-01	412 - Grassed Waterway- complex 30' design	500	Lin. Feet	393.75	$8,075	$2.05
DGS-22-03-02	412 - Grassed Waterway- complex 30' design	480	Lin. Feet	252	$8,010	$3.18
DGS-22-04-01	410 - Grade Stabilization Structure 250+ ac	1	Each	3437.5	$111,700	$3.25
DGS-22-02-02	412 - Grassed Waterway - simple design	350	Lin. Feet	67.38	$5,738	$8.52
DGS-22-03-09	412 - Grassed Waterway - simple design	1000	Lin. Feet	74.38	$7,200	$9.68
DGS-22-01-03	412 - Grassed Waterway - complex 20' design	400	Lin. Feet	53.55	$6,800	$12.70
DGS-22-03-08	638 - Water & Sediment Control Basin(wide)	1	Each	57.75	$13,325	$23.07
DGS-22-04-04	412 - Grassed Waterway - simple design	250	Lin. Feet	21.25	$5,513	$25.94
DGS-22-01-04	580 - Streambank and Shoreline Protection	950	Lin. Feet	365.75	$111,745	$30.55
DGS-22-01-01	412 - Grassed Waterway - simple design	350	Lin. Feet	18.22	$5,738	$31.49
DGS-22-01-02	412 - Grassed Waterway - simple design	350	Lin. Feet	18.22	$5,738	$31.49
DGS-22-03-06	638 - Water & Sediment Control Basin(wide)	1	Each	33	$13,325	$40.38
DGS-22-03-07	638 - Water & Sediment Control Basin(wide)	1	Each	33	$13,325	$40.38
DGS-22-04-05	410 - Grade Stabilization Structure 0-10ac	1	Each	22.31	$13,450	$60.29
DGS-22-03-03	638 - Water & Sediment Control Basin(wide)	1	Each	11	$13,325	$121.14
DGS-22-03-04	638 - Water & Sediment Control Basin(wide)	1	Each	11	$13,325	$121.14
DGS-22-03-05	638 - Water & Sediment Control Basin(wide)	1	Each	11	$13,325	$121.14



Source: (Aerial) Dakota County 2015

Douglas Township, Section 22

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Douglas Township, Section 23

Description:

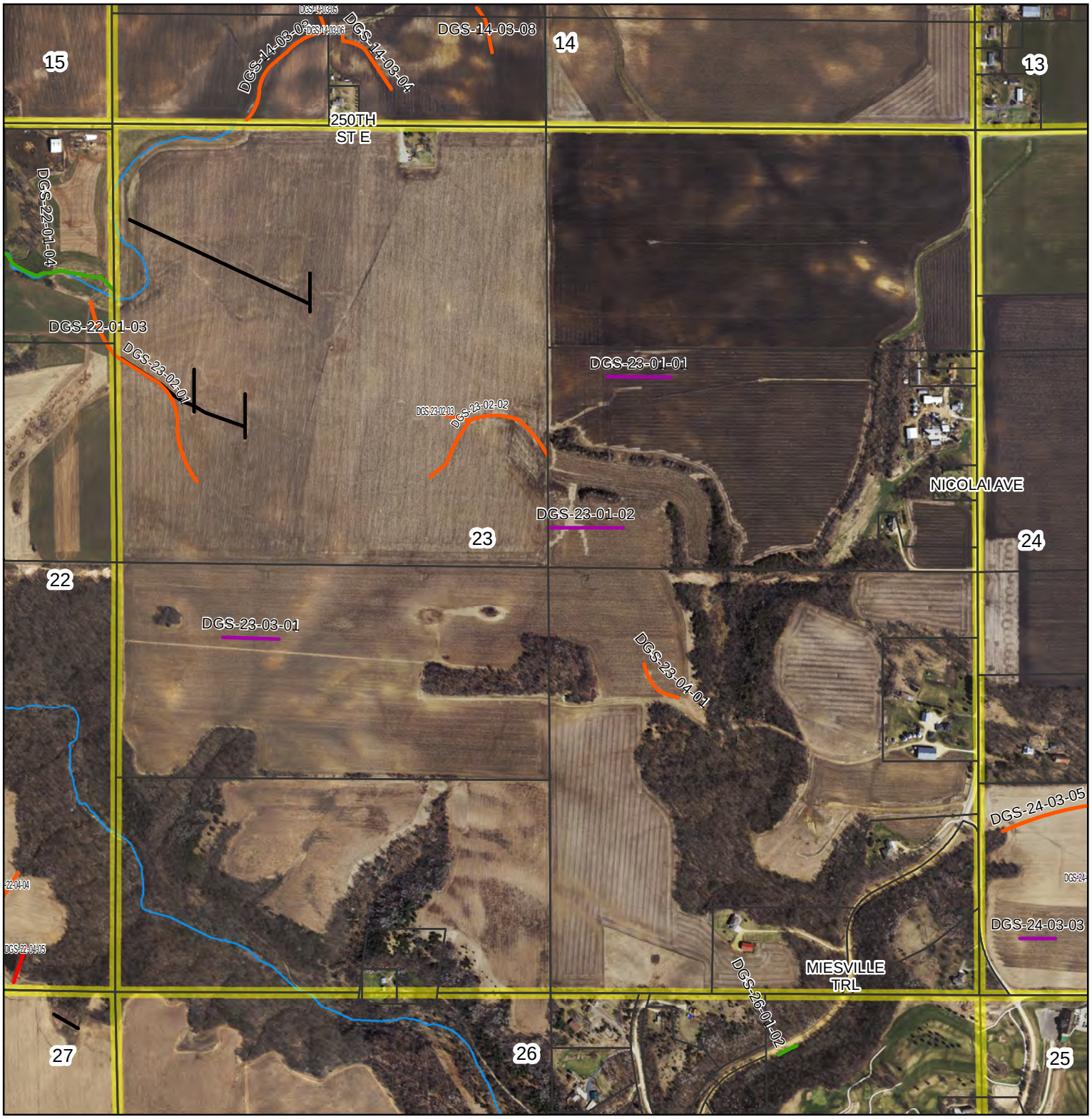
All 640 acres of Douglas Township, Section 23, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with some portions in prairie grassland or deciduous forest. The South ½ of the SW ¼ of section 23 is part of the Miesville Ravine Park Reserve. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Carmi loam with slopes of 2% - 8%, Waukegan silt loam with slopes of 1% - 6%, Timula-Bold silt loams with slopes of 12% - 25% (eroded), and Rockton loam with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is a combination of agriculture, natural areas, and parkland. Land management practices recommended for agricultural portions of this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Much of the natural areas and parkland are in perennial forest or grassland cover and land management practices in this portion include the management of invasive species and promotion of robust native vegetation. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-23-02-01	412 - Grassed Waterway - complex 20' design	950	Lin. Feet	141.31	$8,313	$5.88
DGS-23-04-01	412 - Grassed Waterway - simple design	300	Lin. Feet	43.14	$5,625	$13.04
DGS-23-02-02	412 - Grassed Waterway - complex 20' design	1000	Lin. Feet	52.06	$8,450	$16.23
DGS-23-02-03	412 - Grassed Waterway - simple design	250	Lin. Feet	21.25	$5,513	$25.94
DGS-23-03-01	638 - Water & Sediment Control Basin(wide)	1	Each	25.5	$13,325	$52.25
DGS-23-01-02	638 - Water & Sediment Control Basin(wide)	1	Each	5.78	$13,325	$230.54
DGS-23-01-01	638 - Water & Sediment Control Basin(wide)	1	Each	2.23	$13,325	$597.53



Source: (Aerial) Dakota County 2015

Douglas Township, Section 23

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 24

Description:

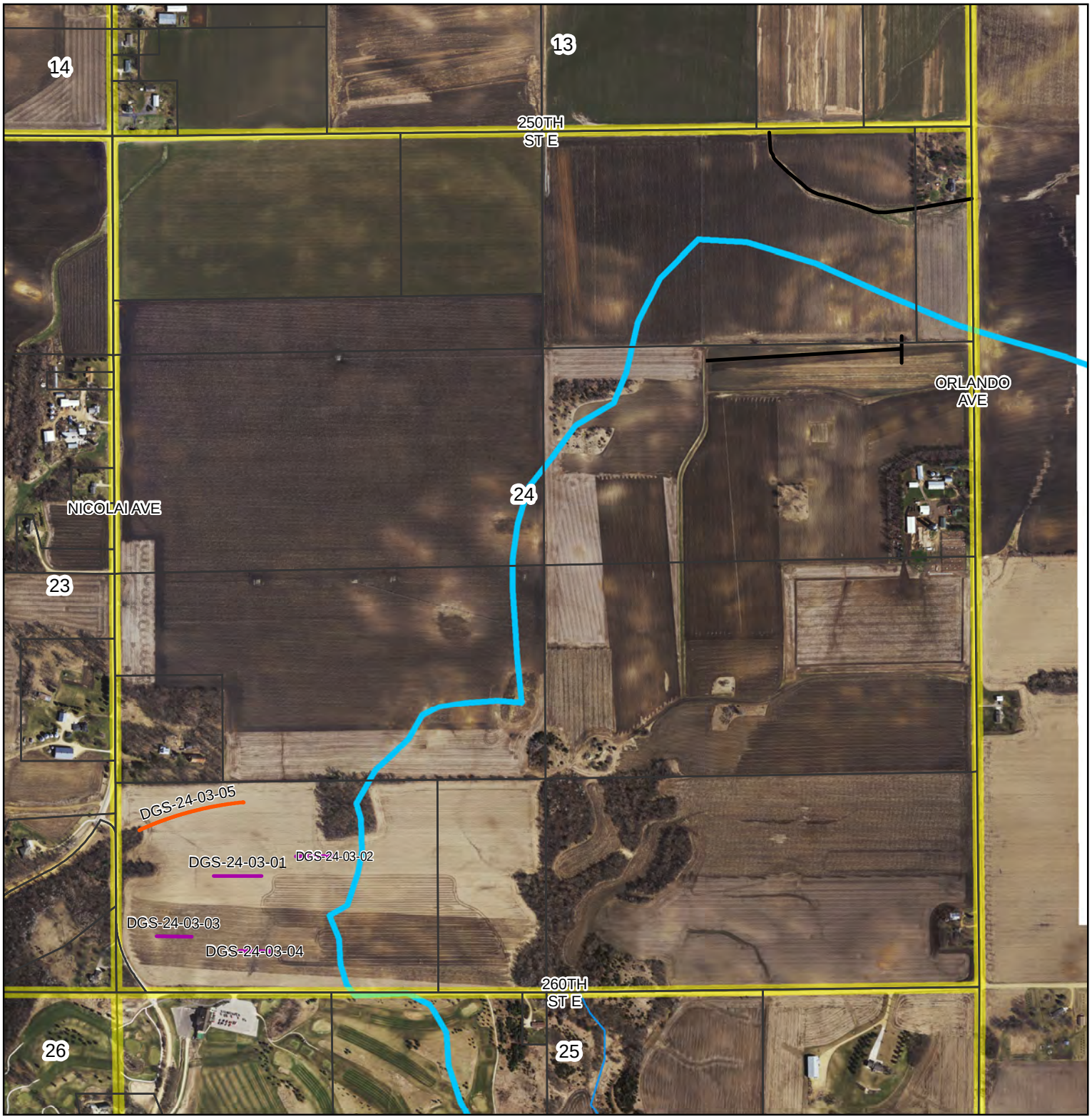
The area of the Trout Brook watershed that lies within Section 24 of Douglas Township is approximately 335.4 acres. This area lies in the northwestern portion of the section and consists primarily of agricultural cropland with small areas of grassland and deciduous trees. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Etter fine sandy loam with slopes of 2% - 6%, Waukegan silt loam with slopes of 0% - 1%, as well as Rockton and Wadena loam with slopes of 0% - 2% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

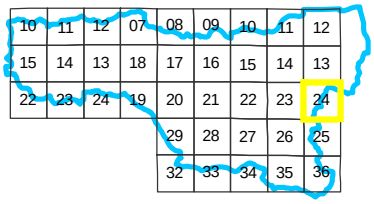
BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-24-03-05	412 - Grassed Waterway - simple design	670	Lin. Feet	99.66	$6,458	$6.48
DGS-24-03-01	638 - Water & Sediment Control Basin(wide)	1	Each	25.5	$13,325	$52.25
DGS-24-03-02	638 - Water & Sediment Control Basin(wide)	1	Each	25.5	$13,325	$52.25
DGS-24-03-03	638 - Water & Sediment Control Basin(narrow)	1	Each	6.38	$6,450	$101.10
DGS-24-03-04	638 - Water & Sediment Control Basin(narrow)	1	Each	6.38	$6,450	$101.10



Source: (Aerial) Dakota County 2015

Douglas Township, Section 24



DAKOTA COUNTY
SOIL & WATER CONSERVATION DISTRICT

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

N

Douglas Township, Section 26

Description:

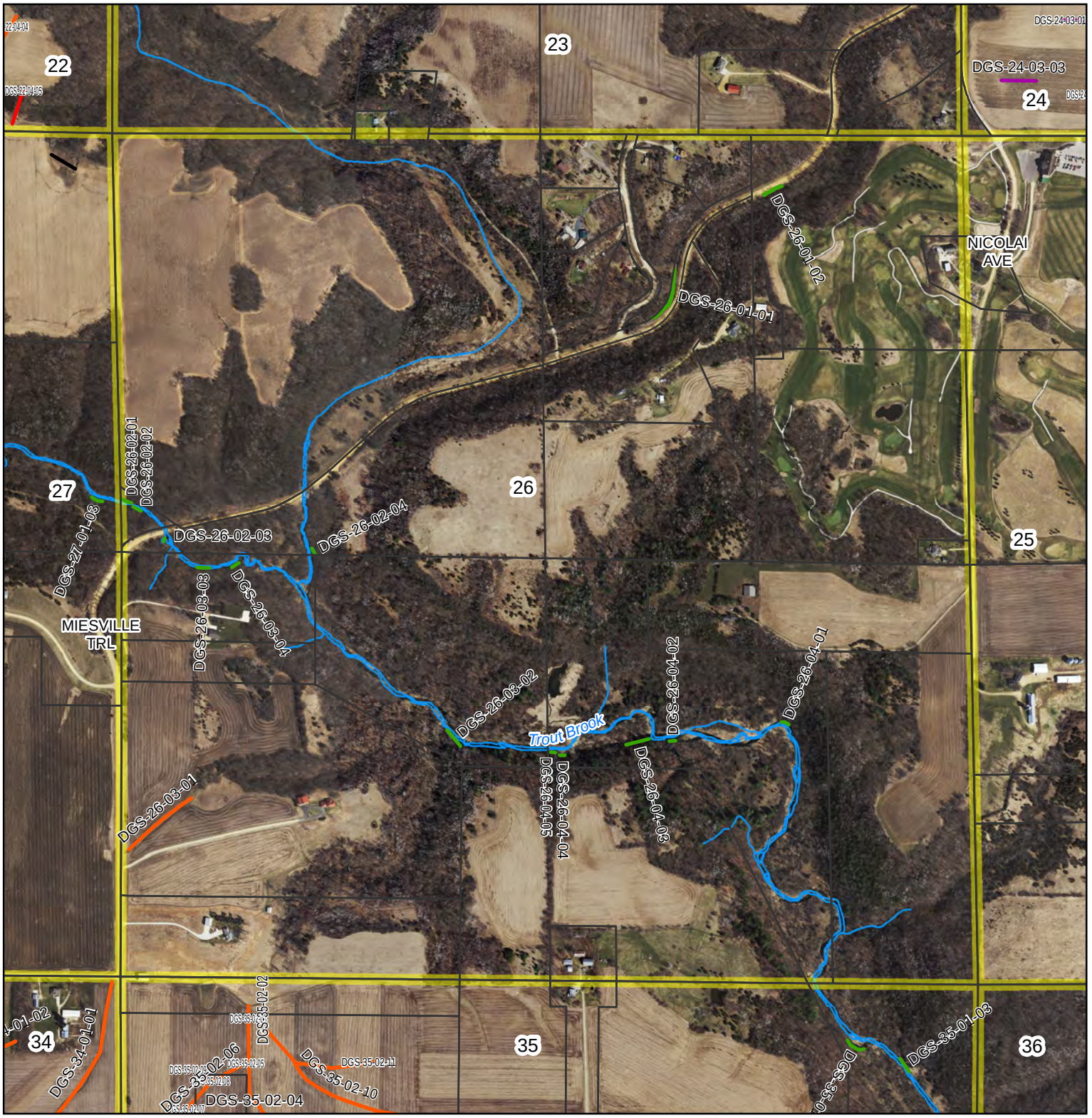
All 640 acres of Douglas Township, Section 26, are within the Trout Brook watershed. The Miesville Ravine Park Reserve covers the majority of the section and consists of mixed deciduous and coniferous forest and wetland in the ravine bottom where Trout Brook flows from the northwest to southeast. The section also contains prairie grassland, managed turf and grassland at a golf course, pasture, and agricultural cropland. Conventional tillage practices are utilized on the majority of the cropland. Frontenac silt loam with slopes of 25% - 40%, Copaston loam with slopes of 6% - 12%, and Kalmarville sandy loam (frequently flooded) are the predominant soils.

Land Management Recommendations:

The primary land use within this section is natural areas and parkland. This section has a small percentage of agricultural land and much of the property is in perennial forest or grassland cover. Land management practices in this section include the management of invasive species and promotion of robust native vegetation. Invasive species, for example buckthorn, can shade out ground layer vegetation, leaving the soil surface vulnerable to erosion and more likely to be a source of pollutants in runoff.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-26-03-01	412 - Grassed Waterway - complex 20' design	500	Lin. Feet	13.02	$7,075	$54.34
DGS-26-01-02	580 - Streambank and Shoreline Protection	125	Lin. Feet	37.19	$20,500	$55.12
DGS-26-01-01	580 - Streambank and Shoreline Protection	350	Lin. Feet	55.78	$34,325	$61.54
DGS-26-02-04	580 - Streambank and Shoreline Protection	40	Lin. Feet	17.6	$16,787	$95.38
DGS-26-02-03	580 - Streambank and Shoreline Protection	10	Lin. Feet	8.93	$8,887	$99.52
DGS-26-04-01	580 - Streambank and Shoreline Protection	30	Lin. Feet	13.2	$14,259	$108.02
DGS-26-03-04	580 - Streambank and Shoreline Protection	50	Lin. Feet	10.63	$14,575	$137.11
DGS-26-04-05	580 - Streambank and Shoreline Protection	30	Lin. Feet	8.25	$11,415	$138.36
DGS-26-04-03	580 - Streambank and Shoreline Protection	150	Lin. Feet	16.5	$25,635	$155.36
DGS-26-04-04	580 - Streambank and Shoreline Protection	20	Lin. Feet	5.5	$9,835	$178.82
DGS-26-02-01	580 - Streambank and Shoreline Protection	25	Lin. Feet	6.38	$11,415	$178.92
DGS-26-02-02	580 - Streambank and Shoreline Protection	25	Lin. Feet	4.25	$9,835	$231.41
DGS-26-04-02	580 - Streambank and Shoreline Protection	100	Lin. Feet	5.5	$12,995	$236.27
DGS-26-03-03	580 - Streambank and Shoreline Protection	75	Lin. Feet	6.38	$16,155	$253.21
DGS-26-03-02	580 - Streambank and Shoreline Protection	125	Lin. Feet	6.88	$22,475	$326.67



Source: (Aerial) Dakota County 2015

Douglas Township, Section 26

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 27

Description:

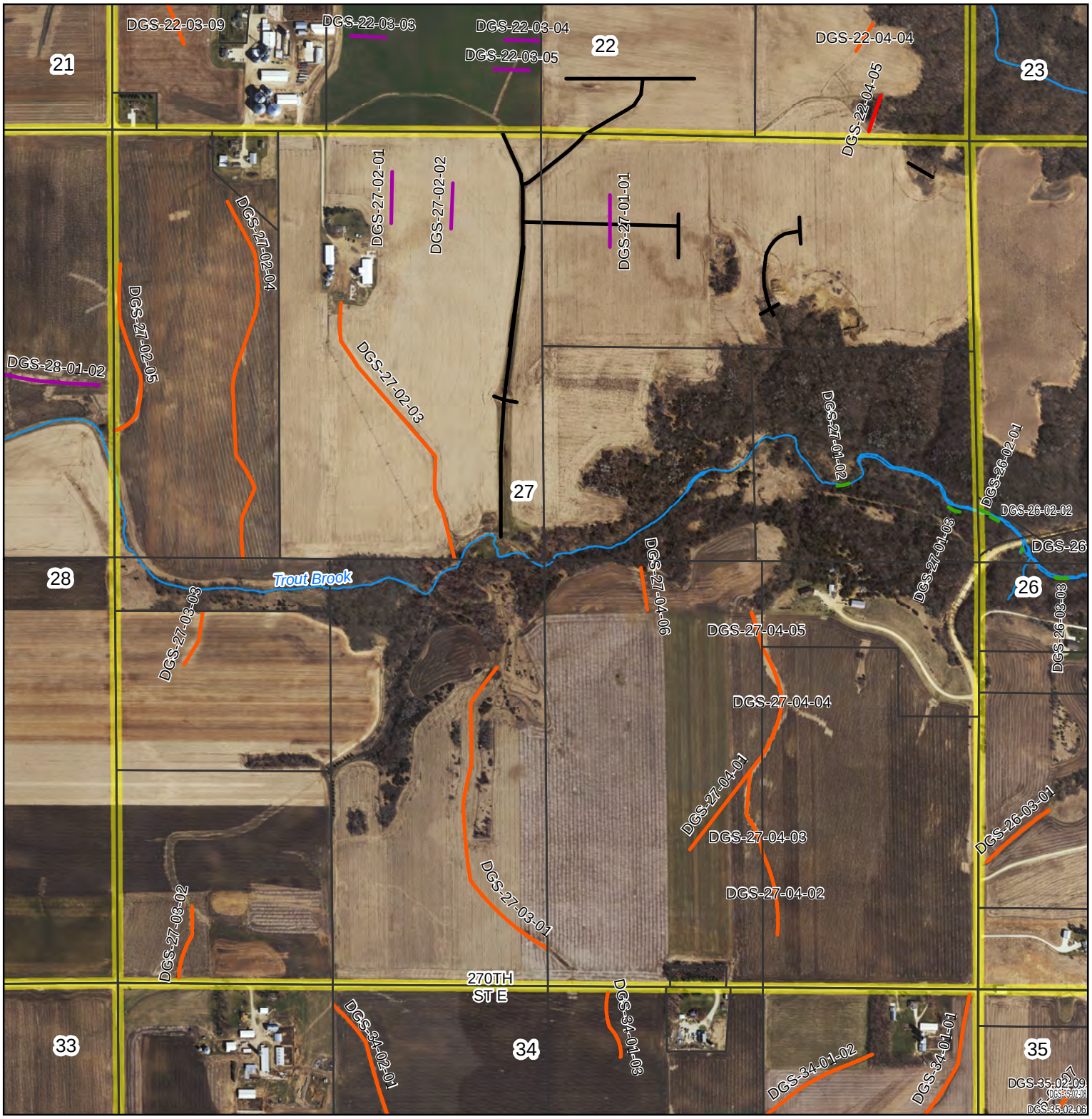
All 640 acres of Douglas Township, Section 27, are within the Trout Brook watershed. The area consists primarily of agricultural cropland with some portions of deciduous forest. The SE ¼ of the NE ¼ of the section is part of the Miesville Ravine Park Reserve and Trout Brook runs through the center of the section from east to west. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Carmi loam with slopes of 2% - 8%, Rockton loam with slopes of 6% - 12%, and Dickinson sandy loam with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is a combination of agriculture, natural areas, and parkland. Land management practices recommended for agricultural portions of this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Much of the natural areas and parkland are in perennial forest or grassland cover and land management practices in this portion include the management of invasive species and promotion of robust native vegetation. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-27-04-04	412 - Grassed Waterway - simple design	700	Lin. Feet	104.13	$6,525	$6.27
DGS-27-02-04	412 - Grassed Waterway - simple design	2300	Lin. Feet	119.74	$10,125	$8.46
DGS-27-02-03	412 - Grassed Waterway - simple design	1800	Lin. Feet	93.71	$9,000	$9.60
DGS-27-03-01	412 - Grassed Waterway - complex 20' design	2000	Lin. Feet	104.13	$11,200	$10.76
DGS-27-04-01	412 - Grassed Waterway - simple design	700	Lin. Feet	52.06	$6,525	$12.53
DGS-27-02-05	412 - Grassed Waterway - simple design	1100	Lin. Feet	57.27	$7,425	$12.96
DGS-27-04-02	412 - Grassed Waterway - simple design	500	Lin. Feet	37.19	$6,075	$16.34
DGS-27-04-03	412 - Grassed Waterway - simple design	500	Lin. Feet	37.16	$6,075	$16.35
DGS-27-04-06	412 - Grassed Waterway - simple design	250	Lin. Feet	13.02	$5,513	$42.34
DGS-27-03-03	412 - Grassed Waterway - complex 20' design	100	Lin. Feet	13.39	$5,975	$44.62
DGS-27-04-05	412 - Grassed Waterway - simple design	225	Lin. Feet	11.71	$5,456	$46.59
DGS-27-03-02	412 - Grassed Waterway - complex 20' design	450	Lin. Feet	6.69	$6,938	$103.70
DGS-27-01-03	580 - Streambank and Shoreline Protection	75	Lin. Feet	22.31	$23,265	$104.28
DGS-27-01-01	638 - Water & Sediment Control Basin(wide)	1	Each	12.75	$13,325	$104.51
DGS-27-02-01	638 - Water & Sediment Control Basin(wide)	1	Each	12.75	$13,325	$104.51
DGS-27-02-02	638 - Water & Sediment Control Basin(wide)	1	Each	12.75	$13,325	$104.51
DGS-27-01-02	580 - Streambank and Shoreline Protection	75	Lin. Feet	19.13	$35,115	$183.56



Source: (Aerial) Dakota County 2015

Douglas Township, Section 27

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 28

Description:

All 640 acres of Douglas Township, Section 28, are within the Trout Brook watershed. The area consists primarily of agricultural cropland. Trout Brook runs through a wetland in the center of the section, flowing west to east. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Port Byron silt loam and Wadena loam with slopes of 2% - 6% as well as Tallula silt loam with slopes of 6% - 12% (eroded) are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-28-01-01	412 - Grassed Waterway - complex 20' design	2100	Lin. Feet	133.88	$11,475	$8.57
DGS-28-02-01	412 - Grassed Waterway - complex 20' design	2400	Lin. Feet	102	$12,300	$12.06
DGS-28-01-02	638 - Water & Sediment Control Basin(narrow)	1	Each	27.5	$6,450	$23.45
DGS-28-02-03	638 - Water & Sediment Control Basin(wide)	1	Each	21.25	$13,325	$62.71
DGS-28-04-01	412 - Grassed Waterway - complex 20' design	1500	Lin. Feet	15.39	$9,825	$63.84
DGS-28-02-02	638 - Water & Sediment Control Basin(wide)	1	Each	10.63	$13,325	$125.35
DGS-28-03-01	412 - Grassed Waterway - simple design	300	Lin. Feet	3.02	$5,625	$186.26
DGS-28-03-02	412 - Grassed Waterway - simple design	250	Lin. Feet	2.57	$5,513	$214.49
DGS-28-01-03	638 - Water & Sediment Control Basin(wide)	1	Each	5.53	$13,325	$240.96
DGS-28-04-02	412 - Grassed Waterway - simple design	500	Lin. Feet	1.6	$6,075	$379.69
DGS-28-04-04	412 - Grassed Waterway - simple design	350	Lin. Feet	1.45	$5,738	$395.69
DGS-28-04-03	412 - Grassed Waterway - simple design	600	Lin. Feet	1.54	$6,300	$409.09

Source: (Aerial) Dakota County 2015

Douglas Township, Section 28

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Douglas Township, Section 29

Description:

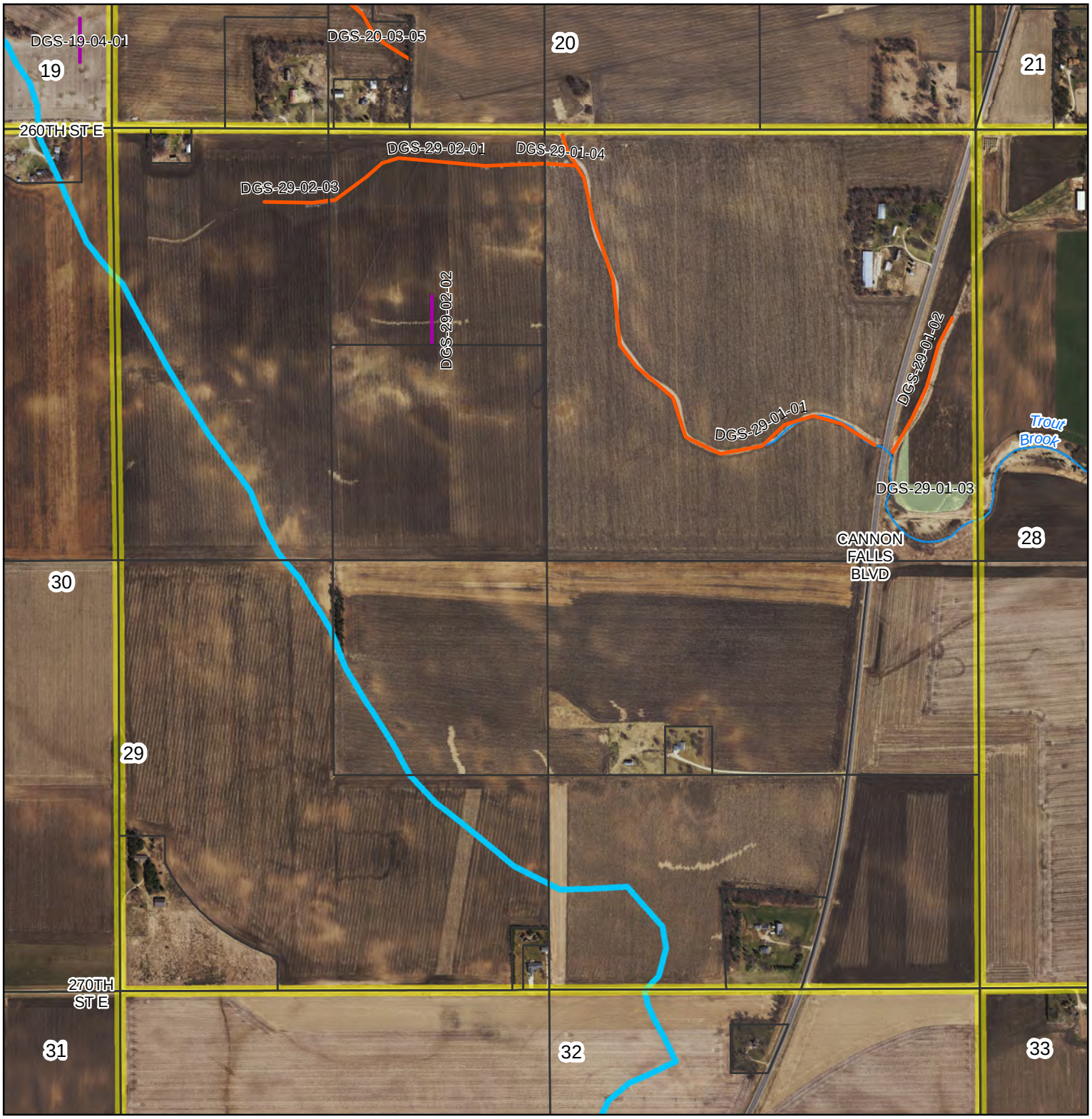
The area of the Trout Brook watershed that lies within Section 29 of Douglas Township is approximately 496.6 acres. This area covers the northeastern portion of the section and consists primarily of agricultural cropland. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Waukegan silt loam with slopes of 1% - 6% as well as Port Byron silt loam and Tallula silt loam with slopes of 2% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-29-01-01	412 - Grassed Waterway - complex 20' design	3400	Lin. Feet	578	$15,050	$2.60
DGS-29-02-01	412 - Grassed Waterway - complex 20' design	1400	Lin. Feet	119	$9,550	$8.03
DGS-29-01-03	393 - Filter Strip	2.2	Acres	9.31	$1,825	$19.60
DGS-29-02-03	412 - Grassed Waterway - complex 20' design	400	Lin. Feet	34	$6,800	$20.00
DGS-29-01-02	412 - Grassed Waterway - complex 20' design	800	Lin. Feet	29.75	$7,900	$26.55
DGS-29-01-04	412 - Grassed Waterway - complex 20' design	200	Lin. Feet	17	$6,250	$36.76
DGS-29-02-02	638 - Water & Sediment Control Basin(narrow)	1	Each	16.97	$6,450	$38.01



Source: (Aerial) Dakota County 2015

Douglas Township, Section 29

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15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

N

Douglas Township, Section 34

Description:

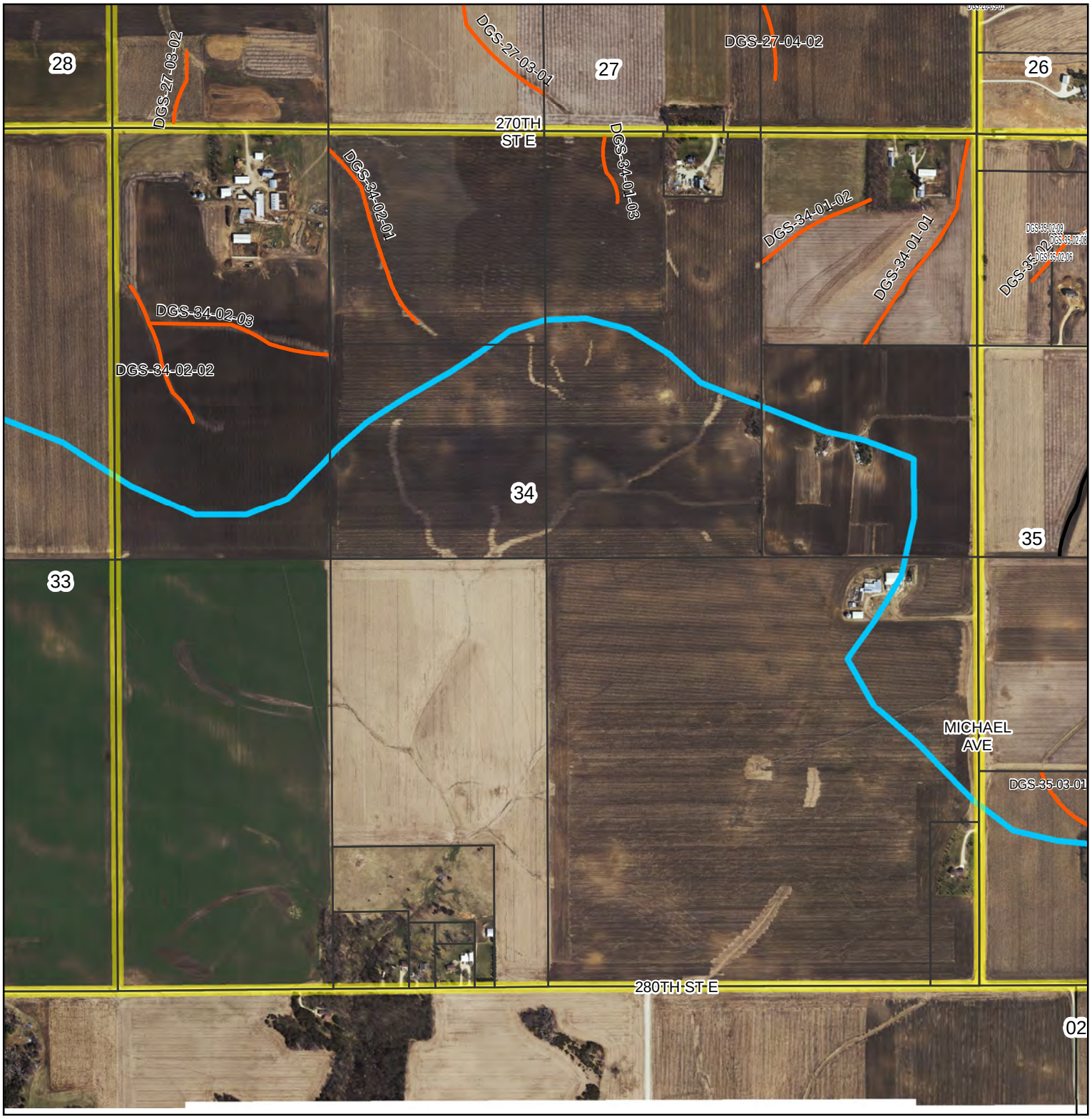
The area of the Trout Brook watershed that lies within Section 34 of Douglas Township is approximately 236.8 acres. This area lies in the northern portion of the section and consists primarily of agricultural cropland. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Port Byron silt loam and Tallula silt loam with slopes of 2% - 6% as well as Waukegan silt loam with slopes of 1% - 6% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is agricultural. Land management practices recommended throughout this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-34-02-03	412 - Grassed Waterway - simple design	1100	Lin. Feet	81.81	$7,425	$9.08
DGS-34-01-01	412 - Grassed Waterway - complex 20' design	1400	Lin. Feet	104.13	$9,550	$9.17
DGS-34-01-02	412 - Grassed Waterway - complex 20' design	750	Lin. Feet	25.27	$7,763	$30.72
DGS-34-01-03	412 - Grassed Waterway - simple design	400	Lin. Feet	17	$5,850	$34.41
DGS-34-02-01	412 - Grassed Waterway - simple design	1200	Lin. Feet	17.85	$7,650	$42.86
DGS-34-02-02	412 - Grassed Waterway - simple design	900	Lin. Feet	8.51	$6,975	$81.96



Source: (Aerial) Dakota County 2015

Douglas Township, Section 34

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15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

Douglas Township, Section 35

Description:

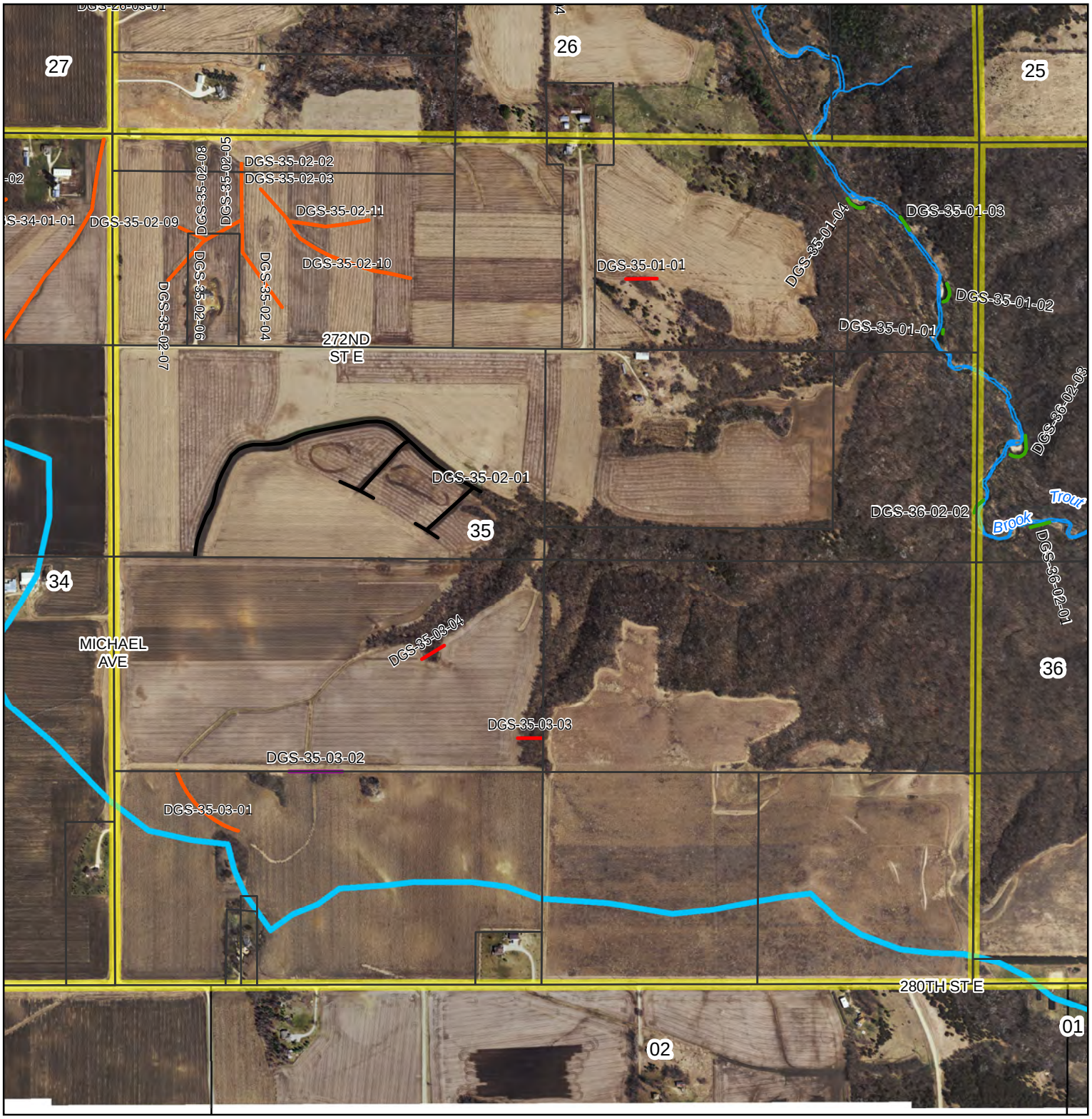
The area of the Trout Brook watershed that lies within Section 35 of Douglas Township is approximately 563.7 acres. This area encompasses all but the southern edge of the section and consists primarily of agricultural cropland, prairie grassland, deciduous forest, and wetland in the ravine bottom where Trout Brook flows through the southwest corner of the section. The eastern portion of the section lies within the Miesville Ravine Park Reserve. Conventional tillage practices are utilized on the majority of the cropland with some conservation tillage farming practices utilized on steeper slopes. Port Byron silt loam with slopes of 2% - 6%, Frontenac silt loam with slopes of 25% - 40%, and Rockton loam with slopes of 2% - 12% are the predominant soils.

Land Management Recommendations:

The primary land use within this section is a combination of agriculture, natural areas, and parkland. Land management practices recommended for agricultural portions of this section include proper use of cover crops, appropriate nutrient management, irrigation water management, conservation crop rotation, and conservation tillage. Much of the natural areas and parkland are in perennial forest or grassland cover and land management practices in this portion include the management of invasive species and promotion of robust native vegetation. Although the land management practices were not analyzed for pollutant reduction, it is likely that they have a greater benefit than structural practices within the watershed due to their ability to prevent the transport of sediment and other nutrients.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-35-02-01	342 - Critical Area Planting (Native)	0.1	Acres	28.88	$1,450	$5.02
DGS-35-02-10	412 - Grassed Waterway - simple design	1100	Lin. Feet	46.75	$7,425	$15.88
DGS-35-03-03	410 - Grade Stabilization Structure 10-100ac	1	Each	114.75	$21,075	$18.37
DGS-35-02-04	412 - Grassed Waterway - simple design	800	Lin. Feet	34	$6,750	$19.85
DGS-35-03-04	410 - Grade Stabilization Structure 10-100ac	1	Each	95.63	$21,075	$22.04
DGS-35-02-11	412 - Grassed Waterway - simple design	500	Lin. Feet	21.25	$6,075	$28.59
DGS-35-03-01	412 - Grassed Waterway - simple design	500	Lin. Feet	13.02	$6,075	$46.66
DGS-35-02-06	412 - Grassed Waterway - simple design	240	Lin. Feet	10.2	$5,490	$53.82
DGS-35-02-07	412 - Grassed Waterway - simple design	180	Lin. Feet	7.65	$5,355	$70.00
DGS-35-02-05	412 - Grassed Waterway - simple design	170	Lin. Feet	7.23	$5,333	$73.76
DGS-35-03-02	638 - Water & Sediment Control Basin(narrow)	1	Each	7.81	$6,450	$82.59
DGS-35-02-03	412 - Grassed Waterway - simple design	100	Lin. Feet	4.25	$5,175	$121.76
DGS-35-02-08	412 - Grassed Waterway - simple design	100	Lin. Feet	4.25	$5,175	$121.76
DGS-35-01-03	580 - Streambank and Shoreline Protection	125	Lin. Feet	27.5	$38,275	$139.18
DGS-35-02-09	412 - Grassed Waterway - simple design	80	Lin. Feet	3.4	$5,130	$150.88
DGS-35-01-01	410 - Grade Stabilization Structure 0-10ac	1	Each	5.21	$13,450	$258.16
DGS-35-01-04	580 - Streambank and Shoreline Protection	100	Lin. Feet	11	$31,955	$290.50
DGS-35-01-05	580 - Streambank and Shoreline Protection	200	Lin. Feet	11	$31,955	$290.50
DGS-35-02-02	412 - Grassed Waterway - simple design	50	Lin. Feet	0.74	$5,063	$684.12
DGS-35-01-02	580 - Streambank and Shoreline Protection	25	Lin. Feet	1.38	$9,835	$712.68



Source: (Aerial) Dakota County 2015

Douglas Township, Section 35

10	11	12	07	08	09	10	11	12
15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

N

Douglas Township, Section 36

Description:

The area of the Trout Brook watershed that lies within Section 36 of Douglas Township is approximately 369.6 acres. This area lies in the western portion of the section, almost entirely within the Miesville Ravine Park Reserve. It consists primarily of prairie grassland, deciduous forest, and wetland in the ravine bottom where Trout Brook flows through the southwest corner of the section. Brodale-Rock outcrop complex with slopes of 18% - 45%, Frontenac silt loam with slopes of 25% - 40%, and Rockton loam with slopes of 2% - 6% are the predominant soils.

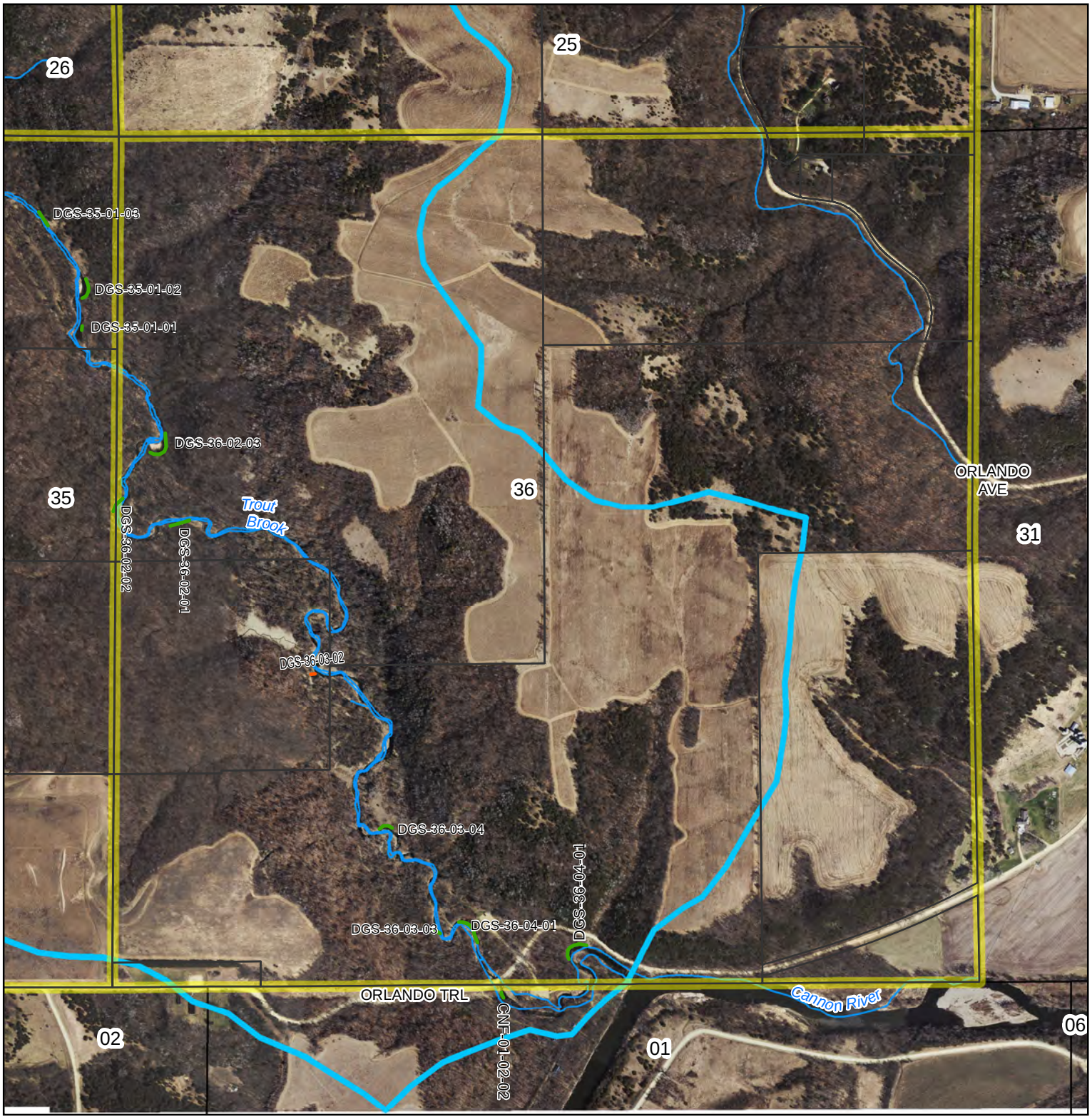
Land Management Recommendations:

The primary land use within this section is natural areas and parkland. This section has a small percentage of agricultural land and much of the property is in perennial forest or grassland cover. Land management practices in this section include the management of invasive species and promotion of robust native vegetation. Invasive species, for example buckthorn, can shade out ground layer vegetation, leaving the soil surface vulnerable to erosion and more likely to be a source of pollutants in runoff.

BMP Cost Benefit Analysis:

Feature ID (Township-section-1/4-#)	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Project Cost	Cost/ton/yr of Sediment Reduction
DGS-36-03-02	412 - Grassed Waterway - simple design	50	Lin. Feet	103.13	$5,063	$4.91
DGS-36-03-01	580 - Streambank and Shoreline Protection	100	Lin. Feet	136	$31,955	$23.50
DGS-36-04-01	580 - Streambank and Shoreline Protection	140	Lin. Feet	53.9	$37,643	$69.84
DGS-36-02-02	580 - Streambank and Shoreline Protection	100	Lin. Feet	39.6	$44,595	$112.61
CNF-01-02-02*	580 - Streambank and Shoreline Protection	40	Lin. Feet	11	$12,995	$118.14
DGS-36-03-03	580 - Streambank and Shoreline Protection	30	Lin. Feet	8.25	$11,415	$138.36
DGS-36-02-01	580 - Streambank and Shoreline Protection	120	Lin. Feet	13.2	$21,843	$165.48
DGS-36-03-04	580 - Streambank and Shoreline Protection	25	Lin. Feet	5.5	$9,835	$178.82
DGS-36-02-03	580 - Streambank and Shoreline Protection	325	Lin. Feet	31.28	$78,565	$251.17

*CNF-01-02-02 is located in Goodhue County just outside of Douglas Section 36.



Source: (Aerial) Dakota County 2015

Douglas Township, Section 36

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15	14	13	18	17	16	15	14	13
22	23	24	19	20	21	22	23	24
				29	28	27	26	25
				32	33	34	35	36

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

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Appendix

Cost estimates were developed based upon the type of BMP and the historical cost of installation and management in Dakota County between 2010 and 2015. The following table provides a breakdown of the estimates used for each BMP:

BMP	Size of BMP (user entered)	Units	Construction Cost per Unit	Design and Project Management	Total BMP Cost (example based on user entered value)
340- Cover Crop	100	Acres	$30	$1,425	$4,425
342 - Critical Area Planting (Native Grasses)	10	Acres	$250	$1,425	$3,925
393- Filter Strip	10	Acres	$250	$1,275	$3,775
410- Grade Stabilization Structure 0-10ac	1	Each	$8,500	$4,950	$13,450
410- Grade Stabilization Structure 10-100ac	1	Each	$15,000	$6,075	$21,075
410- Grade Stabilization Structure100-250ac	1	Each	$25,000	$7,200	$32,200
410- Grade Stabilization Structure250+ ac	1	Each	$100,000	$11,700	$111,700
412- Grassed Waterway - simple design	500	Lin. Ft.	$2.25	$4,950	$6,075
412- Grassed Waterway - complex 20' design	500	Lin. Ft.	$2.75	$5,700	$7,075
412- Grassed Waterway- complex 30' design	500	Lin. Ft.	$3.25	$6,450	$8,075
580- Streambank and Shoreline Protection	500	Sq. Ft.	$10	$6,675	$11,675
638-Water & Sediment Control Basin(narrow)	1	Each	$1,500	$4,950	$6,450
638-Water & Sediment Control Basin(wide)	1	Each	$6,500	$6,825	$13,325

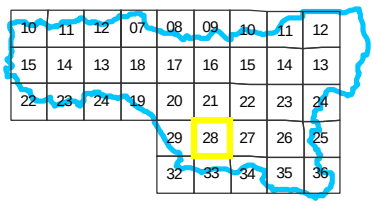
Trout Brook SWA Updates

The collection of projects listed in this report is updated on a regular basis as new projects or new technologies are identified. These projects have been identified since the initial analysis and are included in the maps on the following pages:

Feature ID (Township-section-1/4-#	BMP/Project Name	Size	Units	Sediment Reduction (ton/yr)	Estimated Construction Cost	Cost/ton of Sediment Reduction
DGS-28-04-05	638 - Water and Sediment Control Basin	1	Each	64.46	$3,400	$5.27
HAM-14-03-03	393 - Filter Strip	1.2	Acres	20.29	$3,200	$15.77
HAM-14-03-04	393 - Filter Strip	1.0	Acres	16.90	$2,100	$12.42
HAM-14-03-05	412- Grassed Waterway	1,250	Lin. Feet	124.85	$12,000	$9.61
DGS-13-04-01	412- Grassed Waterway	1,650	Lin. Feet	28.78	$4,200	$14.59
HAM-13-02-05	412- Grassed Waterway	1,392	Lin. Feet	8.51	$5,800	$68.16
DGS-19-02-04	393 - Filter Strip	4.5	Acres	4.03	$11,800	$292.80
DGS-22-01-05	410 - Grade Stabilization Structure	1	Each	10.20	$20,400	$200.00
DGS-16-01-02	638 - Water and Sediment Control Basin	1	Each	12.75	$6,000	$47.06
DGS-16-01-03	638 - Water and Sediment Control Basin	1	Each	8.50	$5,500	$64.71

Source: (Aerial) Dakota County 2015

Douglas Township, Section 28



Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Source: (Aerial) Dakota County 2015

Hampton Township, Section 14

09	10	11	12	07	08	09	10	11	12
16	15	14	13	18	17	16	15	14	13
	22	23	24	19	20	21	22	23	24
				30	29	28	27	26	25
					32	33	34	35	36
								02	01

Potential Practices

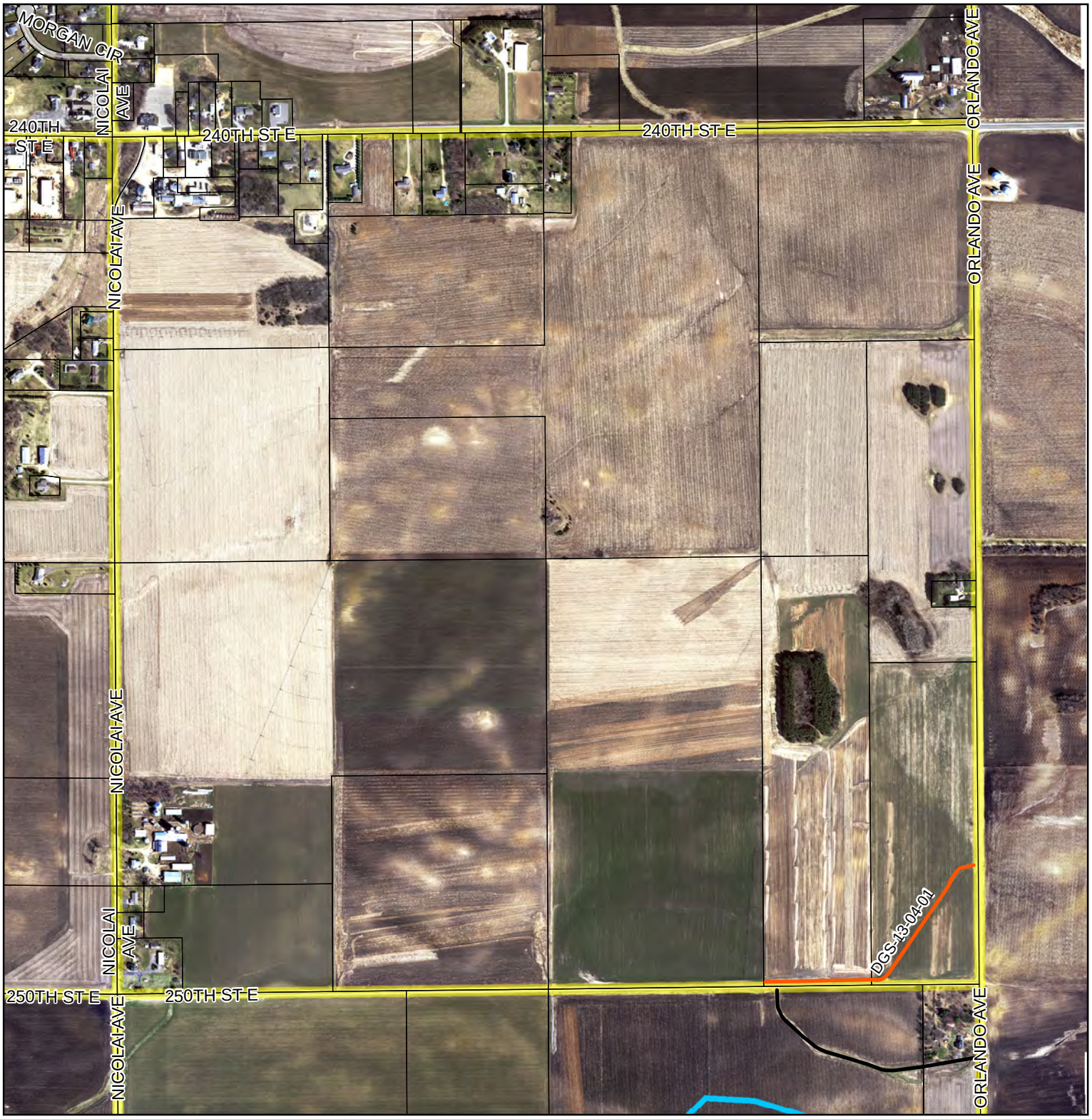
- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

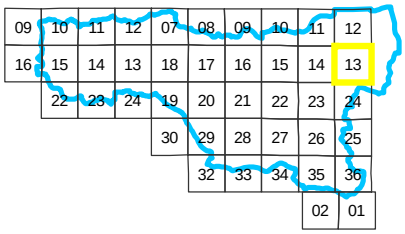
0 400 800 1,600 Feet

N



Source: (Aerial) Dakota County 2015

Douglas Township, Section 13



Potential Practices

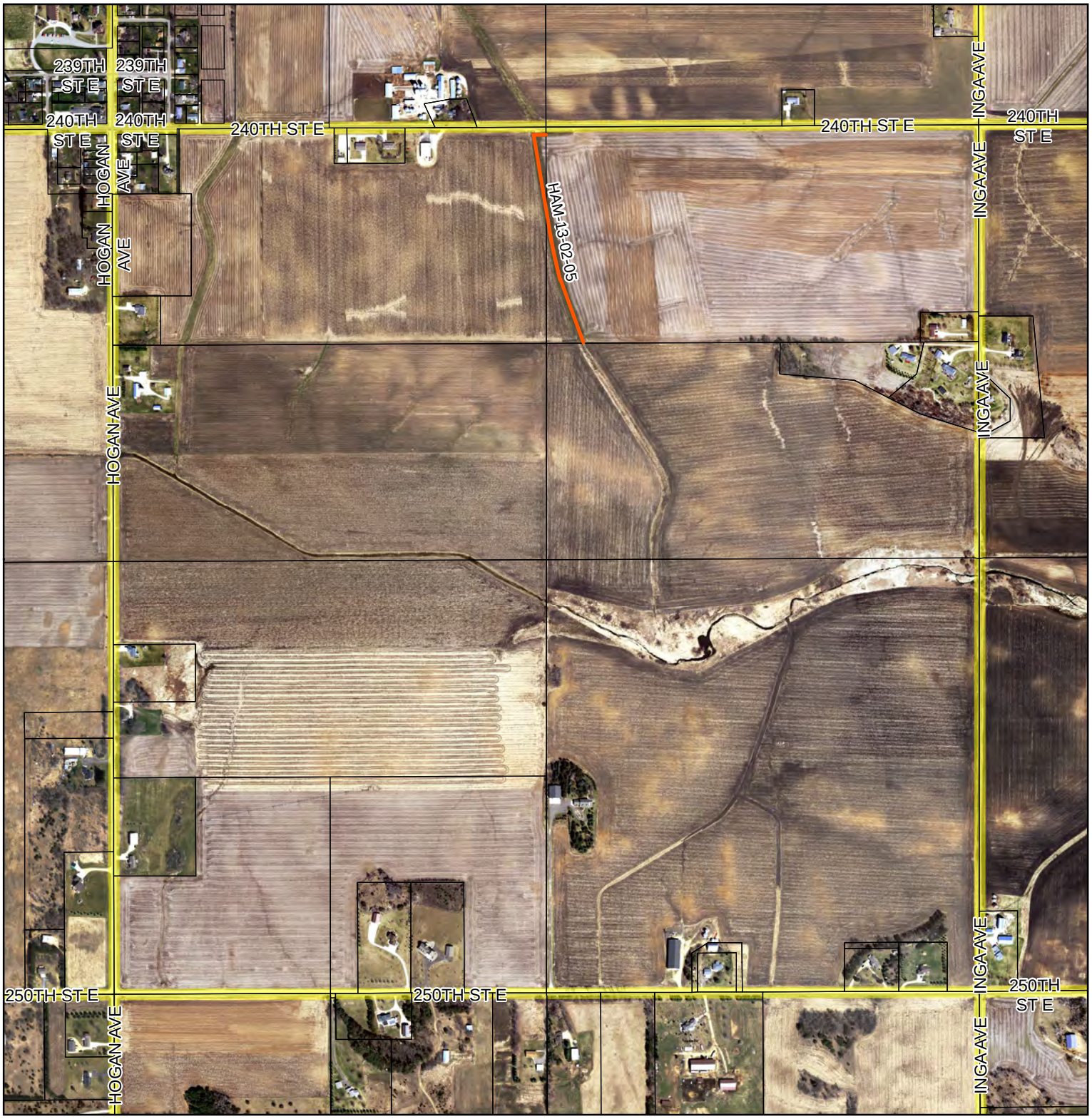
- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY
SOIL & WATER
CONSERVATION DISTRICT

0 400 800 1,600 Feet

N



Source: (Aerial) Dakota County 2015

Hampton Township, Section 13

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	22	23	24	19	20	21	22	23	24
				30	29	28	27	26	25
					32	33	34	35	36
								02	01

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Source: (Aerial) Dakota County 2015

Douglas Township, Section 19

09	10	11	12	07	08	09	10	11	12
16	15	14	13	18	17	16	15	14	13
	22	23	24	19	20	21	22	23	24
				30	29	28	27	26	25
					32	33	34	35	36
								02	01

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

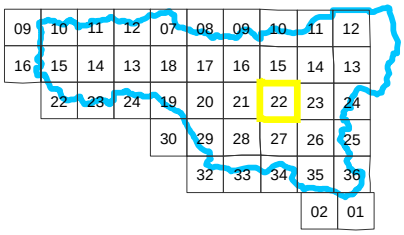
- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

0 400 800 1,600 Feet

N

Source: (Aerial) Dakota County 2015

Douglas Township, Section 22



Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

N

Source: (Aerial) Dakota County 2015

Douglas Township, Section 16

09	10	11	12	07	08	09	10	11	12
16	15	14	13	18	17	16	15	14	13
	22	23	24	19	20	21	22	23	24
				30	29	28	27	26	25
					32	33	34	35	36
								02	01

Potential Practices

- Stream Stabilization
- Grade Stabilization
- Water and Sediment Control Basin
- Waterway
- Filter Strip / Critical Area Planting

- Existing SWCD Practices
- Existing SWCD Filter Strips
- Trout Brook Watershed

DAKOTA COUNTY SOIL & WATER CONSERVATION DISTRICT

0 400 800 1,600 Feet

N