Partially Drained Wetland Assessment

Prepared for the

Comfort Lake Forest Lake Watershed District

By the

Chisago Soil & Water Conservation District

September 2014

CLEAN WATER LAND & LEGACY AMENDMENT

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Executive Summary

A vast majority of Minnesota's wetlands have been altered by human activity. In most cases, especially in agricultural areas, wetlands have been ditched and partially drained to increase farmable land or pasture area. With the loss of these wetlands, their benefits are also lost. Wetlands are nature's filtration system for surface water. Runoff water flows from upland through streams and often passes through wetlands along the way. The wetlands help slow water down, reducing the likelihood of soil erosion. Plants in the wetland, and pooling time, reduce the amount of nitrogen and phosphorus in the water. Phosphorus is a key nutrient in algal blooms in lakes.

Most partially drained wetlands were drained by cutting a ditch through the wetland to an outlet. To restore the wetland to its pre-drainage hydrology, this ditch must be plugged. It can be a relatively cost-effective way to reduce the amount of phosphorus reaching a lake.

The Comfort Lake Forest Lake Watershed District (CLFLWD) has long known there are many partially drained wetlands within its boundary. The CLFLWD has also learned that these partially drained wetlands are an important source of phosphorus discharge to surface waters through studies done by Emmons and Oliver Resources (EOR) on degraded wetlands in the Forest Lake area (for more information, contact EOR or CLFLWD). The CLFLWD believes there is an opportunity to reduce phosphorus export from these partially drained wetlands by restoring them to their original hydrology. Many of these wetlands that were partially drained for livestock pastures could be restored since many of these pastures are no longer used.

Although it was known that partially drained wetlands were an opportunity, there was no good way to know which wetlands should be targeted for restoration with available funding. This assessment provides the missing link that allows the watershed district to target those partially drained wetlands that will provide the most phosphorus reduction for the least amount of money. With this assessment, the watershed district can confidently approach landowners with cost share and begin restoring the identified wetlands.

This assessment identifies the top 24 wetland groups that are currently partially drained and classified as a Type 1 or 2 wetland. When 2 or more small wetlands were close together and likely to be restored in the same project, they were identified as a "wetland group" with the same identification number and a letter modifier ("a", "b", etc). Each wetland has been altered, usually by a drainage ditch. The wetlands are identified as Type 1 or 2 by the Circular 39 system, meaning the wetland is a seasonally flooded basin or a wet meadow. Most of them have severely degraded vegetation lacking natives and dominated by non-native invasive species. Some drained Type 1 or 2 wetlands were thrown out of this assessment due to the large number of landowners, inability to alter water level due to adjacent roadways or buildings, or other similar factors that make a restoration unlikely.

This report looks at the top 24 wetland groups and ranks them according to the lowest cost per pound of phosphorus reduction. In depth information is provided for each of these identified wetlands.

This assessment and report was funded through a Clean Water Fund (CWF) grant through the Clean Water, Land and Legacy Amendment, awarded to the Comfort Lake Forest Lake Watershed District (CLFLWD). The CLFLWD sub-contracted the Chisago Soil & Water Conservation District to complete the assessment and report, with review from Emmons and Oliver Resources (EOR). The CWF grant required a 25% match, which was provided by the CLFLWD.

Project Methods

The first step of this assessment was to gather information in GIS. The assessment area covers a portion of two counties, Chisago and Washington. Data from each county had to be acquired. The GIS layers that were included in the project are the NWI (National Wetland Inventory), MLCCS (Minnesota Land Cover Classification System), soils, topography, hillshade, DEM (Digital Elevation Model), parcel data, and ditches and culvert information where available. Several years of aerial photography were used when available, including LiDAR (2007) and County-acquired photography.

Once all of these layers were added into a project in GIS, the initial assessment was started by identifying all wetlands that were known to be partially drained. To determine if a wetland was partially drained, the NWI modifier code of "d" and the MLCCS modifier code of "drained" were extremely helpful. Beyond these layers, a visual inspection of wetlands using DEMs, hillshade, ditch, culverts, and streams layers was conducted. Any wetlands that had visual evidence of being partially drained were noted.

The field of wetlands was further reduced by identifying which are Type 1 or Type 2. Type 1 wetlands are seasonally flooded basins or floodplains. Vegetation varies according to the season and the amount of flooding. Type 2 wetlands are wet meadows. The soil is without standing water during most of the growing season, but is saturated below the surface. Vegetation includes grasses, sedges, rushes, and various broad-leaved plants. When Type 1 and Type 2 wetlands have been disturbed, the vegetation often is dominated by the non-native invasive grass Reed Canary Grass (*Phalaris arundinacea).*

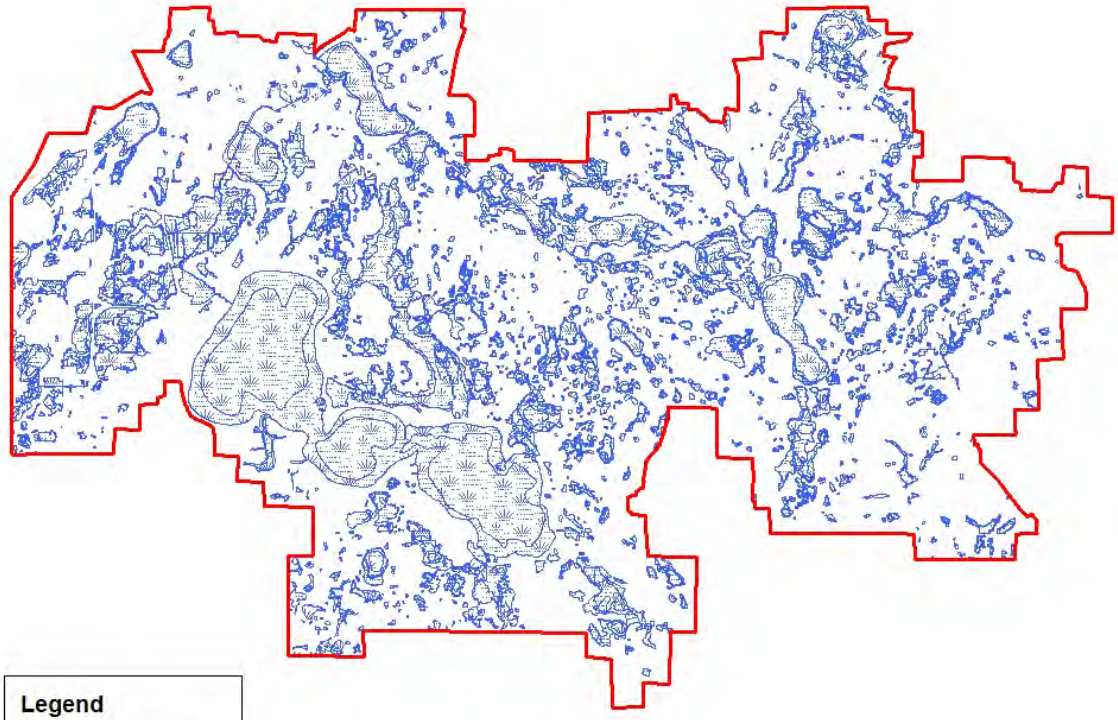
Next, the partially drained Type 1 or 2 wetlands were visually assessed to rule out wetlands that would not be suitable for restoration due to a large number of landowners or their position next to roadways. The goal was to identify the top 24 wetland groups for restoration potential for further investigation. To narrow down the remaining field of eligible wetlands to 24, SWCD staff focused on subwatershed loading, soils, hydrography, and hydrologic connectivity.

The top 24 wetland groups were then visited where land owners gave permission to access the property. Those wetlands that were not visited in the field were reviewed aerially or from a public road or property. In the field, a field assessment sheet was used to record information including existing conditions, vegetation present, inlet and outlet conditions, along with other pertinent field data.

Additional GIS work was conducted on these top 24 wetland groups to determine the watershed area of each wetland and the size of the wetland itself. When possible, dimensions of the drainage ditch channel were taken in the field. This information was sent to MM Engineering, LLC, for determination of what type of structure or Best Management Practice (BMP) would best fit the situation to restore the wetland, along with approximate cost of installation.

To determine an approximate pollution reduction value of restoring each wetland, a Pondnet calculator developed by Bruce Wilson, EOR, was used. Inputs for this calculator include land cover, watershed area, wetland area, and depth of pool. The calculator gives an output of Total Phosphorus removed by the wetland in pounds per year.

Comfort Lake Forest Lake Watershed District-All Wetlands

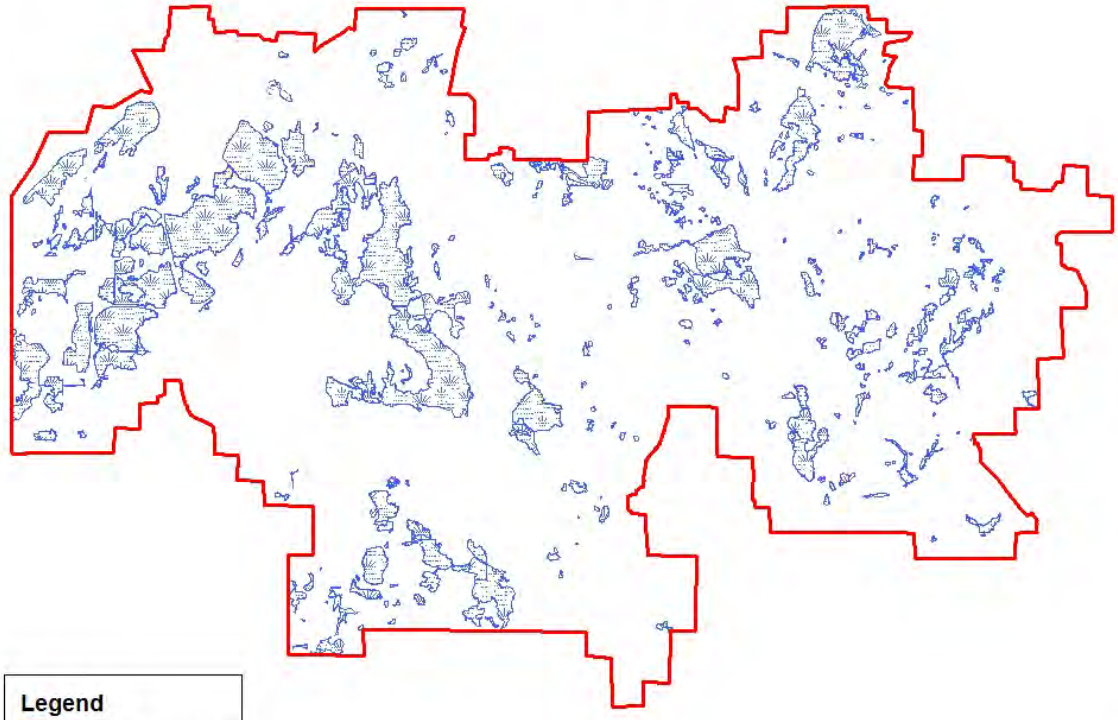


Legend
- NWI Wetlands
- CLFLWD Boundary

0 1.25 2.5 5 Miles

Comfort Lake Forest Lake Watershed District-Drained Wetlands

As indicated by MLCCS, NWI, and visual inspection

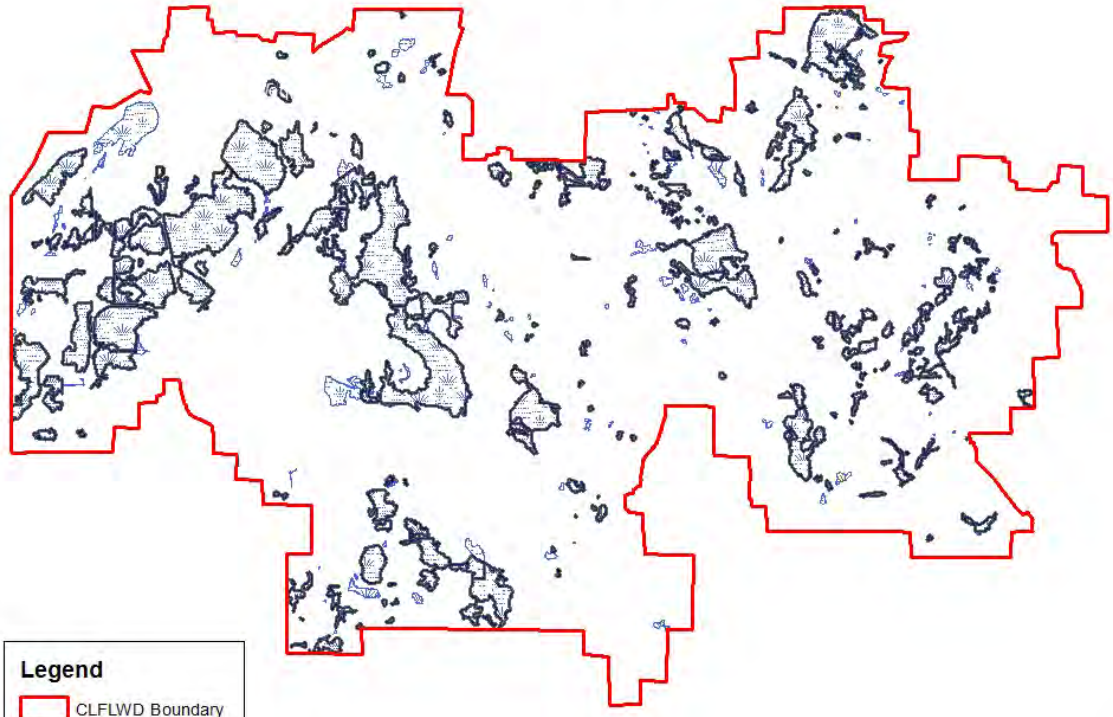


Legend
- CLFLWD Boundary
- Drained Wetlands

0 1.25 2.5 5 Miles

Comfort Lake Forest Lake Watershed District-Drained Type 1 or 2 Wetlands

As indicated by MLCCS, NWI, and visual inspection



Legend

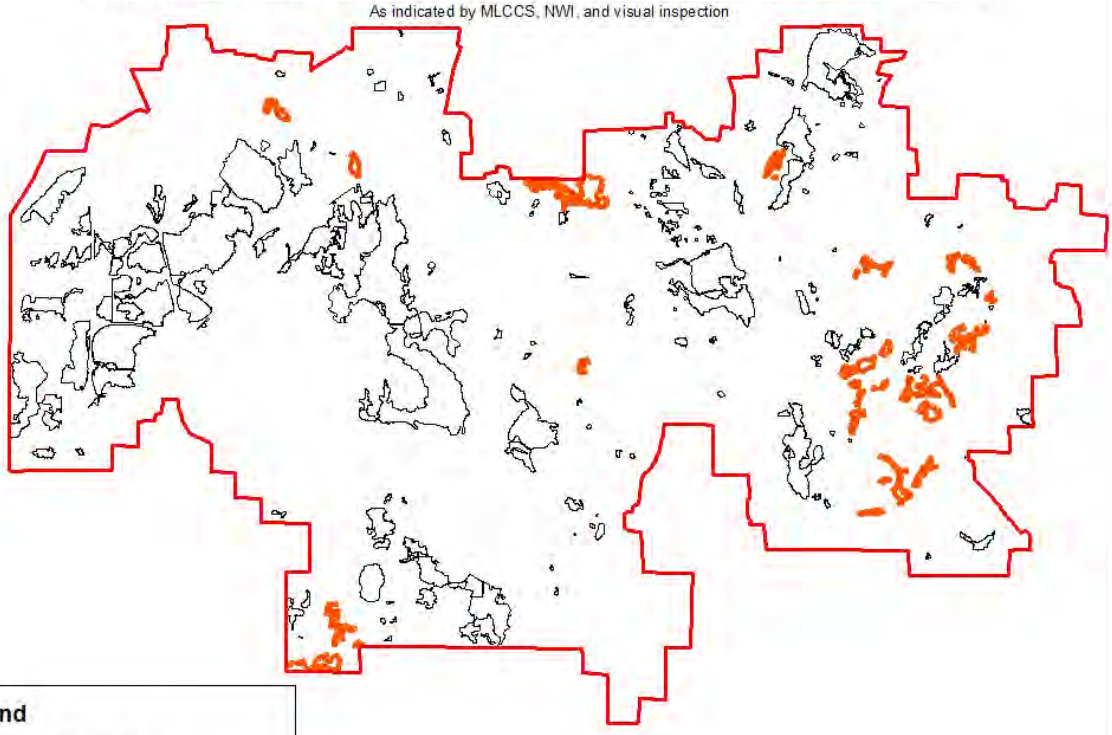
- CLFLWD Boundary
- Drained Wetlands
- Drained Type 1 or 2

0 1.25 2.5 5 Miles

N

Comfort Lake Forest Lake Watershed District-Drained Type 1 or 2 Wetlands

As indicated by MLCCS, NWI, and visual inspection



Legend

- CLFLWD Boundary

Potentially Restorable Wetlands

- Top 25
- Drained Type 1 or 2

0 1.25 2.5 5 Miles

N

Final Wetland Ranking

The top 24 wetland groups were given a final ranking based on the potential pollution reduction and the cost of the proposed practice. From these two items, an approximate cost per pound of Total Phosphorus reduction can be determined and used to rank the projects. The project with the most reduction for the least cost per pound is ranked as number 1.

Below are two ranking tables. Table 1 shows the individual wetlands ranked by cost/lb of Total Phosphorus. Some of the wetlands are actually a group of individual wetlands that are connected by drainage ditches and would require multiple BMPs for a complete restoration. Table 2 ranks the wetlands by the group, assuming that all BMPs will be installed for the individual wetlands that make up the group. The project profile pages are shown by wetland group.

Table 1. Wetland Ranking by Individual Wetland

Rank	Wetland ID	TP (lb/yr)	Estimated Cost	Cost/Lb TP
1	17	79.72	$1,359.30	$17.05
2	20	128.92	$6,265.20	$48.60
3	18	58.093	$3,507.50	$60.33
4	4b	7.8734	$793.50	$100.78
5	5	15.972	$1,807.80	$113.19
6	4a	31.837	$4,623.00	$145.21
7	12a	23.198	$3,749.00	$161.61
8	9	27.942	$5,262.40	$188.33
9	23b	17.698	$3,519.00	$198.84
10	21	31.515	$6,384.80	$202.60
11	10b	31.13	$6,463.00	$207.61
12	16	4.8844	$1,058.00	$216.61
13	19	18.225	$4,705.80	$258.21
14	10c	15.973	$4,390.70	$274.88
15	22b	6.0429	$1,681.30	$278.23
16	1b	16.43	$5,959.30	$362.71
17	7a	5.5437	$2,057.35	$371.11
18	23a	17.409	$6,658.50	$382.47
19	24	3.5494	$1,914.75	539.46
20	22a	5.8848	$3,255.65	$553.23
21	13	3.6917	$2,120.60	$574.42
22	8B	3.4	$1,986.05	$584.13
23	6b	6.5297	$4,221.65	$646.53
24	7b	3.8463	$2,547.25	$662.26
25	2	2.2157	$2,346.00	$1,058.81
26	14	2.083	$2,210.30	$1,061.11
27	10d	3.8232	$4,443.60	$1,162.27
28	15	1.1488	$1,623.80	$1,413.47
29	11	4.6209	$6,949.45	$1,503.92
30	3a	0.9014	$1,382.30	$1,533.50

31	6a	0.6174	$1,137.35	$1,842.16
32	12b	8.3456	$16,622.10	$1,991.72
33	10a	3.2741	$7,333.55	$2,239.87
34	3b	0.3234	$805.00	$2,489.18
35	1a	0.7076	$1,814.70	$2,564.58
36	8a	0.3954	$1,331.70	$3,367.98

Table 2. Wetland Ranking by Wetland Group

Rank	Wetland ID	TP (lb/yr)	Estimated Cost	Cost/Lb TP	Priority
1	17	79.72	$1,359.30	$17.05	High
2	20	128.92	$6,265.20	$48.60	
3	18	58.093	$3,507.50	$60.33	
4	5	15.972	$1,807.80	$113.19	
5	4	39.7104	$5,416.50	$136.40	
6	9	27.942	$5,262.40	$188.33	
7	21	31.515	$6,384.80	$202.60	
8	16	4.8844	$1,058.00	$216.61	
9	19	18.225	$4,705.80	$258.21	
10	23	35.107	$10,177.50	$289.90	
11	22	11.9277	$4,936.95	$413.91	Medium
12	10	54.2003	$22,630.85	$417.54	
13	1	17.1376	$7,774.00	$453.62	
14	7	9.39	$4,604.60	$490.37	
15	24	3.5494	$1,914.75	$539.46	
16	13	3.6917	$2,120.60	$574.42	
17	12	31.5436	$20,371.10	$645.81	
18	6	7.1471	$5,359.00	$749.81	
19	8	3.7954	$3,317.75	$874.15	
20	2	2.2157	$2,346.00	$1,058.81	Low
21	14	2.083	$2,210.30	$1,061.11	
22	15	1.1488	$1,623.80	$1,413.47	
23	11	4.6209	$6,949.45	$1,503.92	
24	3	1.2248	$2,187.30	$1,785.84	

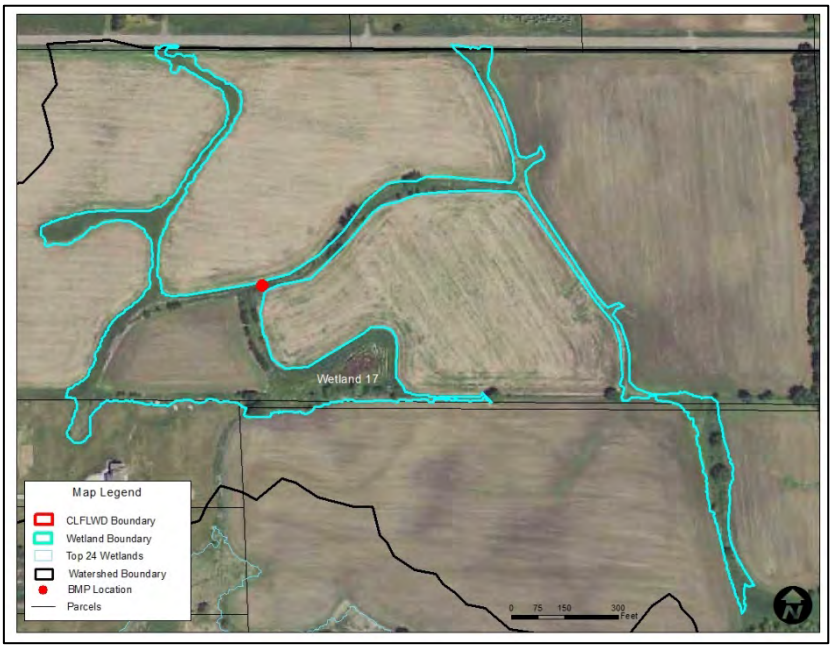
Project Profiles

An individual profile is provided for the top 24 identified drained type 1 or 2 potentially restorable wetland groups. Within each profile, data about the individual wetland(s) is provided. A map is provided showing the wetland and contours.

Ranking #1

Wetland Group #17

Soil Type	132B;123;75
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Unverified
Outlet Type	Ditch channel
Wetland Size	6.5 acres
Pool Elevation	942
Berm Elevation	943.5
Watershed Size	319.0 acres
Watershed to Wetland Ratio	49.1:1
Receives water from	Upland, Wetland 18
Flows to	Wetland 10
Dominant Watershed Land Use	Agricultural
Suggested BMP	Grass spillway
Number of Landowners	2
Priority Ranking	High



Total Phosphorus Reduction

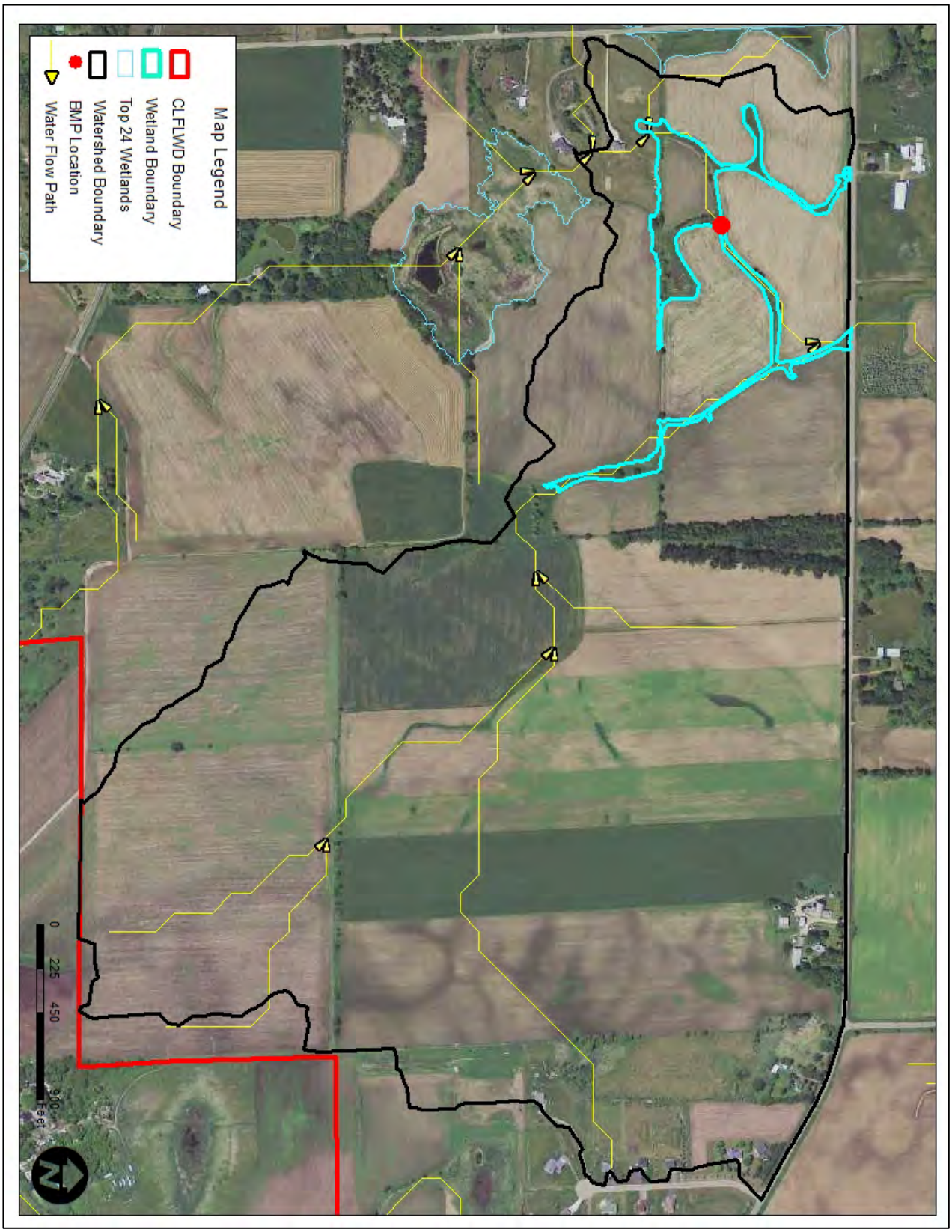
79.72 lb/yr

Engineer's Estimated Cost

$1,359.30

Cost/Lb Total Phosphorus

$17.05/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
225
450
900
Feet
N

Ranking #2

Wetland Group #20

Soil Type	158C; 161;544;456
NWI Wetland Code	PEM1Ad-Seasonally flooded basin
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Culvert
Wetland Size	8.5 acres
Pool Elevation	970
Berm Elevation	972
Watershed Size	547.6 acres
Watershed to Wetland Ratio	64.4:1
Receives water from	Wetland 21, Wetland 19
Flows to	Wetland 16
Dominant Watershed Land Use	Agricultural
Suggested BMP	Weir structure
Number of Landowners	4
Priority Ranking	High

Total Phosphorus Reduction

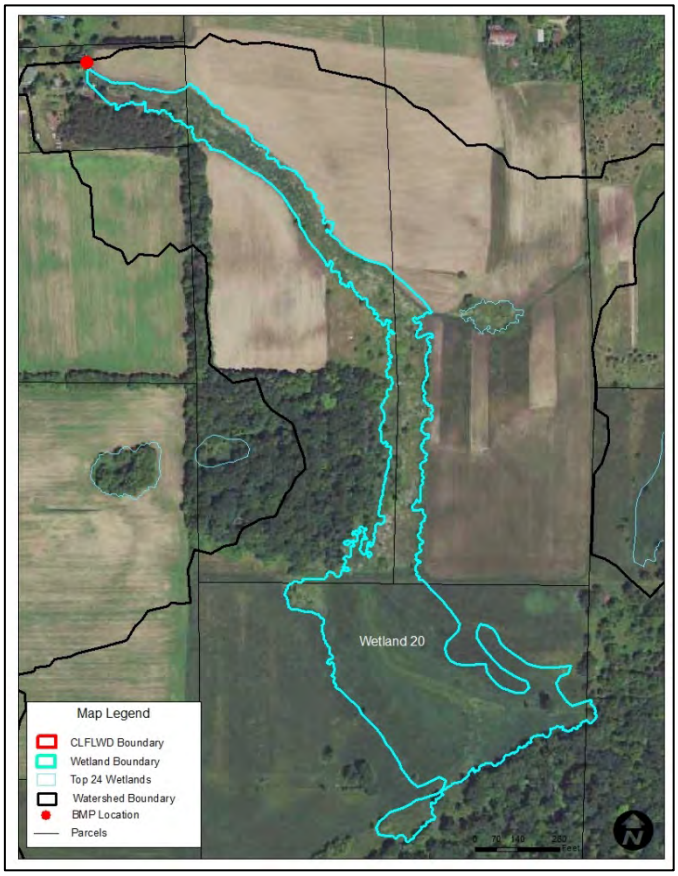
128.92 lb/yr

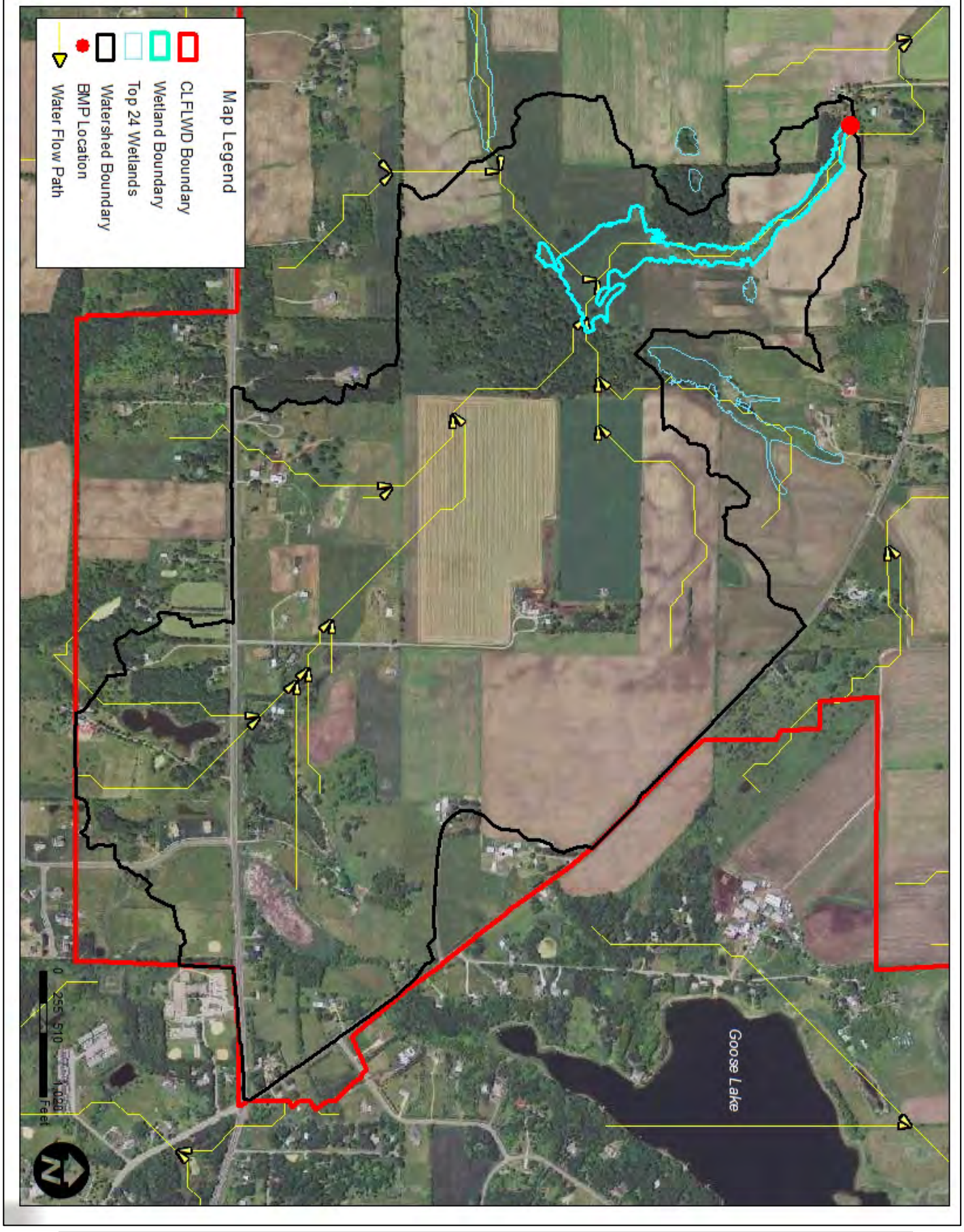
Engineer's Estimated Cost

$6,265.20

Cost/Lb Total Phosphorus

$48.60/lb

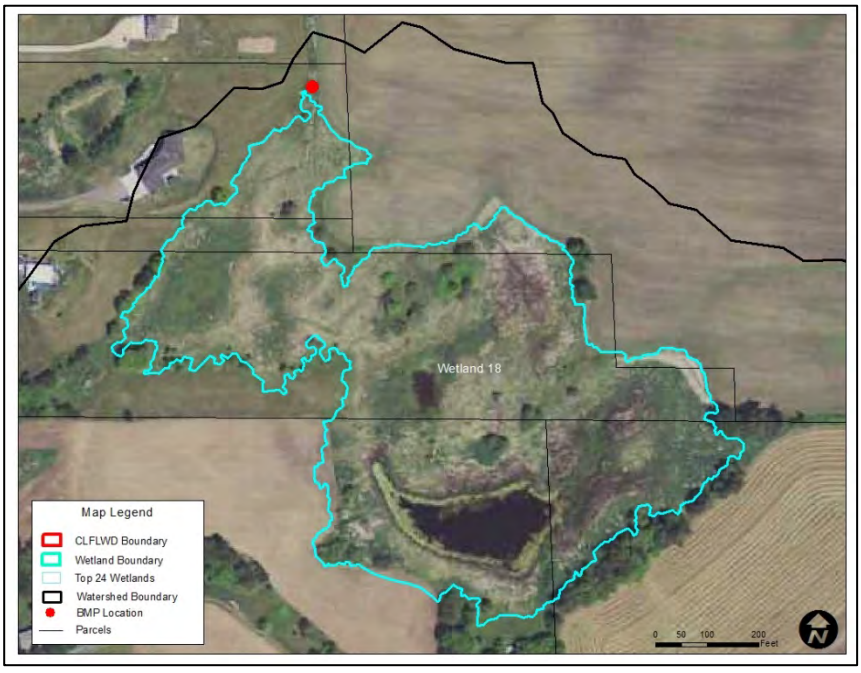



Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
Goose Lake
0 255 510 1,020
Feet
N

Ranking #3

Wetland Group #18

Soil Type	75
NWI Wetland Code	PEM1A; inclusions: PEM1C
Wetland Type	Type 1; inclusions: Type 3
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	12.6 acres
Pool Elevation	942
Berm Elevation	944
Watershed Size	211.7 acres
Watershed to Wetland Ratio	16.8:1
Receives water from	Upland
Flows to	Wetland 17
Dominant Watershed Land Use	Agricultural
Suggested BMP	Weir structure
Number of Landowners	5
Priority Ranking	High



Total Phosphorus Reduction

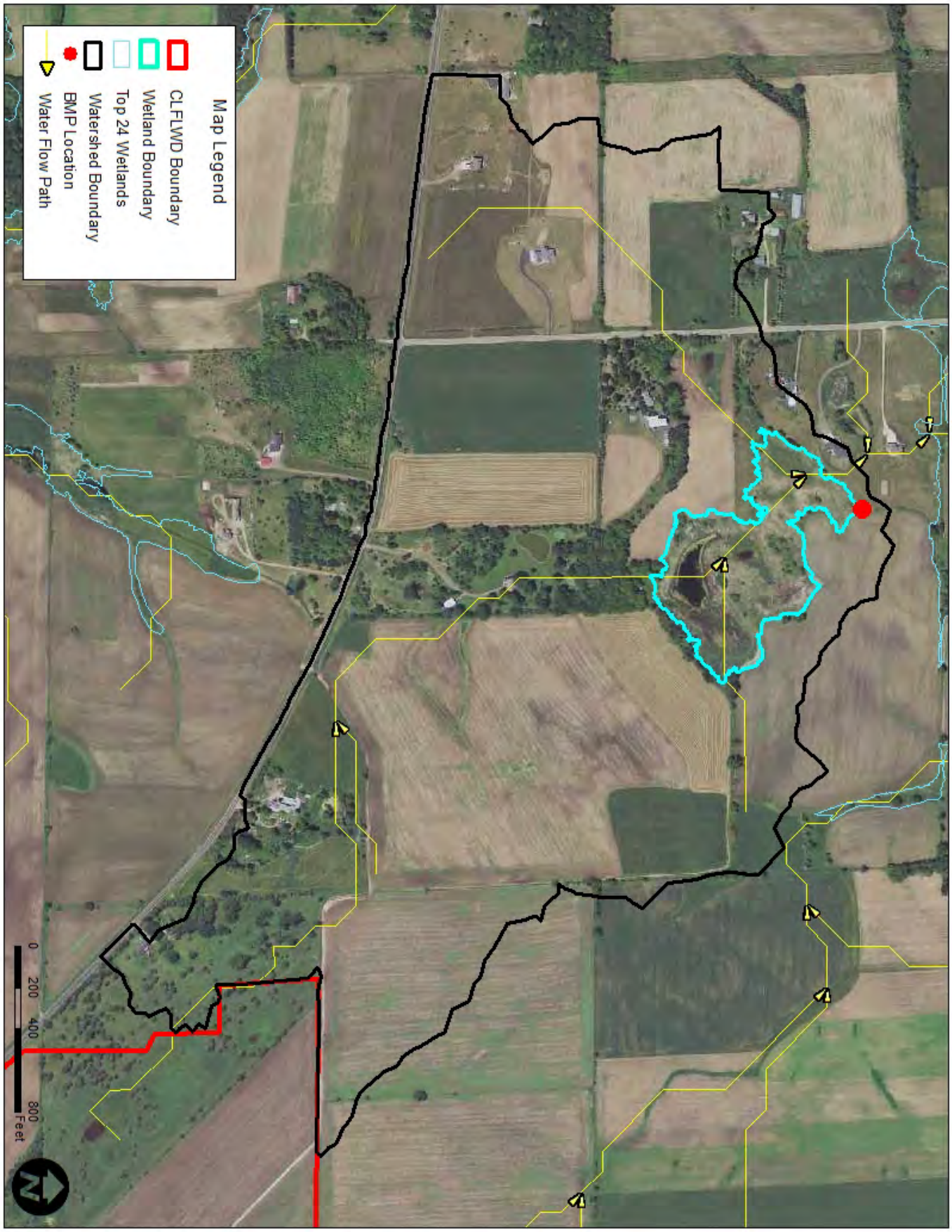
58.093 lb/yr

Engineer's Estimated Cost

$3,507.50

Cost/Lb Total Phosphorus

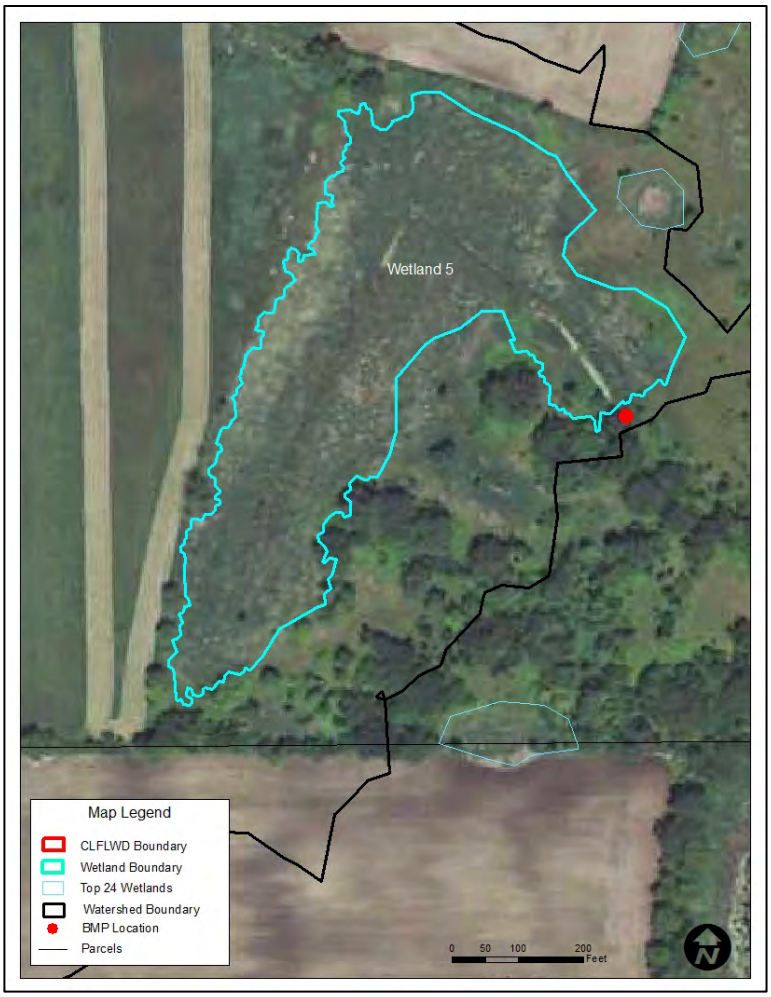
$60.33/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
200
400
800
Feet
N

Ranking #4

Wetland Group #5

Soil Type	544;75;346;40B
NWI Wetland Code	PEM1Ad
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	6.2 acres
Pool Elevation	920
Berm Elevation	921.5
Watershed Size	93.2 acres
Watershed to Wetland Ratio	11.8:1
Receives water from	Upland
Flows to	Fourth Lake
Dominant Watershed Land Use	Agricultural
Suggested BMP	8” Riser with 8” tile
Number of Landowners	1
Priority Ranking	High



Total Phosphorus Reduction

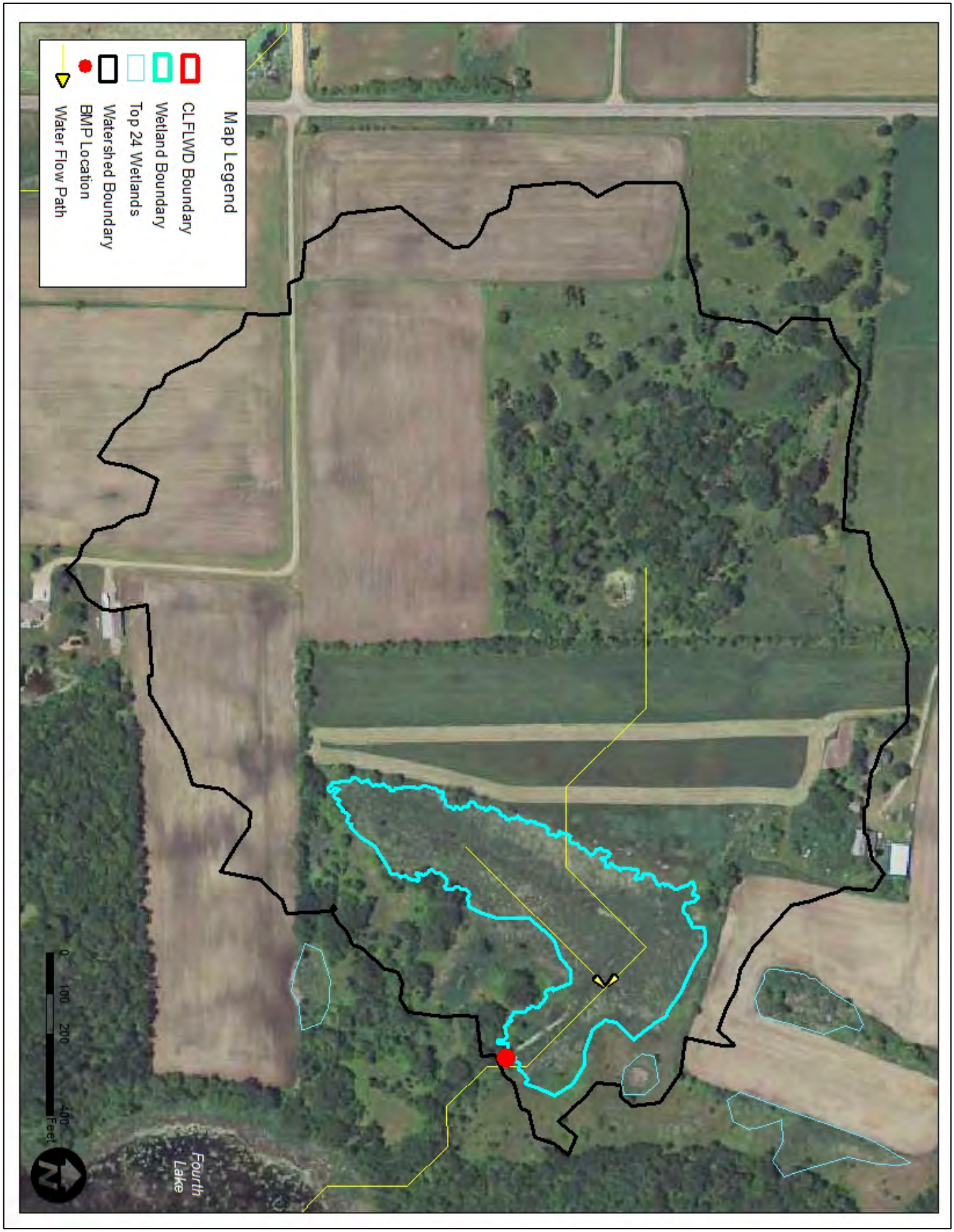
15.972 lb/yr

Engineer’s Estimated Cost

$1,807.80

Cost/Lb Total Phosphorus

$113.19/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
100
200
400
Feet
N
Fourth Lake

Ranking #5

Wetland Group #4

Wetland 4a

Soil Type	540;75
NWI Wetland Code	PEM1Ad; inclusions: PFO1A, PABGx, PEM1C
Wetland Type	Type 1; inclusions: Type 3, Type 4
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	37.5 acres
Pool Elevation	916
Berm Elevation	918
Watershed Size	216 acres
Watershed to Wetland Ratio	5.8:1
Receives water from	Upland
Flows to	Wetland 4b
Dominant Watershed Land Use	Rural residential
Suggested BMP	Weir structure
Number of Landowners	7
Priority Ranking	High

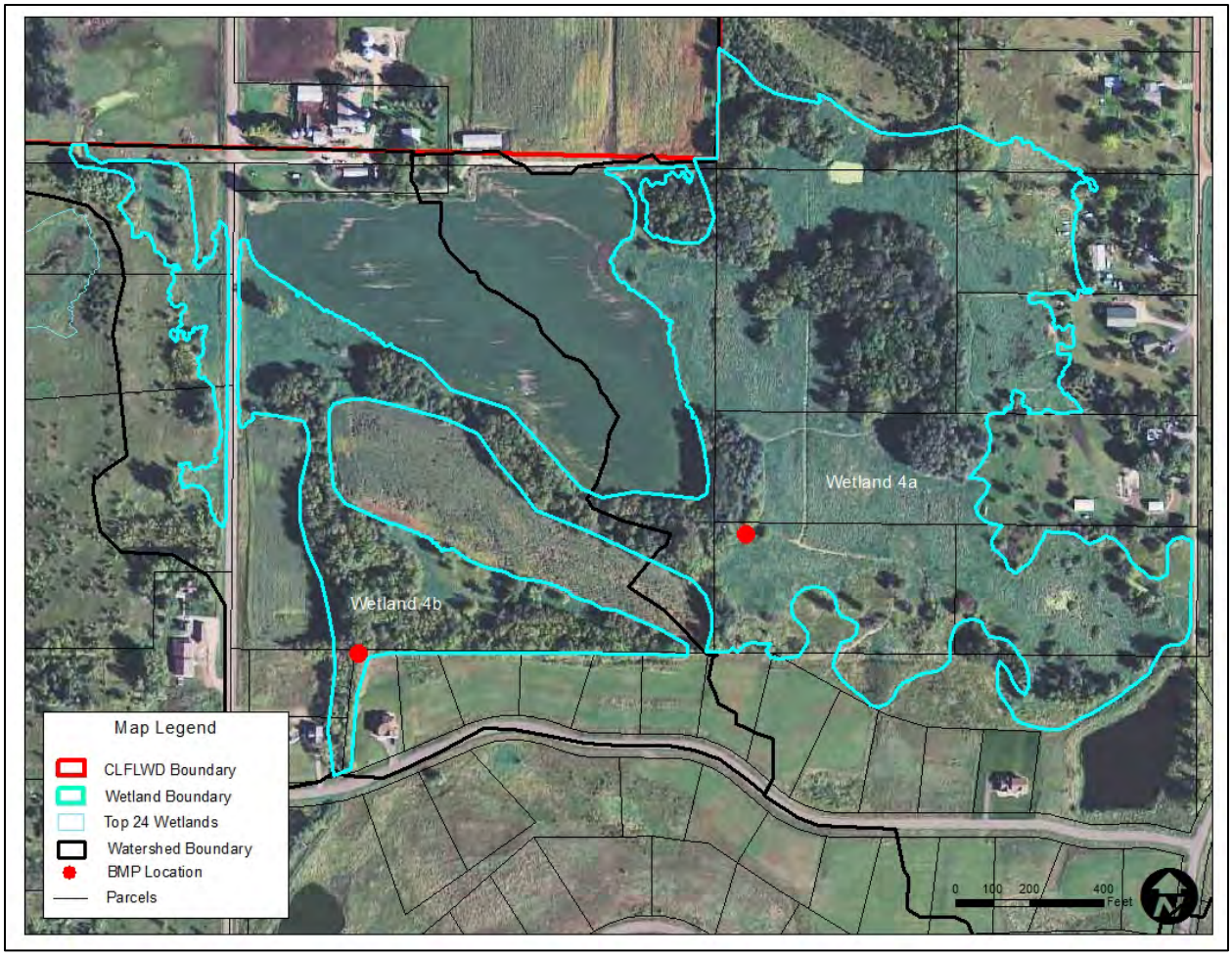
Wetland 4b

Soil Type	346;544
NWI Wetland Code	PFO1Ad; PEM1Ad; inclusions: PEM1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	9.9 acres
Pool Elevation	916
Berm Elevation	917
Watershed Size	45.8 acres
Watershed to Wetland Ratio	4.6:1
Receives water from	Wetland 4a
Flows to	School Lake
Dominant Watershed Land Use	Agricultural/Pasture
Suggested BMP	Grass Spillway
Number of Landowners	1
Priority Ranking	High

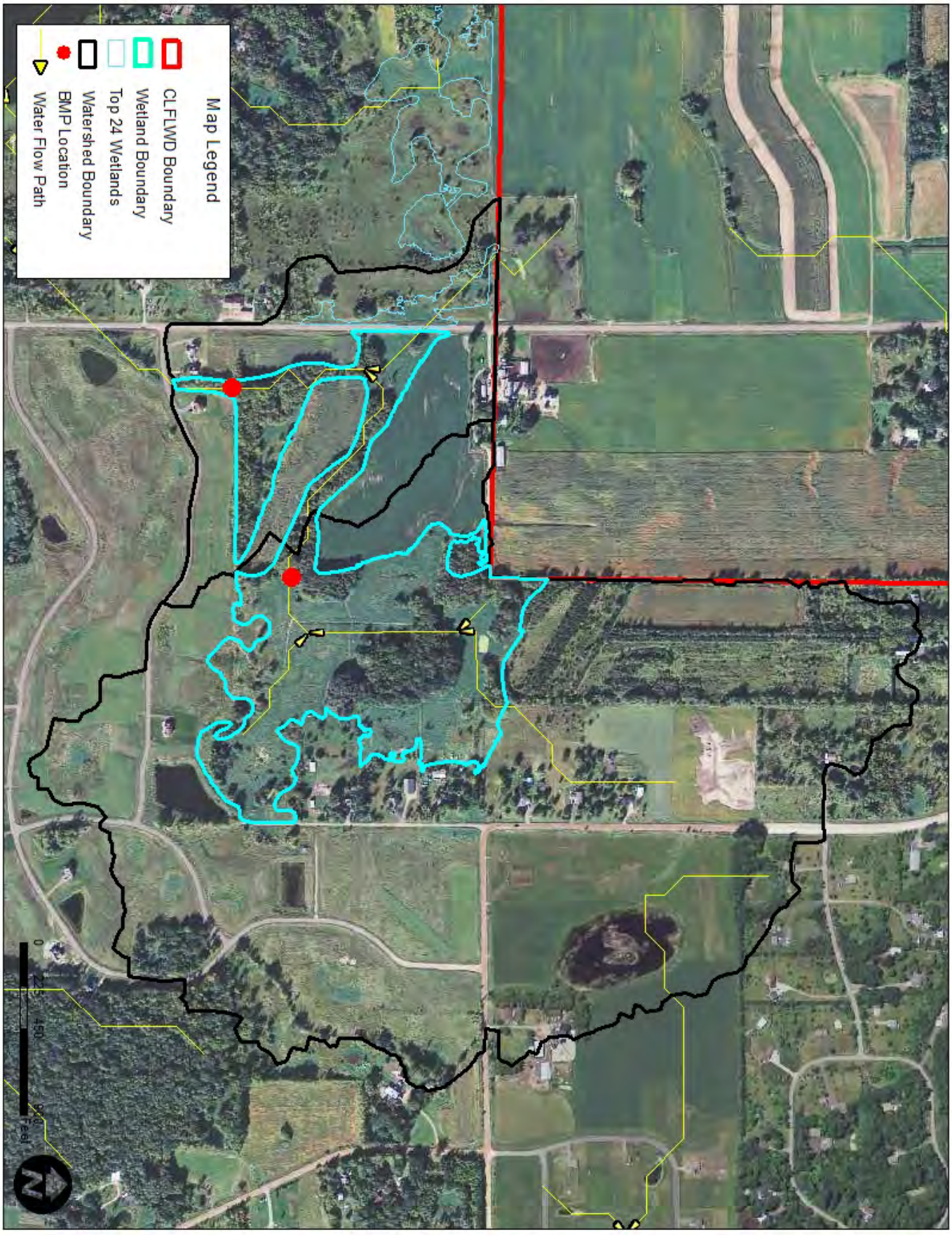
Total Phosphorus Reduction	Engineer's Estimated Cost
39.7104 lb/yr	$5,416.50

Cost/Lb Total Phosphorus

$136.40/lb



Wetland 4a Ditch channel at BMP location


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
225
450
900
Feet
N

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Ranking #6

Wetland Group #9

Soil Type	123;225
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass; small inclusion of sedges
Outlet Type	Ditch channel
Wetland Size	1.7 acres
Pool Elevation	925
Berm Elevation	926.5
Watershed Size	159.9 acres
Watershed to Wetland Ratio	94:1
Receives water from	Upland
Flows to	Wetland 8b
Dominant Watershed Land Use	Rural residential/Agricultural
Suggested BMP	Weir structure
Number of Landowners	1
Priority Ranking	High

Wetland 9 Ditch channel

Total Phosphorus Reduction

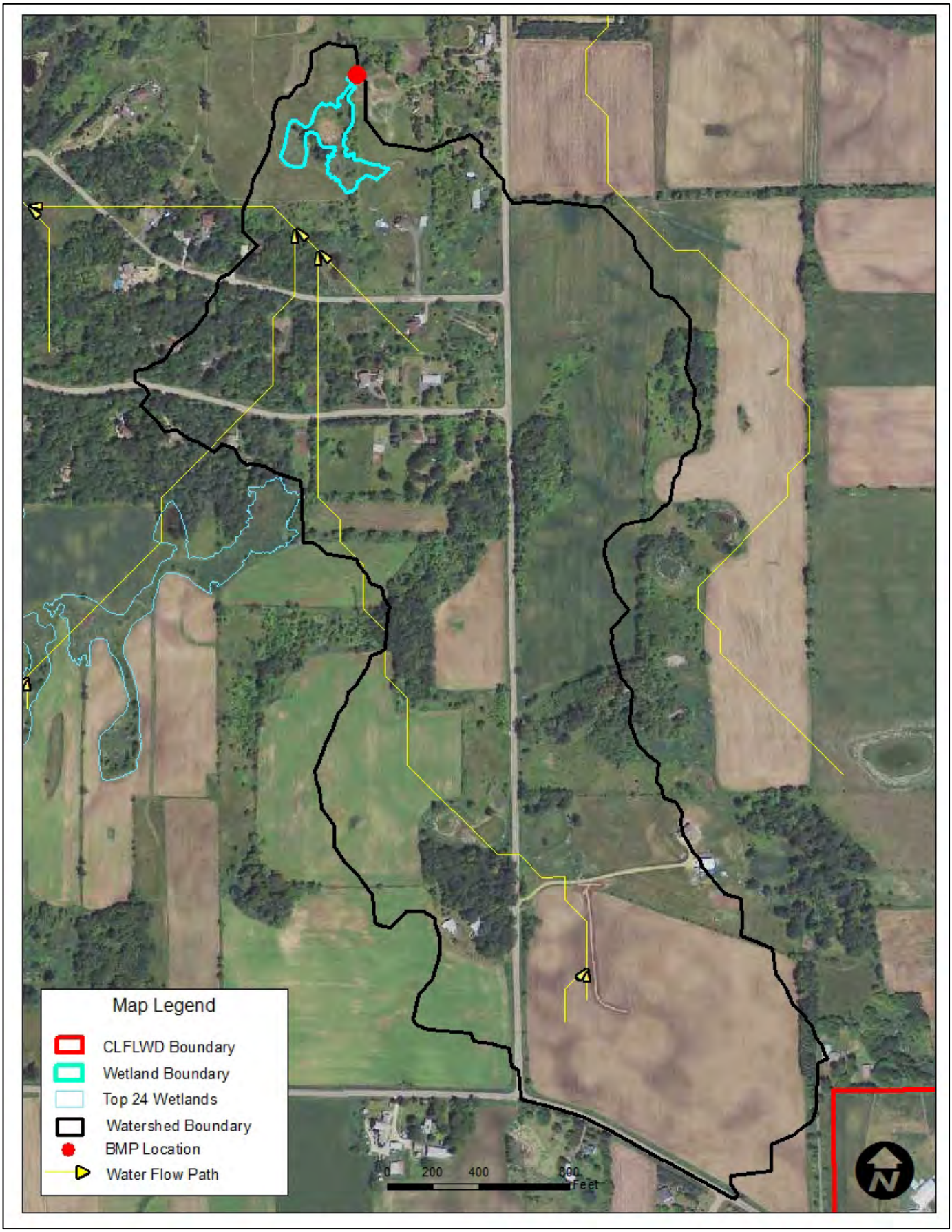
27.942 lb/yr

Engineer's Estimated Cost

$5,262.40

Cost/Lb Total Phosphorus

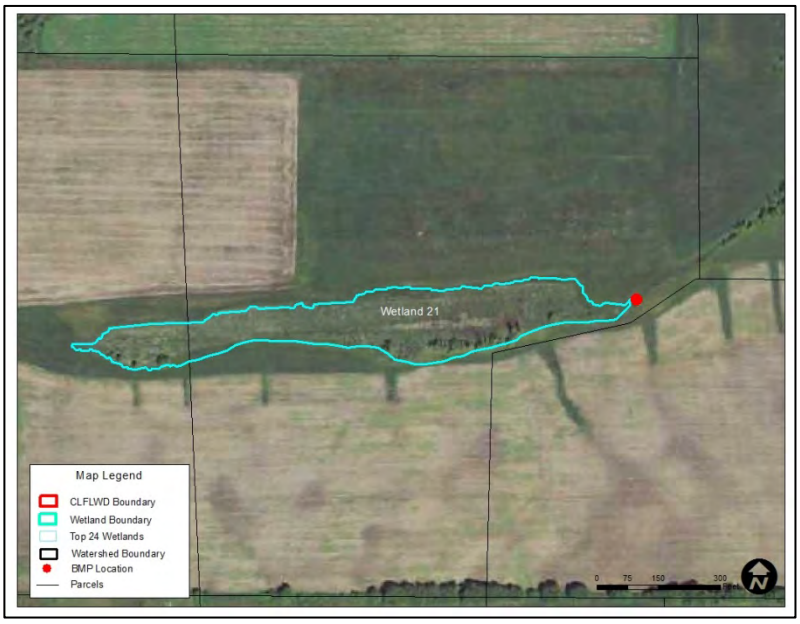
$188.33/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
200
400
800
Feet
N

Ranking #7

Wetland Group #21

Soil Type	543; 1847
NWI Wetland Code	PEM1Ad
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	3.3 acres
Pool Elevation	973
Berm Elevation	975
Watershed Size	139.6 acres
Watershed to Wetland Ratio	42.3:1
Receives water from	Upland
Flows to	Wetland 20
Dominant Watershed Land Use	Agricultural
Suggested BMP	Weir structure
Number of Landowners	1
Priority Ranking	High



Total Phosphorus Reduction

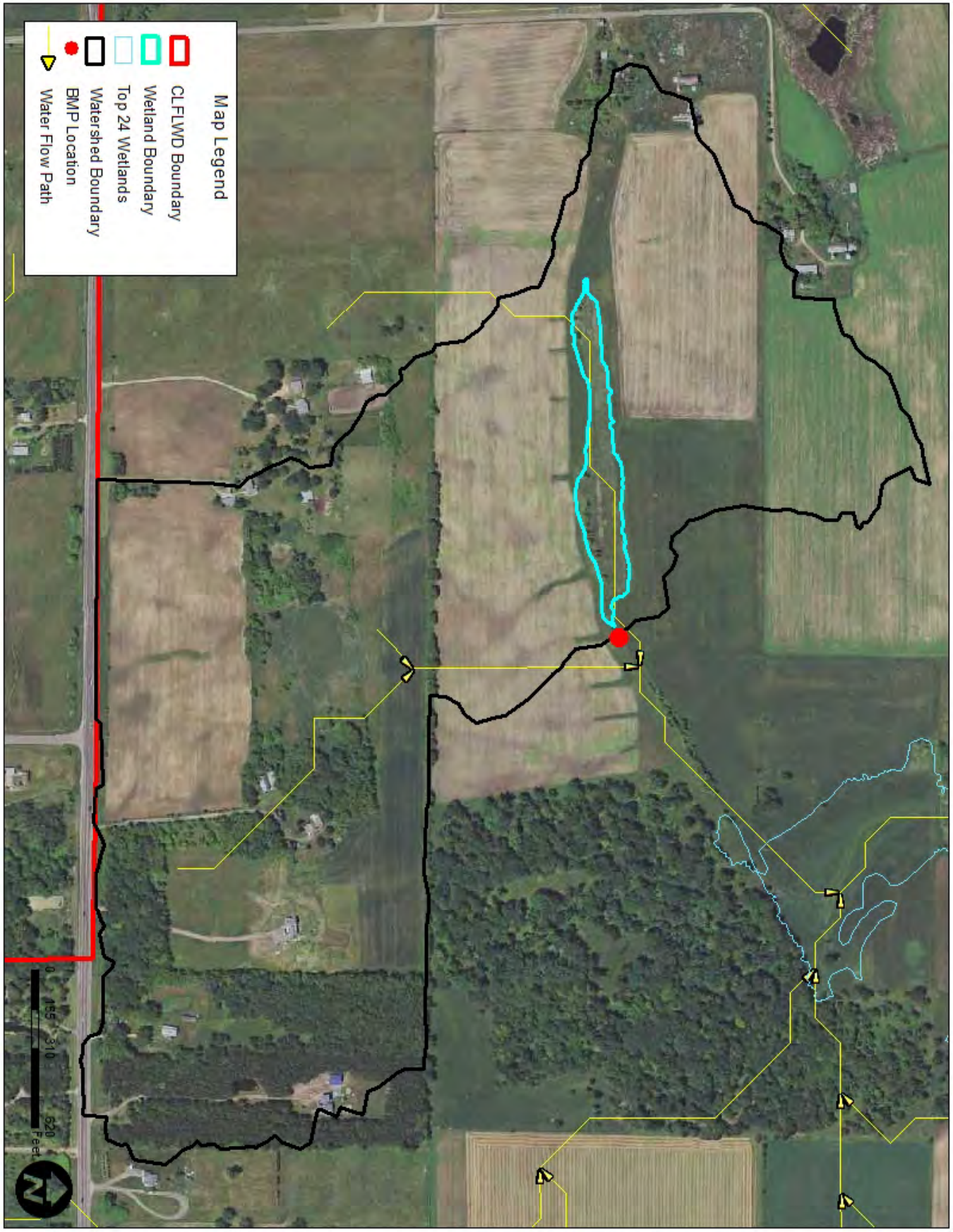
31.515 lb/yr

Engineer's Estimated Cost

$6,384.80

Cost/Lb Total Phosphorus

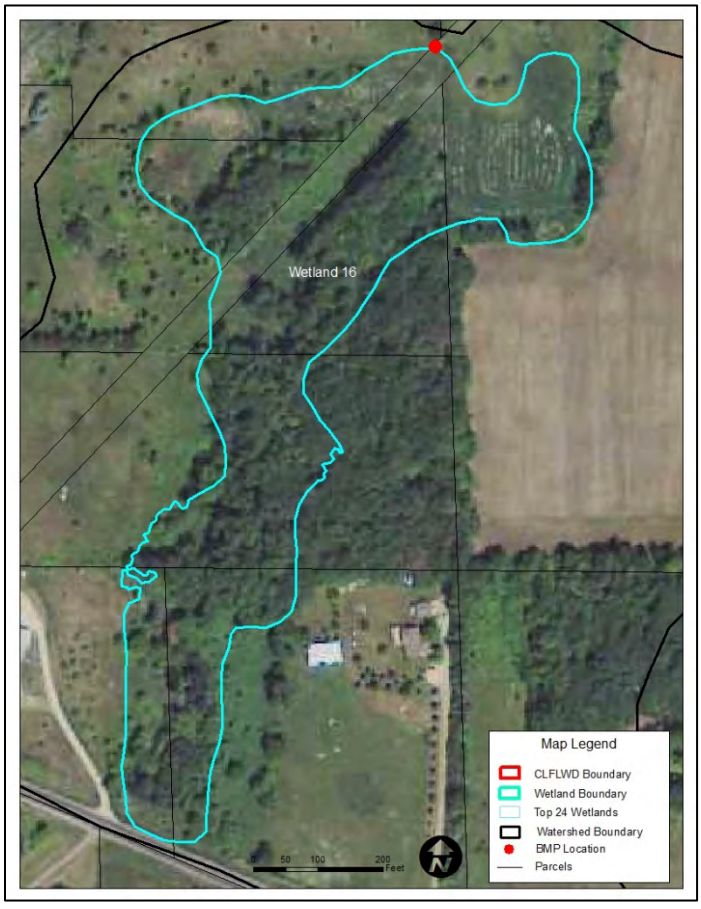
$202.60/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
155
310
620
Feet
N

Ranking #8

Wetland Group #16

Soil Type	75
NWI Wetland Code	PEM1A; PFO1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass; Some natives present
Outlet Type	Ditch channel
Wetland Size	7.5 acres
Pool Elevation	936
Berm Elevation	937.5
Watershed Size	41.1 acres
Watershed to Wetland Ratio	5.5:1
Receives water from	Wetland 20
Flows to	Wetland 14
Dominant Watershed Land Use	Open herbaceous
Suggested BMP	Grass spillway
Number of Landowners	6
Priority Ranking	High



Total Phosphorus Reduction

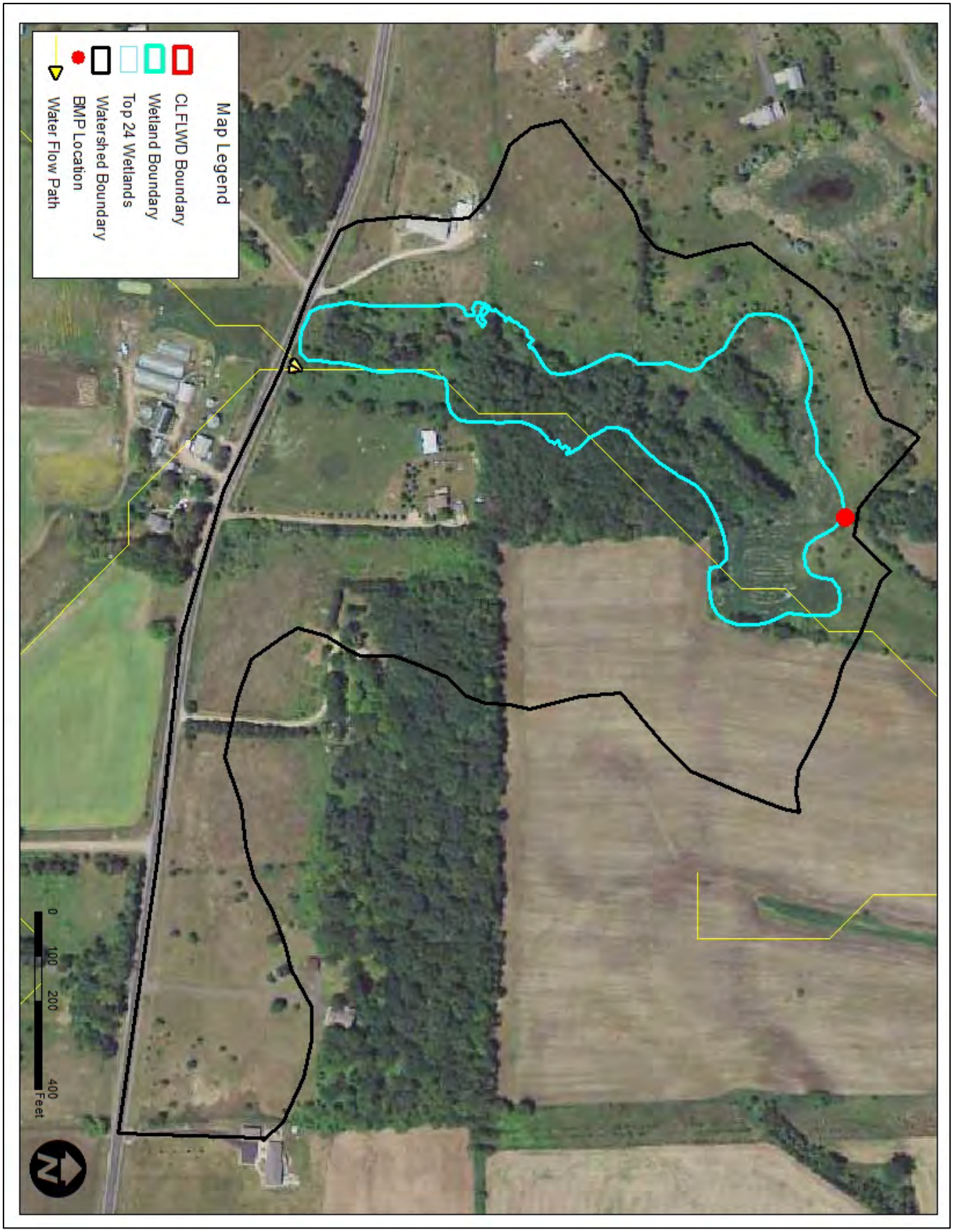
4.8844lb/yr

Engineer's Estimated Cost

$1,058.00

Cost/Lb Total Phosphorus

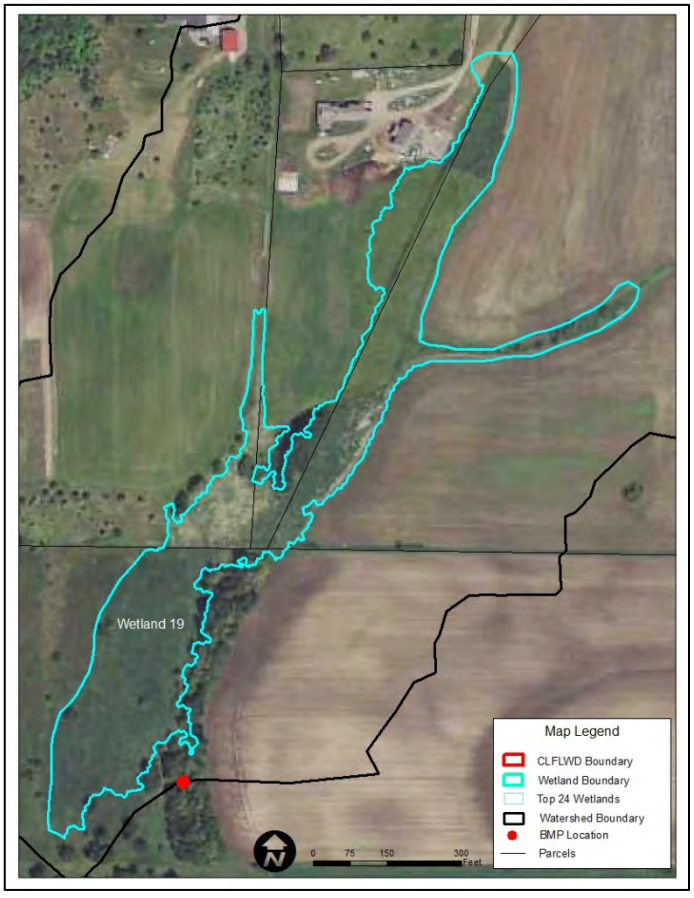
$216.61/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
100
200
400
Feet
N

Ranking #9

Wetland Group #19

Soil Type	326;543;166
NWI Wetland Code	PEM1Ad; inclusions: PFO1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	6.6 acres
Pool Elevation	978
Berm Elevation	980
Watershed Size	64.7 acres
Watershed to Wetland Ratio	9.8:1
Receives water from	Upland
Flows to	Wetland 20
Dominant Watershed Land Use	Agricultural
Suggested BMP	8” Riser and 8” Tile
Number of Landowners	4
Priority Ranking	High



Total Phosphorus Reduction

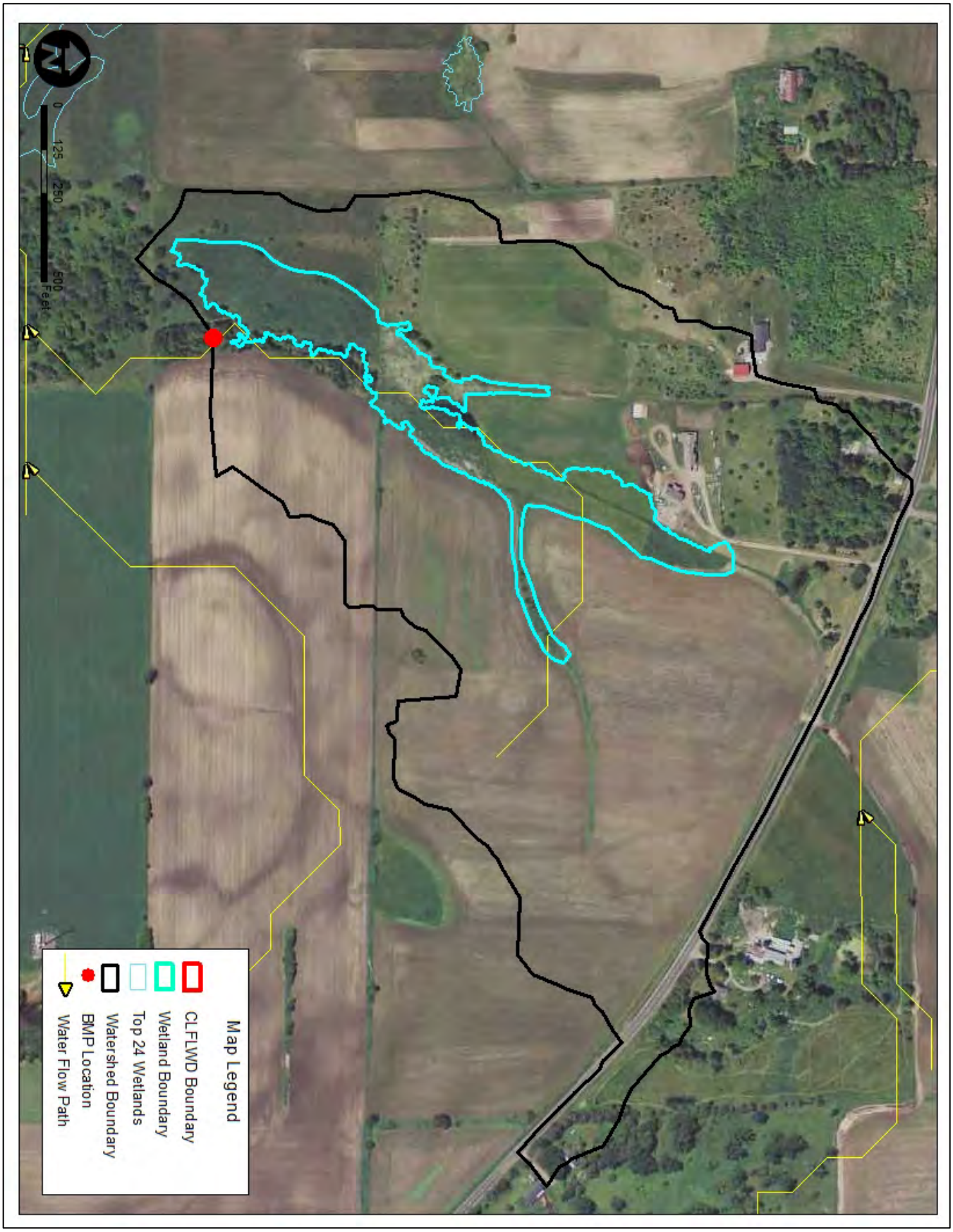
18.225lb/yr

Engineer’s Estimated Cost

$4,705.80

Cost/Lb Total Phosphorus

$258.21/lb


N
0
125
250
500
Feet
Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path

Ranking #10

Wetland Group #23

Wetland 23a

Soil Type	75;132C
NWI Wetland Code	PEM1Ad;PFO1A;PEM1Cd;PFO1/EM1Ad
Wetland Type	Type 1; Type 3
Dominant Vegetation	Reed canary grass
Outlet Type	Culvert
Wetland Size	7.6 acres
Pool Elevation	920
Berm Elevation	922
Watershed Size	90.2 acres
Watershed to Wetland Ratio	11.9:1
Receives water from	Wetland 22
Flows to	Wetland 23b
Dominant Watershed Land Use	Agricultural
Suggested BMP	12” Riser on DW culvert
Number of Landowners	3
Priority Ranking	High

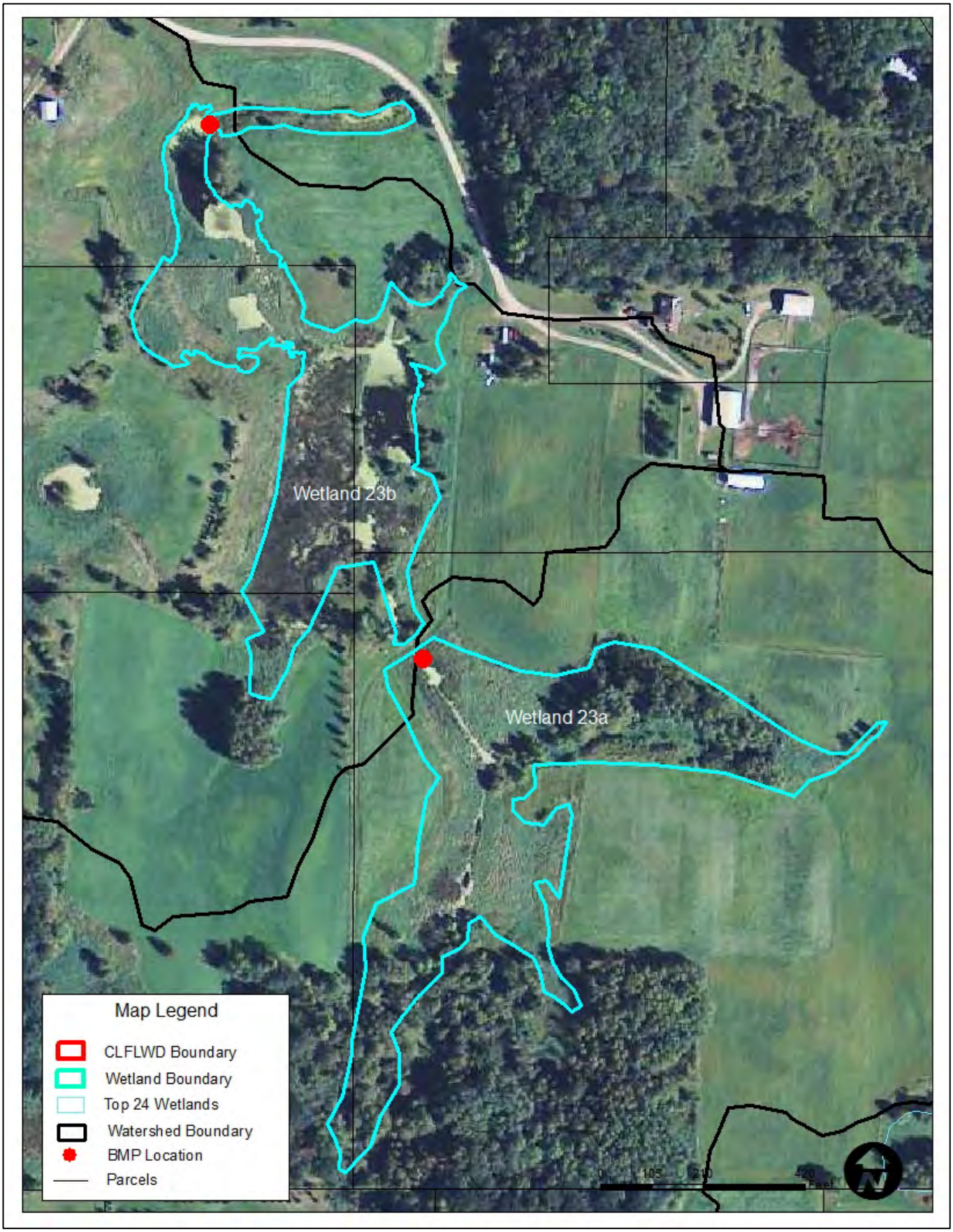
Wetland 23b

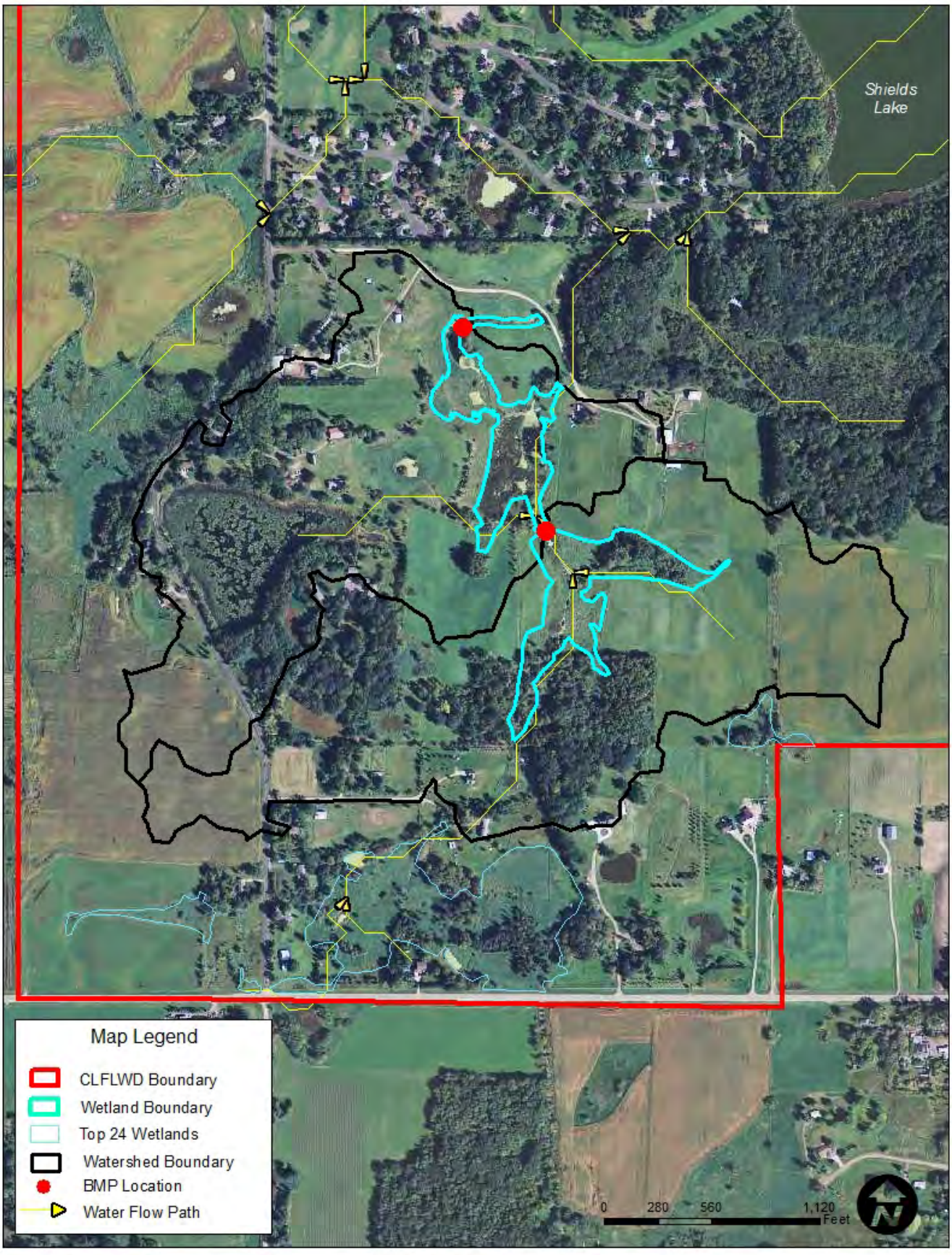
Soil Type	544;75
NWI Wetland Code	PEM1C; inclusions: PABGx;PEM1A;PABG
Wetland Type	Type 1; inclusions: Type 3, Type 4
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	6.7 acres
Pool Elevation	922
Berm Elevation	924
Watershed Size	82.3 acres
Watershed to Wetland Ratio	12.3:1
Receives water from	Wetland 23a
Flows to	Shields Lake
Dominant Watershed Land Use	Agricultural
Suggested BMP	Weir structure
Number of Landowners	2
Priority Ranking	High

Total Phosphorus Reduction	Engineer’s Estimated Cost
35.107lb/yr	$10,177.50

Cost/Lb Total Phosphorus

$289.90/lb


Wetland 23b
Wetland 23a
Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Parcels
0
105
210
420
Feet
N


Shields Lake
Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
280
560
1,120
Feet

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Ranking #11

Wetland Group #22

Wetland 22a

Soil Type	75;123
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	1.3 acres
Pool Elevation	946
Berm Elevation	944.5
Watershed Size	23.9 acres
Watershed to Wetland Ratio	18.4:1
Receives water from	Upland
Flows to	Wetland 22b
Dominant Watershed Land Use	Agricultural
Suggested BMP	6” Riser and 6” Tile
Number of Landowners	2
Priority Ranking	Medium

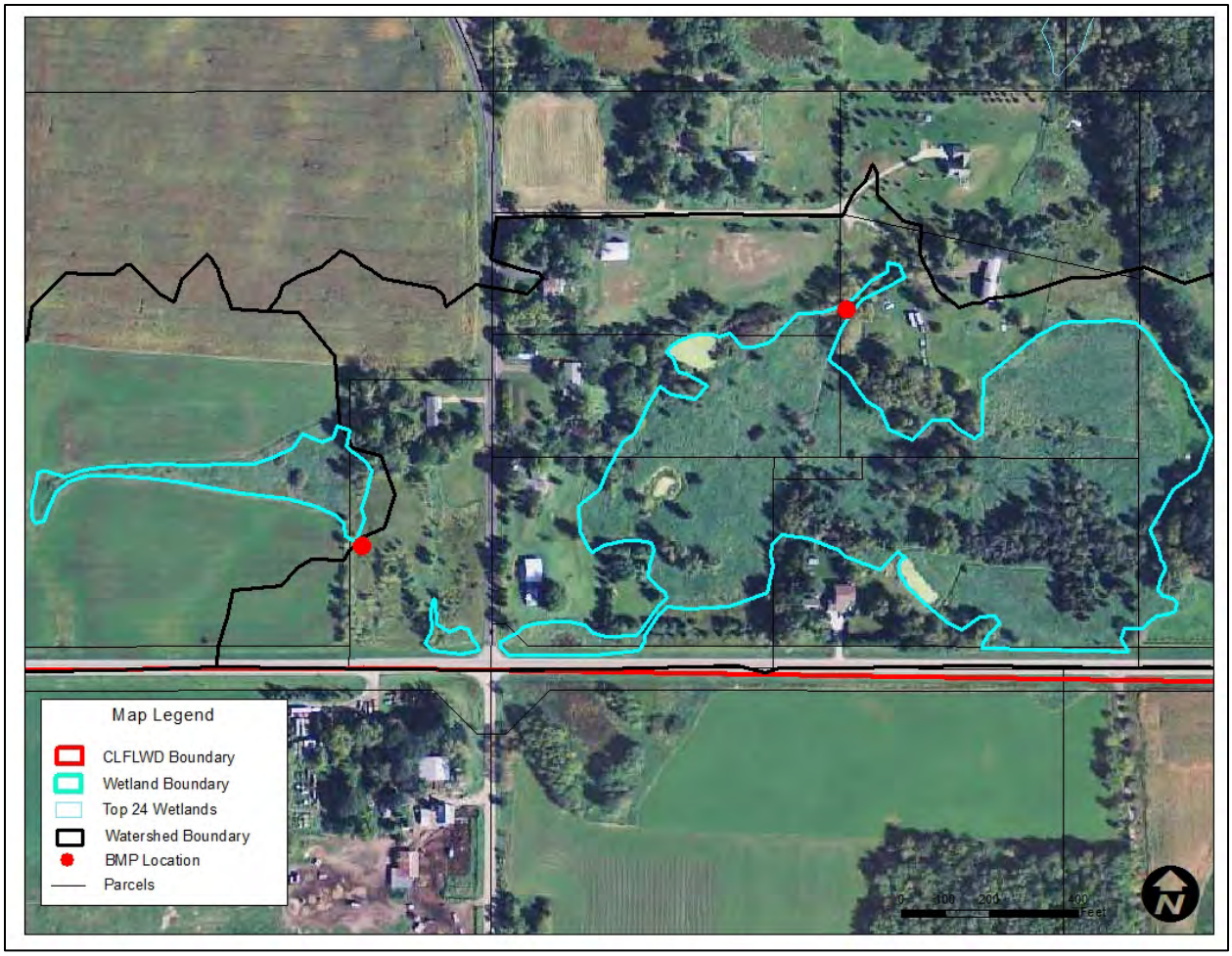
Wetland 22b

Soil Type	540;123;544
NWI Wetland Code	PEM1A; inclusions: PFO1/2B;PFO4A;PABGx;PEM1B
Wetland Type	Type 1; inclusions: Type 2, Type 3, Type 4
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	16.4 acres
Pool Elevation	933
Berm Elevation	934.5
Watershed Size	45 acres
Watershed to Wetland Ratio	2.7:1
Receives water from	Wetland 22a
Flows to	Wetland 23
Dominant Watershed Land Use	Rural residential
Suggested BMP	8” Riser and 8” Tile
Number of Landowners	5
Priority Ranking	Medium

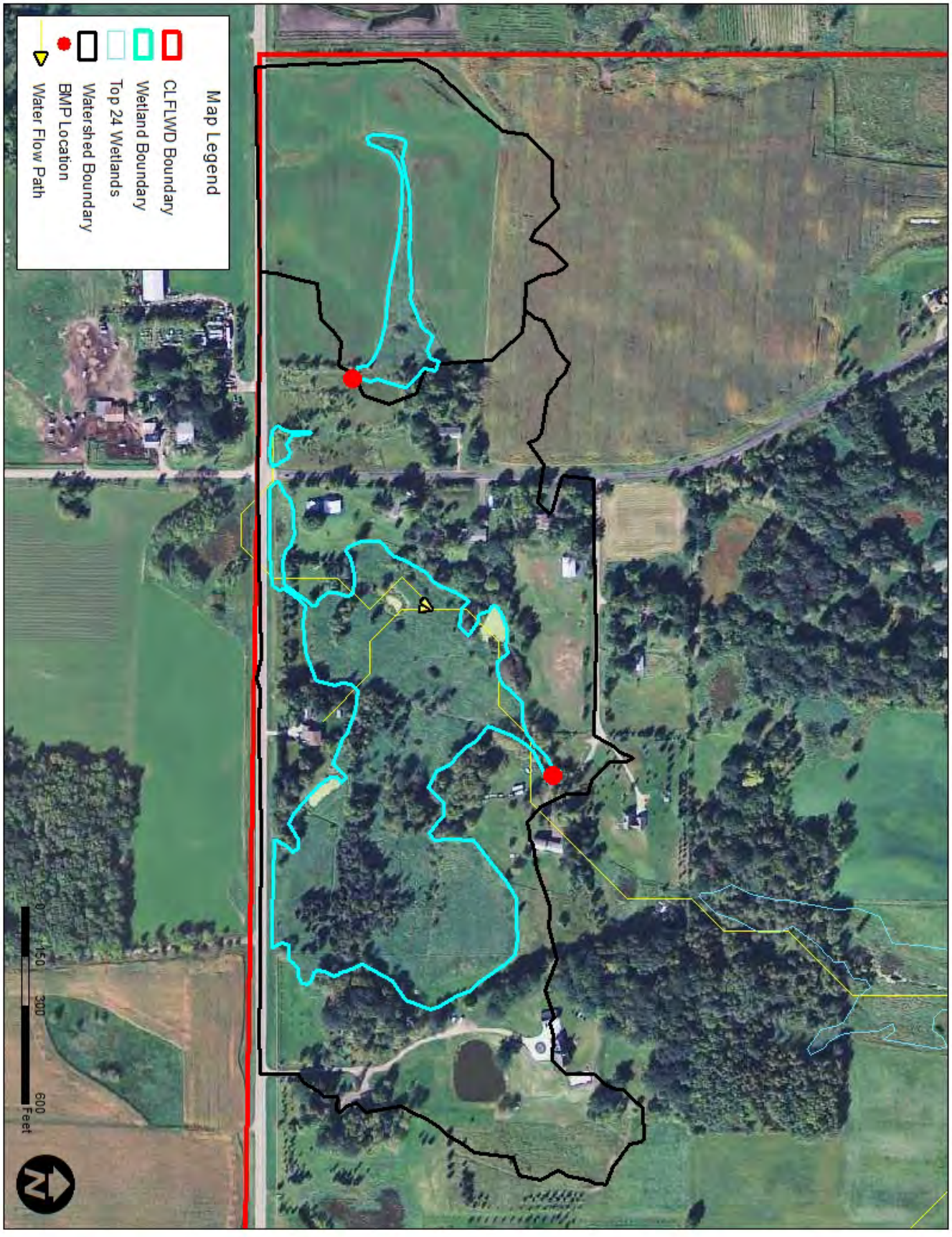
Total Phosphorus Reduction	Engineer’s Estimated Cost
11.9277 lb/yr	$4,936.95

Cost/Lb Total Phosphorus

$413.91/lb



Wetland 22 Ditch channel


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
150
300
600
Feet
N

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Ranking #12

Wetland Group #10

Wetland 10a

Soil Type	540;132B;132C
NWI Wetland Code	PEM1A; inclusions: PEM1F
Wetland Type	Type 1; inclusions: Type 3
Dominant Vegetation	Unverified
Outlet Type	Unverified
Wetland Size	5.1 acres
Pool Elevation	938
Berm Elevation	939
Watershed Size	20.4 acres
Watershed to Wetland Ratio	4:1
Receives water from	Upland
Flows to	Wetland 8
Dominant Watershed Land Use	Agricultural
Suggested BMP	Grass spillway
Number of Landowners	2
Priority Ranking	Medium

Wetland 10b

Soil Type	75;123
NWI Wetland Code	PEM1A; inclusions: PUBG; PEM1C
Wetland Type	Type 1; inclusions: Type 3, Type 5
Dominant Vegetation	Unverified
Outlet Type	Unverified
Wetland Size	3.6 acres
Pool Elevation	934
Berm Elevation	936
Watershed Size	126.8 acres
Watershed to Wetland Ratio	35.2:1
Receives water from	Wetland 17
Flows to	Wetland 10c
Dominant Watershed Land Use	Agricultural
Suggested BMP	Weir structure
Number of Landowners	1
Priority Ranking	Medium

Wetland 10c

Soil Type	123;132D
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Unverified
Outlet Type	Unverified
Wetland Size	2.7 acres
Pool Elevation	932
Berm Elevation	934
Watershed Size	34.9 acres
Watershed to Wetland Ratio	12.9:1
Receives water from	Wetland 10b
Flows to	Wetland 10d
Dominant Watershed Land Use	Agricultural
Suggested BMP	Weir structure
Number of Landowners	1
Priority Ranking	Medium

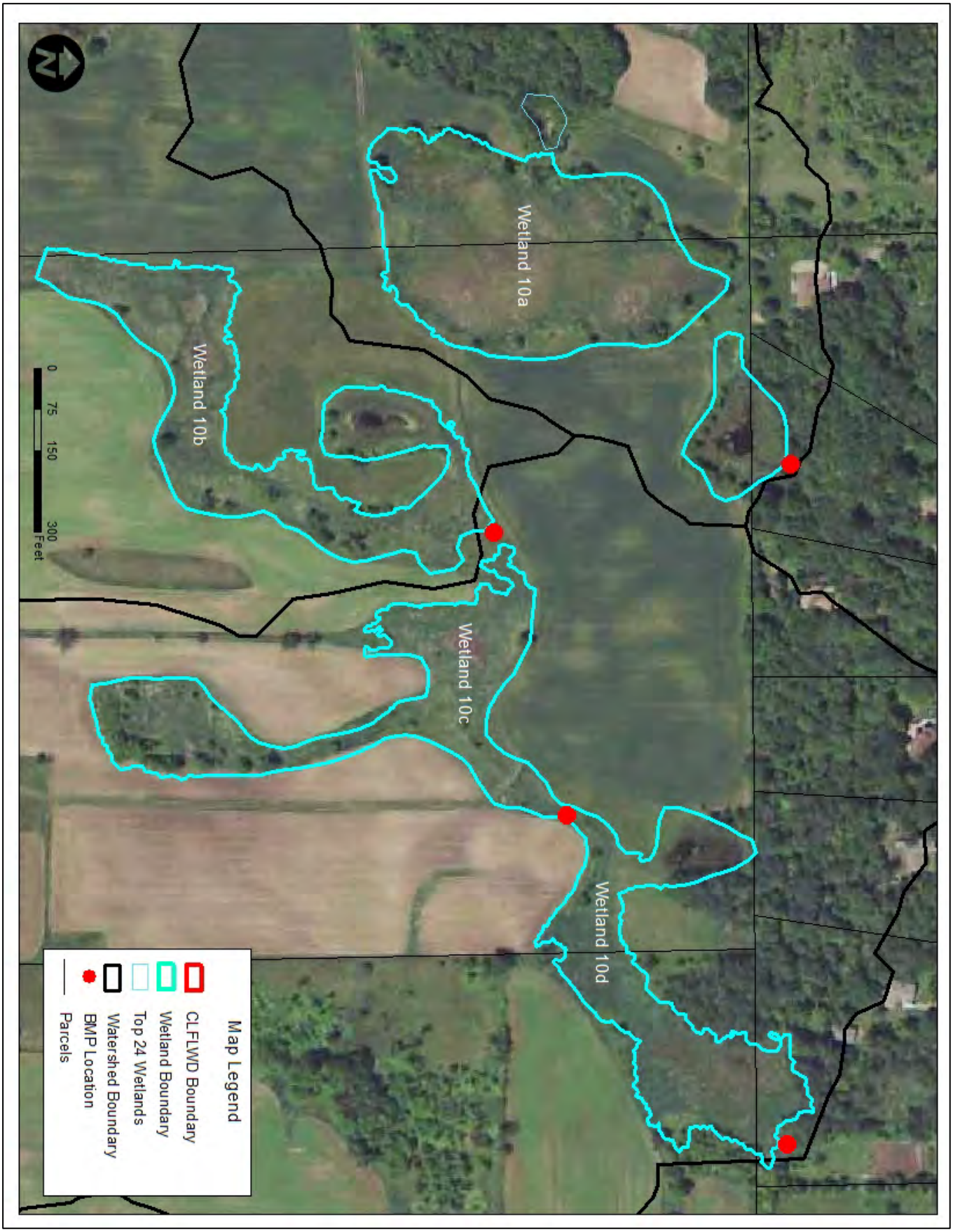
Wetland 10d

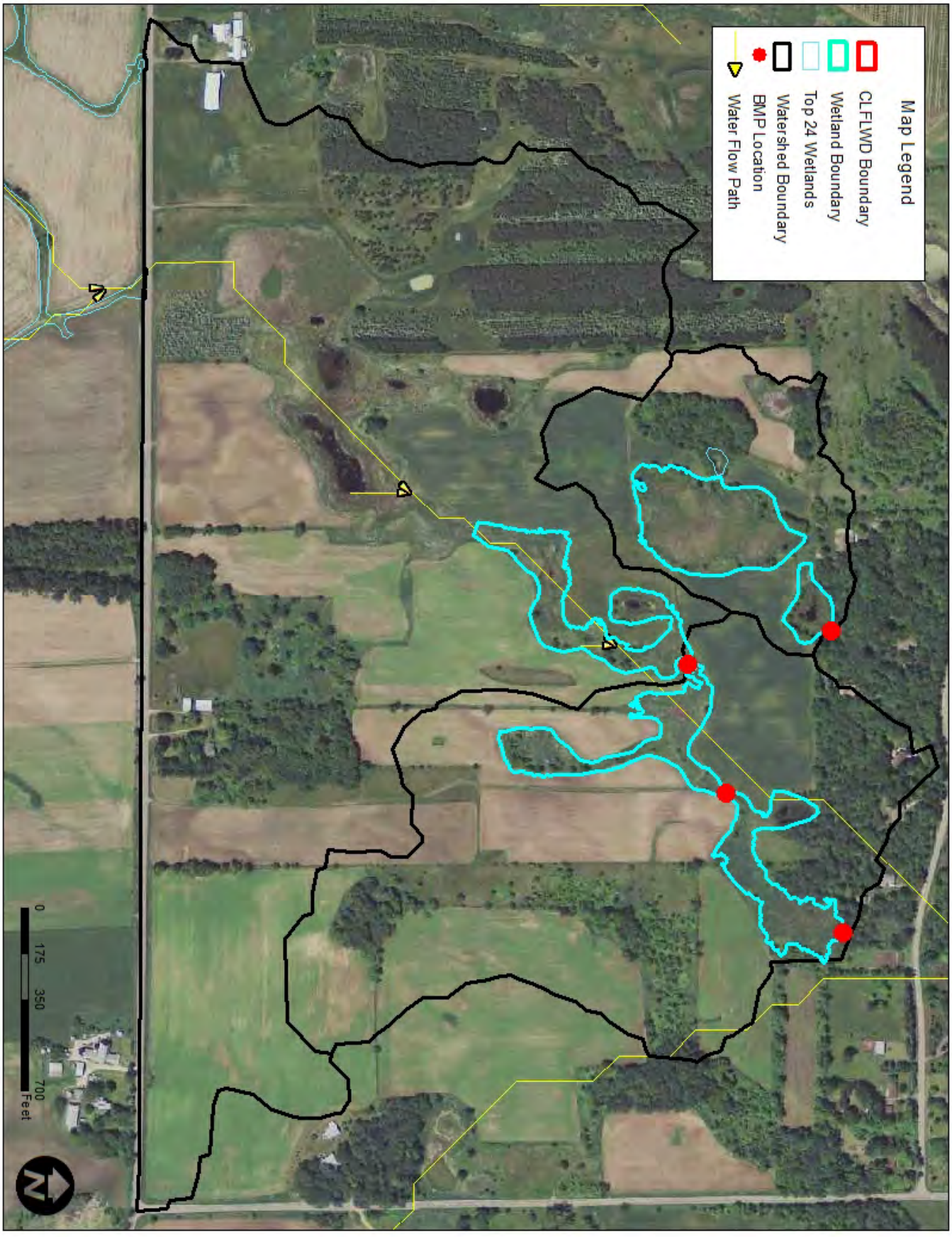
Soil Type	123;543
NWI Wetland Code	PEM1A; inclusions: PEM1C
Wetland Type	Type 1; inclusions: Type 3
Dominant Vegetation	Unverified
Outlet Type	Culvert under road
Wetland Size	2.9 acres
Pool Elevation	928
Berm Elevation	930
Watershed Size	24.6 acres
Watershed to Wetland Ratio	8.5:1
Receives water from	Wetland 10c
Flows to	Wetland 9
Dominant Watershed Land Use	Agricultural
Suggested BMP	Weir structure
Number of Landowners	3
Priority Ranking	Medium

Total Phosphorus Reduction	Engineer's Estimated Cost
54.2003 lb/yr	$22,630.85

Cost/Lb Total Phosphorus

$417.51/lb


Wetland 10a
Wetland 10b
Wetland 10c
Wetland 10d
0
75
150
300
Feet
Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Parcels


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
175
350
700
Feet
N

Ranking #13

Wetland Group #1

Wetland 1a

Soil Type	540
NWI Wetland Code	PEM1A; inclusions: PEM1F;PUBF
Wetland Type	Type 1; inclusions: Type 3; Type 4
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	1.5 acres
Pool Elevation	898
Berm Elevation	899
Watershed Size	6.4 acres
Watershed to Wetland Ratio	4.3:1
Receives water from	Upland
Flows to	Wetland 1b
Dominant Watershed Land Use	Rural residential
Suggested BMP	Grass spillway
Number of Landowners	4
Priority Ranking	Medium

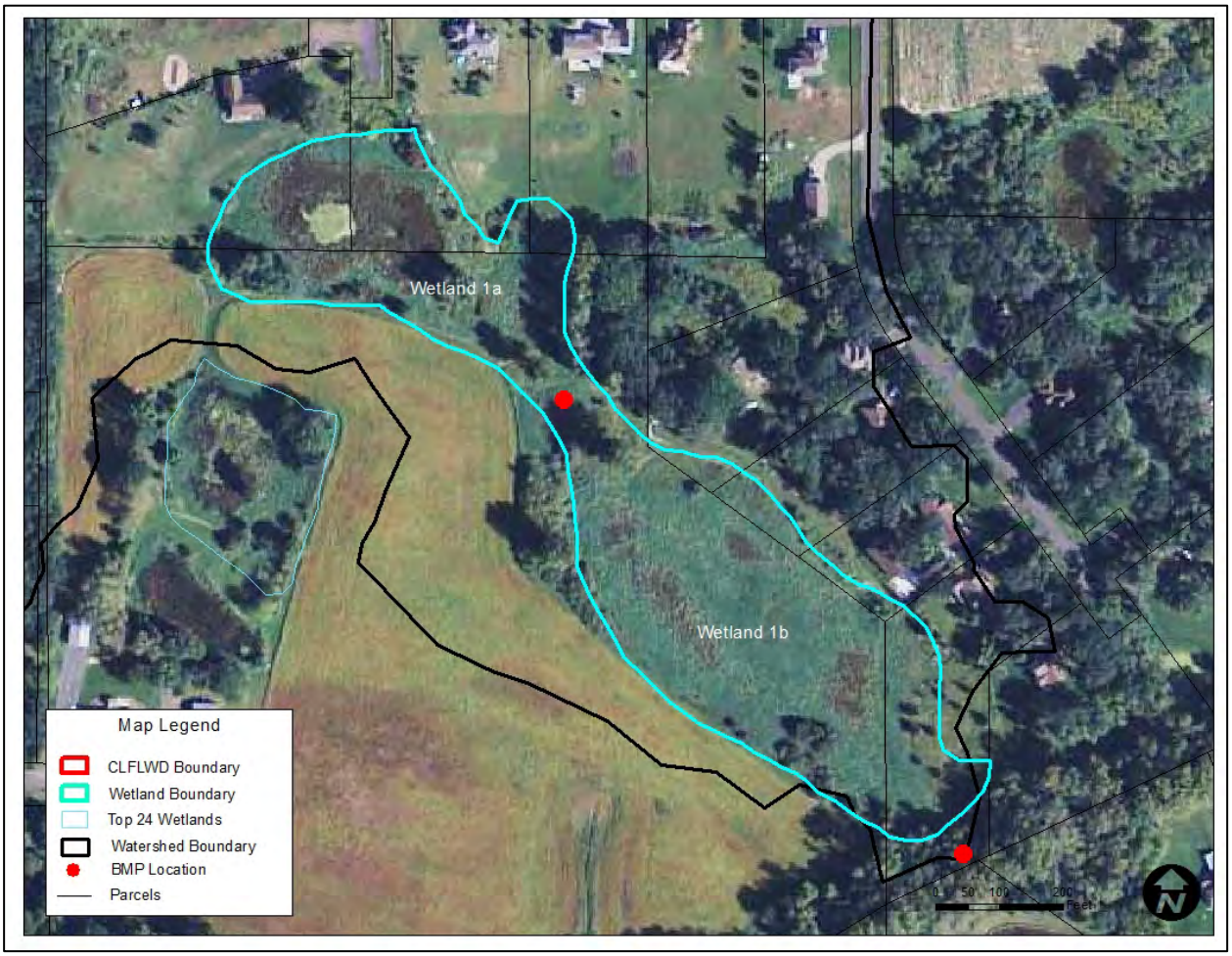
Wetland 1b

Soil Type	540
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	3.4 acres
Pool Elevation	894
Berm Elevation	895.5
Watershed Size	117.8 acres
Watershed to Wetland Ratio	34.6:1
Receives water from	Wetland 1a
Flows to	Comfort Lake
Dominant Watershed Land Use	Rural residential
Suggested BMP	12” Riser and 12” Tile
Number of Landowners	5
Priority Ranking	Medium

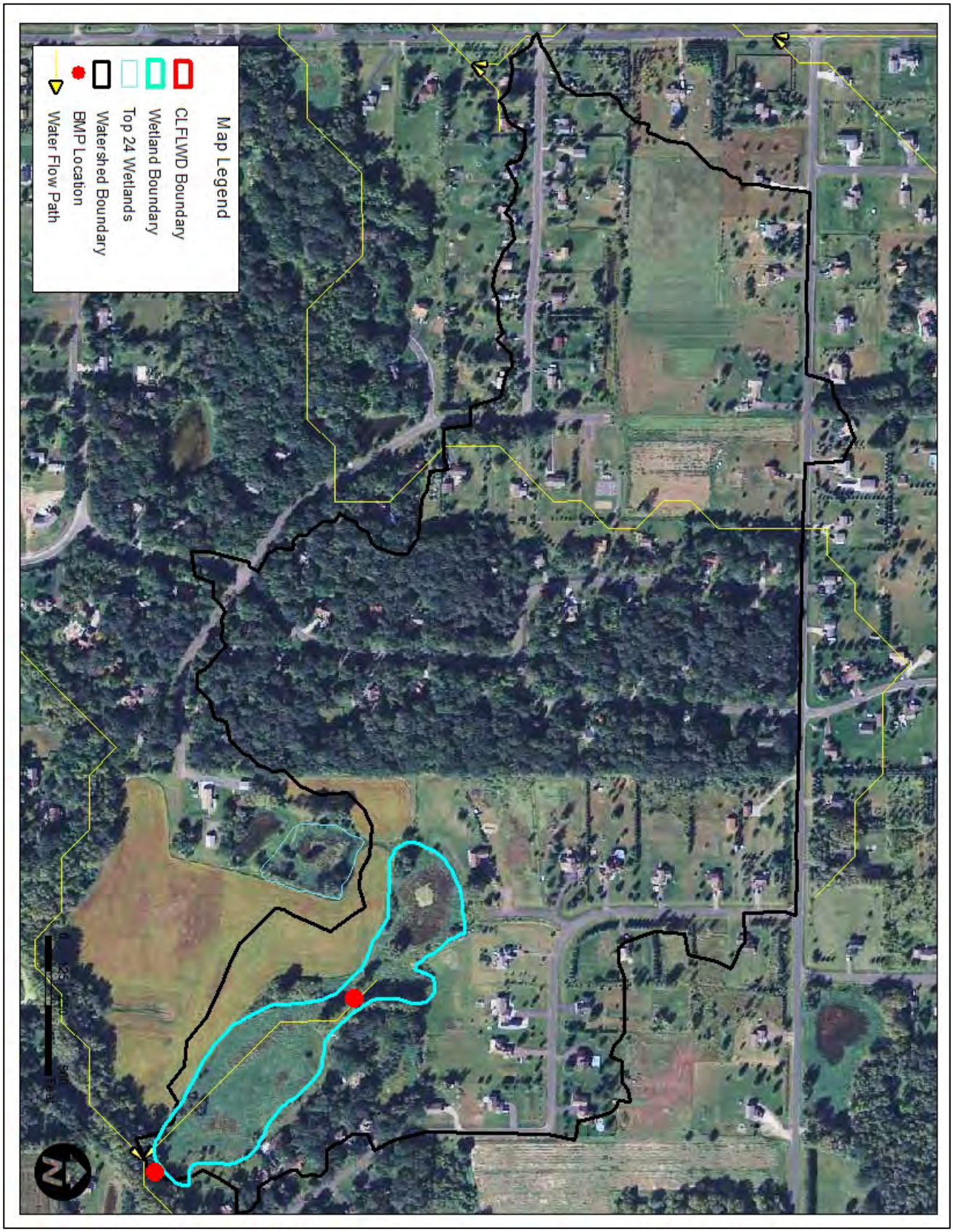
Total Phosphorus Reduction	Engineer’s Estimated Cost
17.1376 lb/yr	$7,774.00

Cost/Lb Total Phosphorus

$453.62/lb



Wetland 1 Dominant vegetation


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
N

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Ranking #14

Wetland Group #7

Wetland 7a

Soil Type	346
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Unverified
Outlet Type	Ditch channel
Wetland Size	1.2 acres
Pool Elevation	922
Berm Elevation	923.5
Watershed Size	19.6 acres
Watershed to Wetland Ratio	16.3:1
Receives water from	Upland
Flows to	Wetland 7b
Dominant Watershed Land Use	Agricultural
Suggested BMP	6” Riser and 6” Tile
Number of Landowners	1
Priority Ranking	Medium

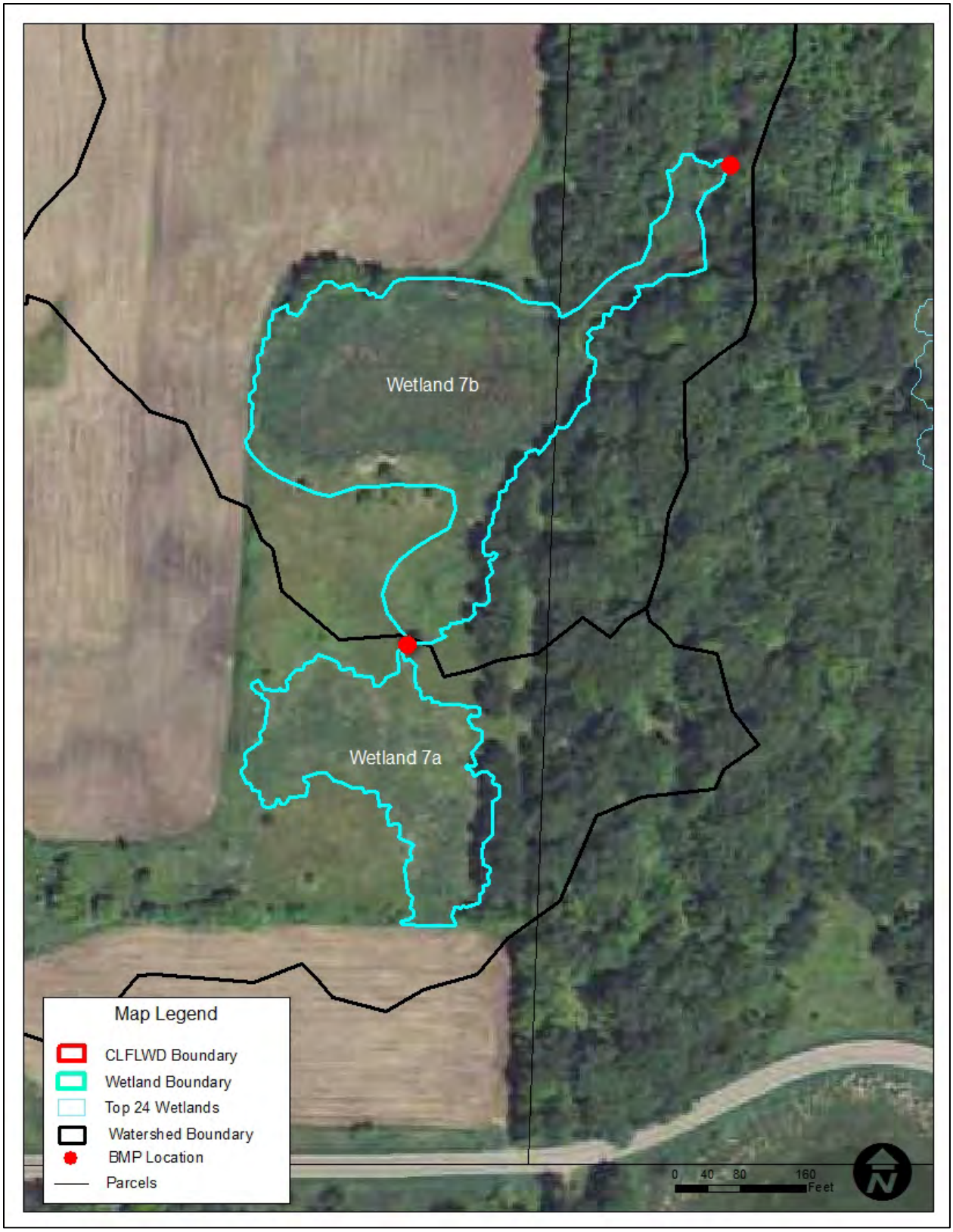
Wetland 7b

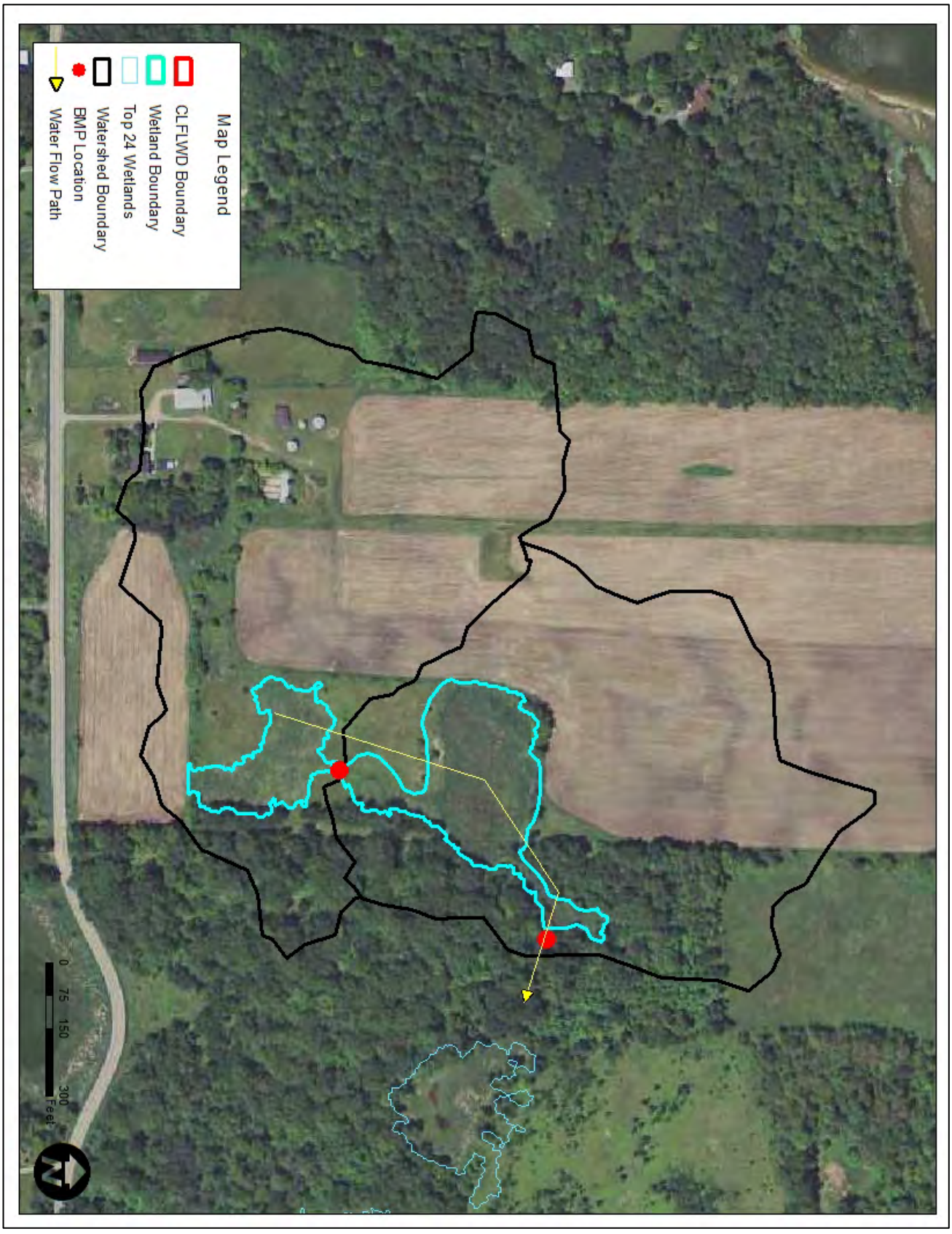
Soil Type	75;40B
NWI Wetland Code	PEM1A; inclusion: PEM1C
Wetland Type	Type 1; inclusion: Type 3
Dominant Vegetation	Unverified
Outlet Type	Ditch channel
Wetland Size	2.7 acres
Pool Elevation	921
Berm Elevation	922.5
Watershed Size	17.4 acres
Watershed to Wetland Ratio	6.4:1
Receives water from	Wetland 7a
Flows to	Wetland 8
Dominant Watershed Land Use	Agricultural
Suggested BMP	6” Riser and 6” Tile
Number of Landowners	2
Priority Ranking	Medium

Total Phosphorus Reduction	Engineer’s Estimated Cost
9.39 lb/yr	$4,604.60

Cost/Lb Total Phosphorus

$490.37/lb


Wetland 7b
Wetland 7a
Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Parcels
0 40 80 160
Feet
N


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
75
150
300
Feet
N

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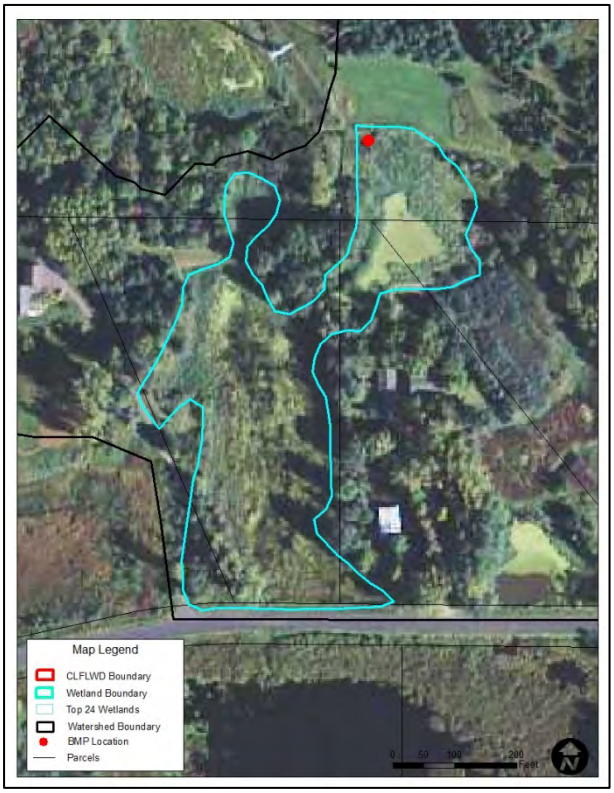
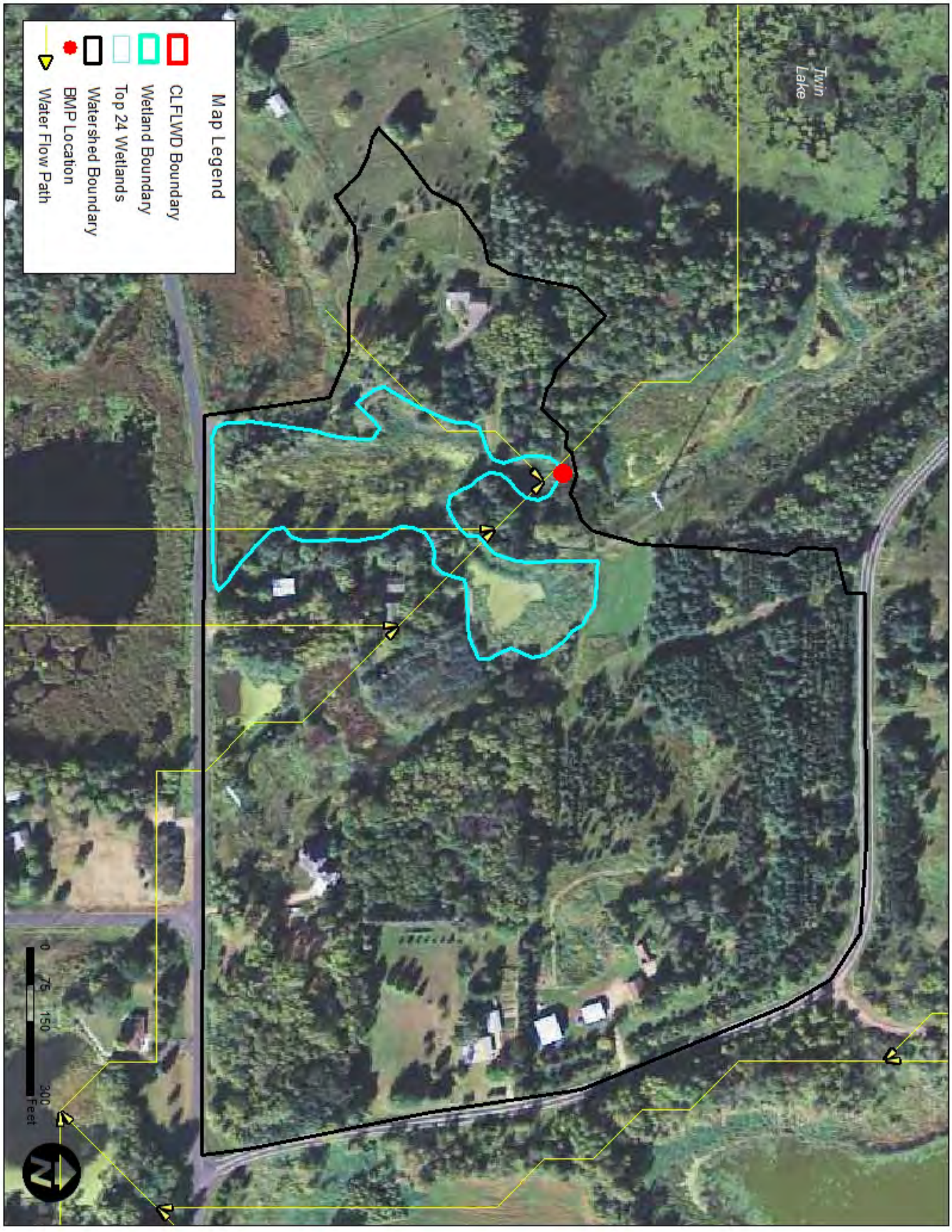
Ranking #15

Wetland Group #24

Soil Type	
NWI Wetland Code	PEM1A; inclusions: PEM1A;PSS1A;PABG
Wetland Type	Type 1; inclusions: Type 3; Type 4; Type 6
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	4.3 acres
Pool Elevation	913
Berm Elevation	914.5
Watershed Size	42.3 acres
Watershed to Wetland Ratio	9.8:1
Receives water from	Clear Lake
Flows to	Twin Lake
Dominant Watershed Land Use	Forest
Suggested BMP	8” Riser and 8” Tile
Number of Landowners	3
Priority Ranking	Medium



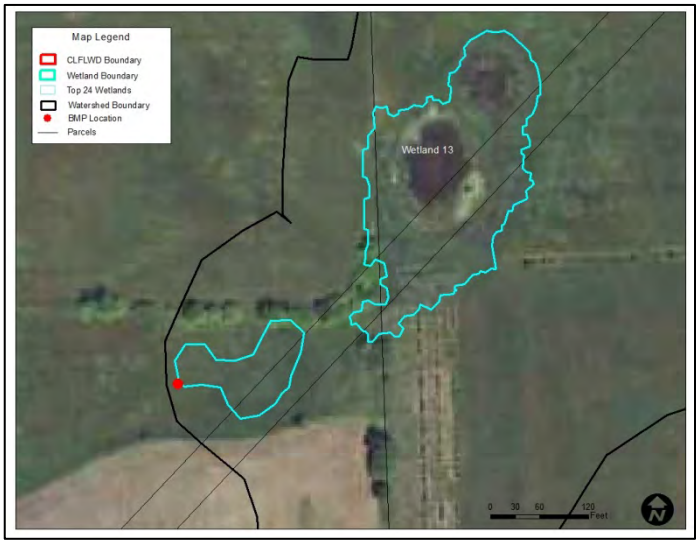
Wetland 24 Drain channel


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
Twin Lake
0
75
150
300
Feet
N

Ranking #16

Wetland Group #13

Soil Type	75
NWI Wetland Code	PEM1A; inclusions: PEM1F; PUBG
Wetland Type	Type 1; inclusions: Type 3, Type 5
Dominant Vegetation	Reed canary grass
Outlet Type	Swale
Wetland Size	1.4 acres
Pool Elevation	938
Berm Elevation	939.5
Watershed Size	12.7 acres
Watershed to Wetland Ratio	9.1:1
Receives water from	Upland
Flows to	Wetland 14
Dominant Watershed Land Use	Agricultural
Suggested BMP	Grass spillway
Number of Landowners	2
Priority Ranking	Medium



Total Phosphorus Reduction

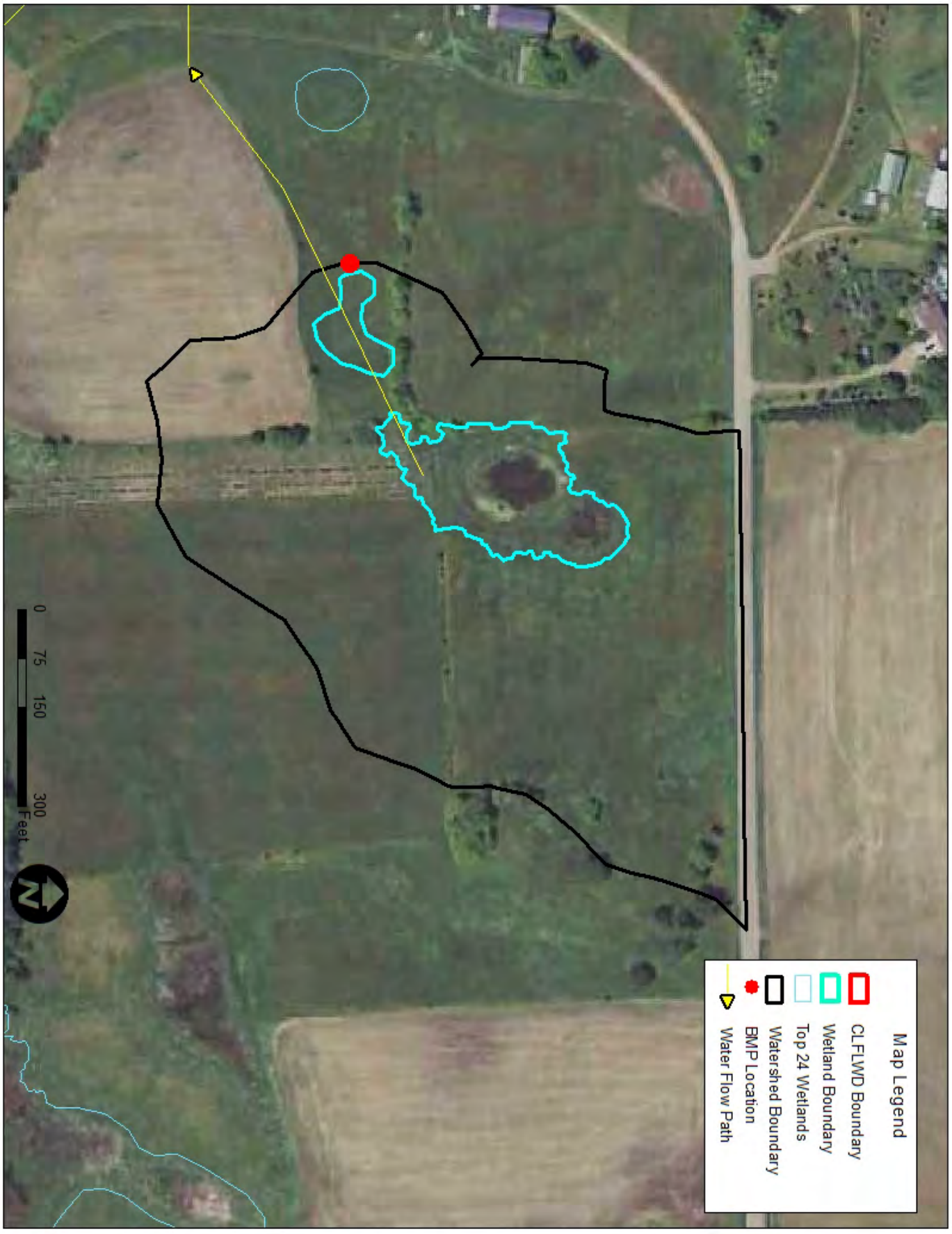
3.6917 lb/yr

Engineer's Estimated Cost

$2,120.60

Cost/Lb Total Phosphorus

$574.42/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
75
150
300
Feet
N

Ranking #17

Wetland Group #12

Wetland 12a

Soil Type	540;123
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	6.0 acres
Pool Elevation	918
Berm Elevation	920
Watershed Size	169.7 acres
Watershed to Wetland Ratio	28.2:1
Receives water from	Wetland 11
Flows to	Wetland 12b
Dominant Watershed Land Use	Forest
Suggested BMP	Weir structure
Number of Landowners	3
Priority Ranking	Medium

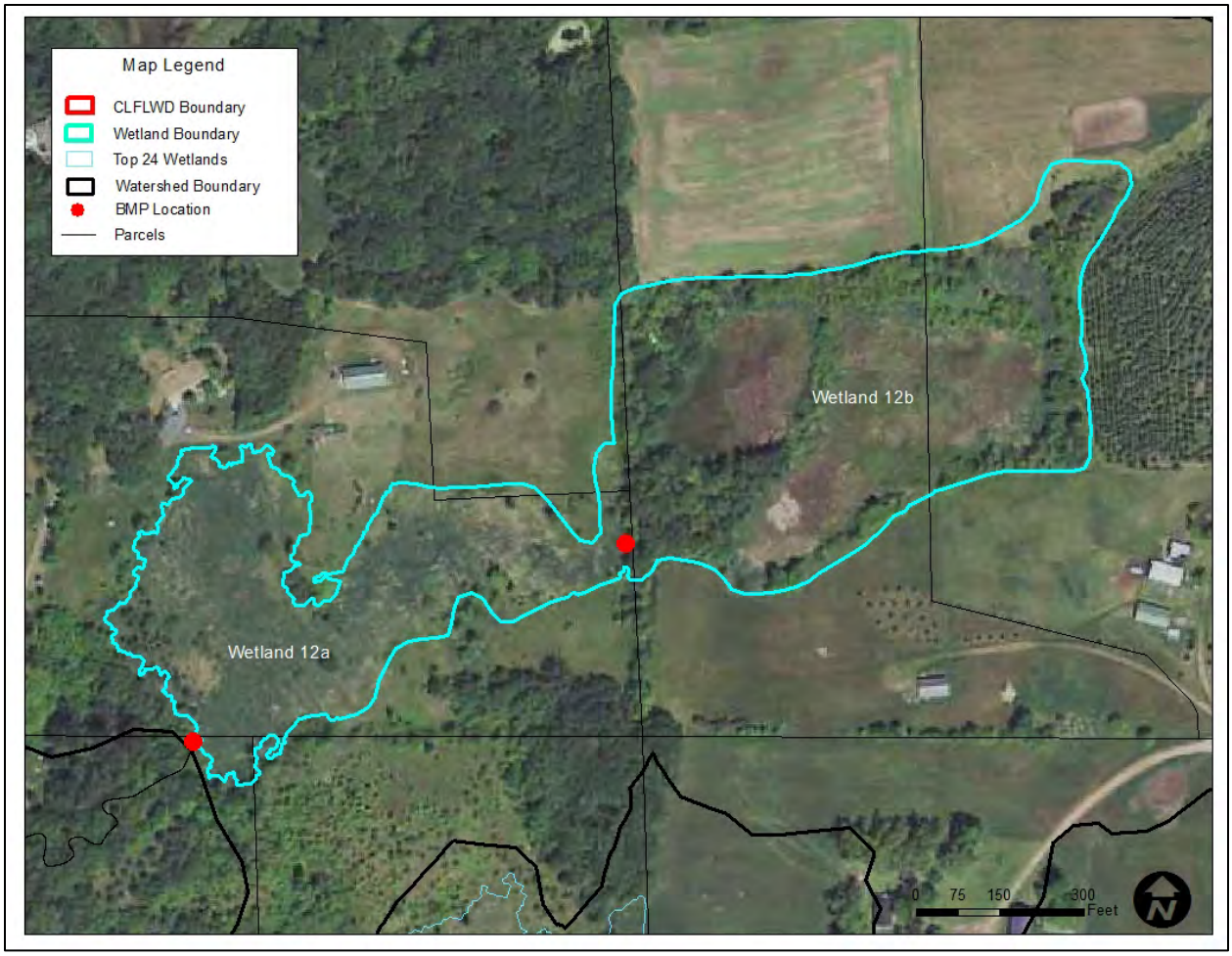
Wetland 12b

Soil Type	544
NWI Wetland Code	PFO1A; inclusions: PEM1C;PSS1A
Wetland Type	Type 1; inclusions: Type 3, Type 6
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	9.9 acres
Pool Elevation	923
Berm Elevation	924.5
Watershed Size	49.8 acres
Watershed to Wetland Ratio	5:1
Receives water from	Wetland 12a
Flows to	Bone Lake
Dominant Watershed Land Use	Agricultural
Suggested BMP	Grass spillway
Number of Landowners	2
Priority Ranking	Medium

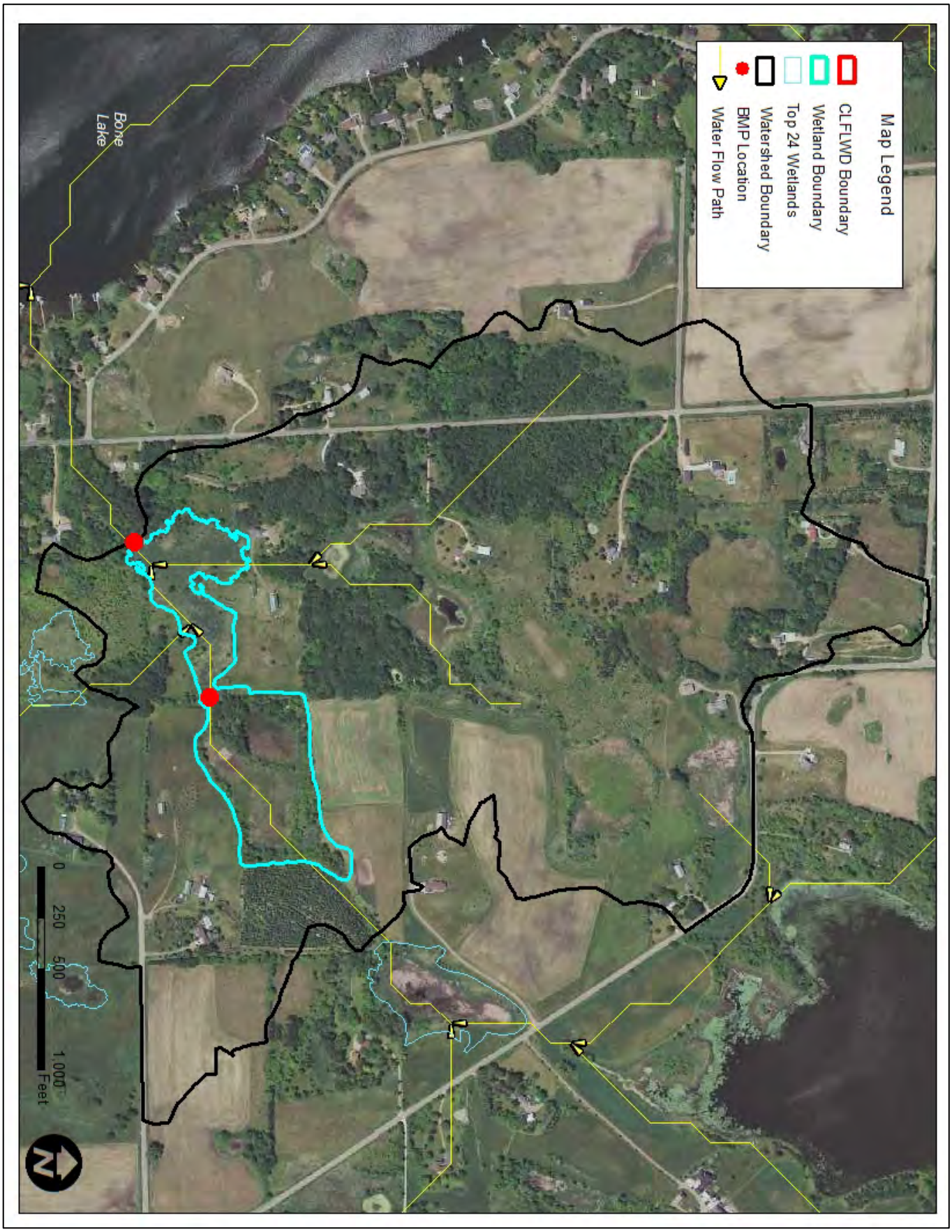
Total Phosphorus Reduction	Engineer's Estimated Cost
31.5436 lb/yr	$20,371.10

Cost/Lb Total Phosphorus

$645.81/lb



Wetland 12 Ditch channel


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
Bone Lake
0
250
500
1,000
Feet
N

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Ranking #18

Wetland Group #6

Wetland 6a

Soil Type	346;40B
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	0.7 acres
Pool Elevation	934
Berm Elevation	935
Watershed Size	3.6 acres
Watershed to Wetland Ratio	5.1:1
Receives water from	Upland
Flows to	Wetland 6b
Dominant Watershed Land Use	Agricultural
Suggested BMP	Grass spillway
Number of Landowners	1
Priority Ranking	Medium

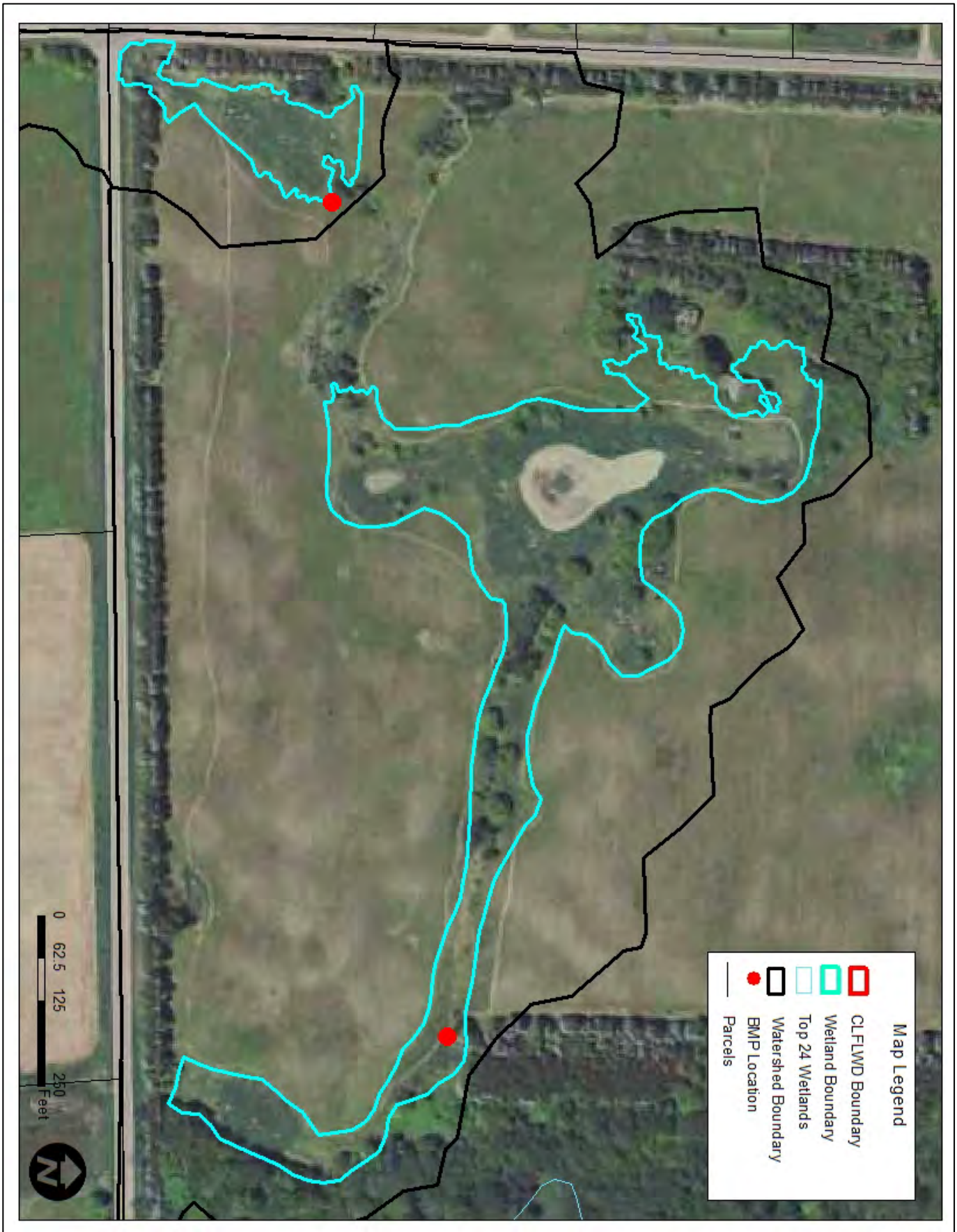
Wetland 6b

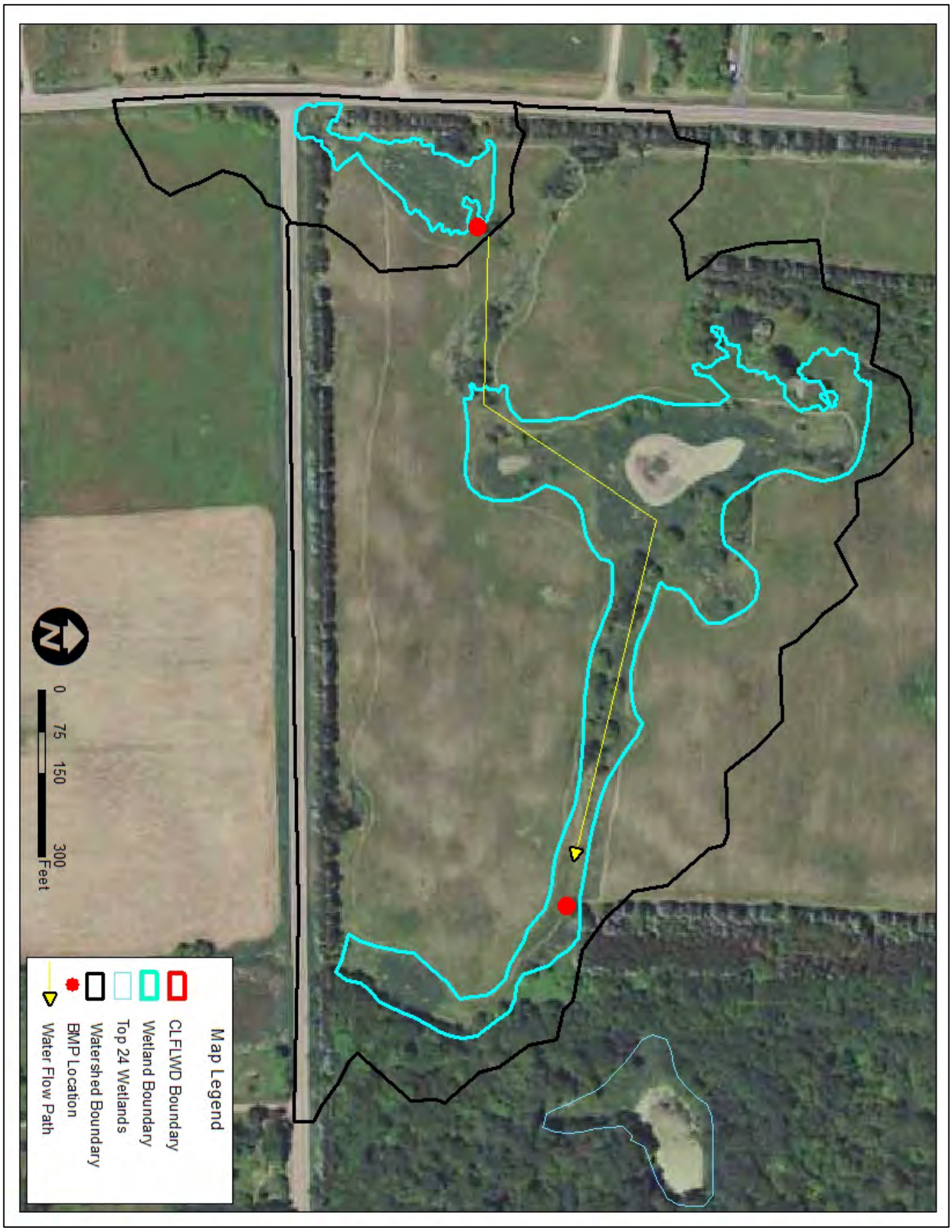
Soil Type	346;40B
NWI Wetland Code	PEM1A; inclusions: PABG
Wetland Type	Type 1; inclusion: Type 4
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	5.7 acres
Pool Elevation	928
Berm Elevation	929.5
Watershed Size	30.8 acres
Watershed to Wetland Ratio	5.4:1
Receives water from	Wetland 6a
Flows to	Second Lake
Dominant Watershed Land Use	Agricultural
Suggested BMP	6” Riser and 6” Tile
Number of Landowners	1
Priority Ranking	Medium

Total Phosphorus Reduction	Engineer’s Estimated Cost
7.1471 lb/yr	$5,359.00

Cost/Lb Total Phosphorus

$749.81/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Parcels
0 62.5 125 250
Feet
N


N
0
75
150
300
Feet
Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path

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Ranking #19

Wetland Group #8

Wetland 8a

Soil Type	75
NWI Wetland Code	PEM1A; inclusions: PEM1C;PABF
Wetland Type	Type 1; inclusions: Type 3, Type 4
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	1.4 acres
Pool Elevation	918
Berm Elevation	919.5
Watershed Size	7.9 acres
Watershed to Wetland Ratio	5.6:1
Receives water from	Wetland 7
Flows to	Wetland 8b
Dominant Watershed Land Use	Forest
Suggested BMP	Grassed spillway
Number of Landowners	1
Priority Ranking	Medium

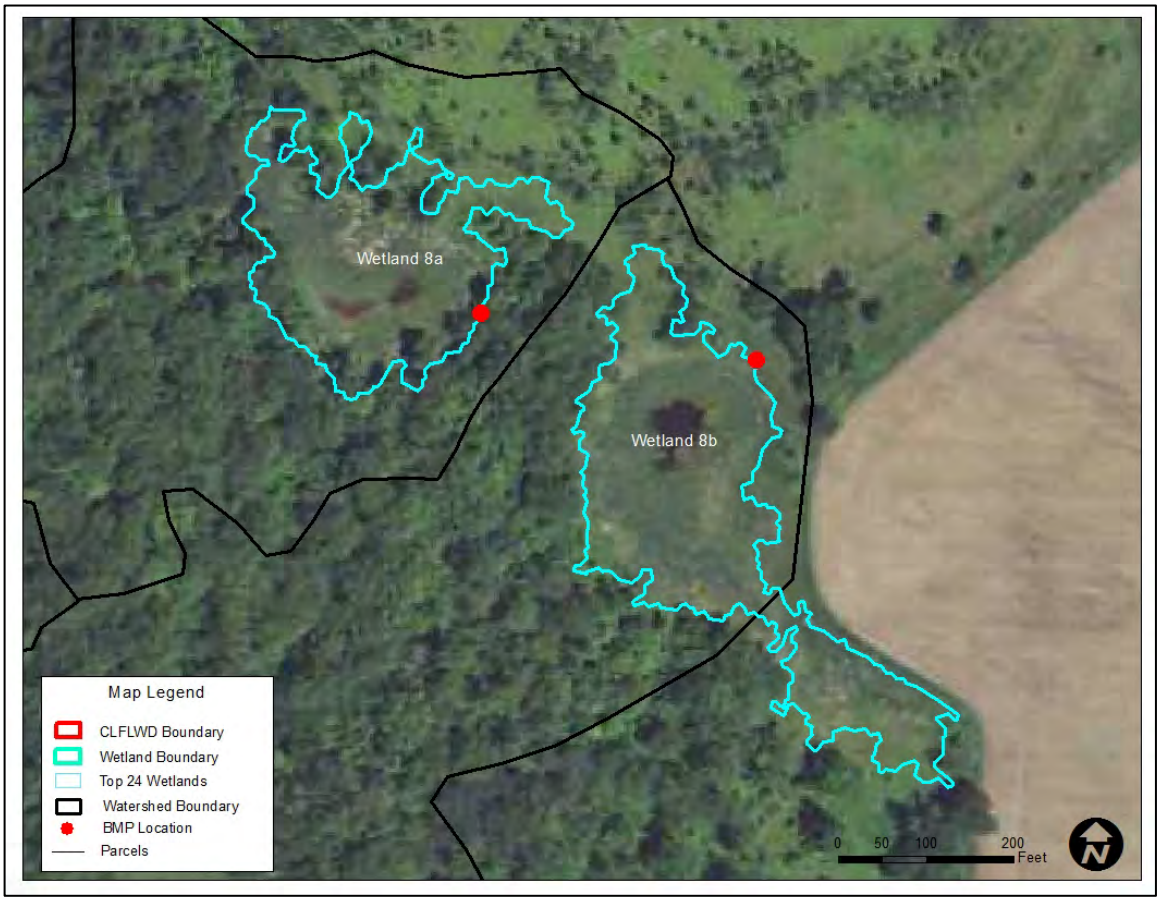
Wetland 8b

Soil Type	75;346
NWI Wetland Code	PEM1A; inclusions: PEM1C;PABF
Wetland Type	Type1; inclusions: Type 3, Type 4
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	1.9 acres
Pool Elevation	912
Berm Elevation	914
Watershed Size	32.8 acres
Watershed to Wetland Ratio	17.2:1
Receives water from	Wetland 8a
Flows to	First Lake
Dominant Watershed Land Use	Forest
Suggested BMP	6” Riser and 6” Tile
Number of Landowners	1
Priority Ranking	Medium

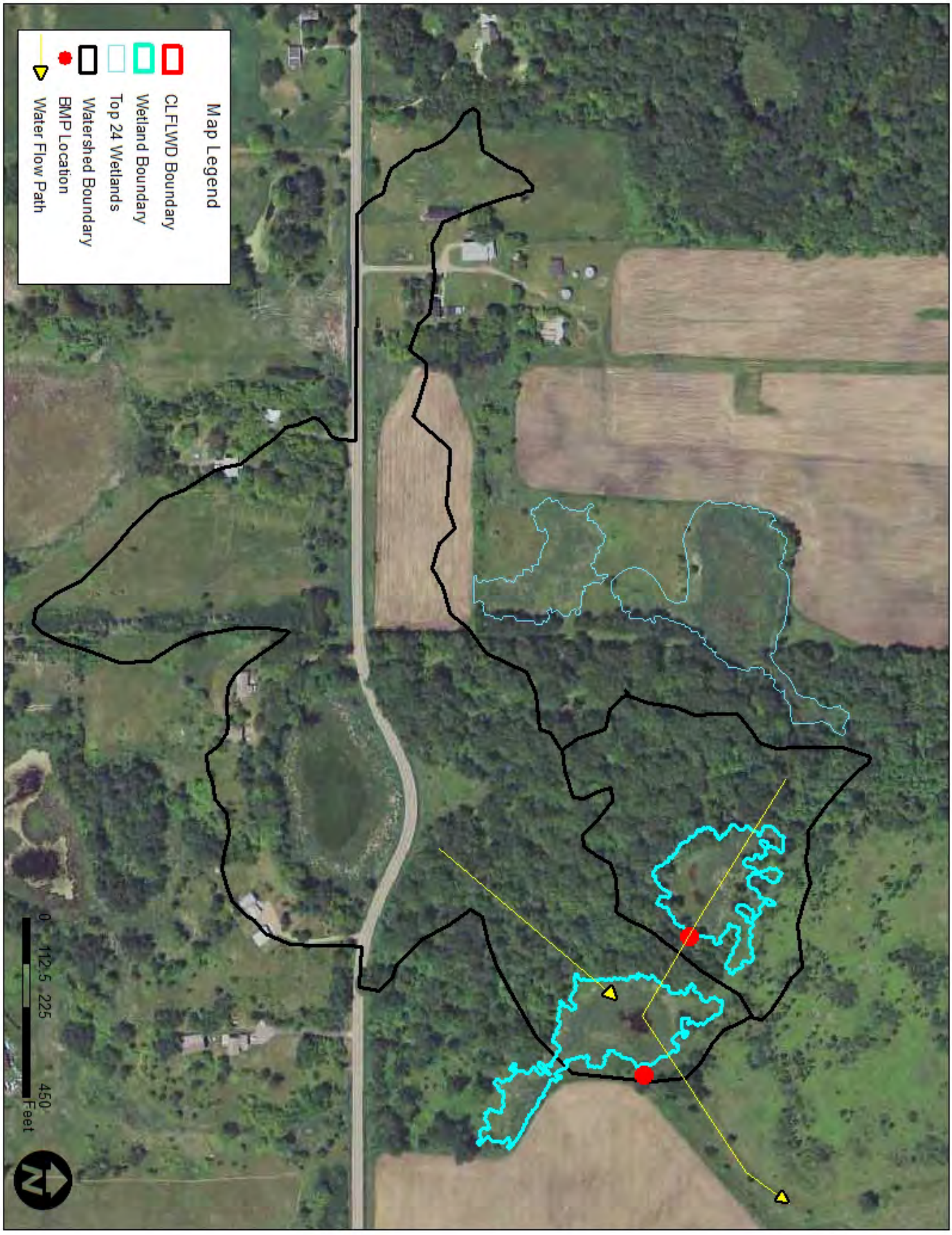
Total Phosphorus Reduction	Engineer’s Estimated Cost
3.7954 lb/yr	$3,317.75

Cost/Lb Total Phosphorus

$874.15/lb



Wetland 8a Ditch channel


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
112.5
225
450
Feet
N

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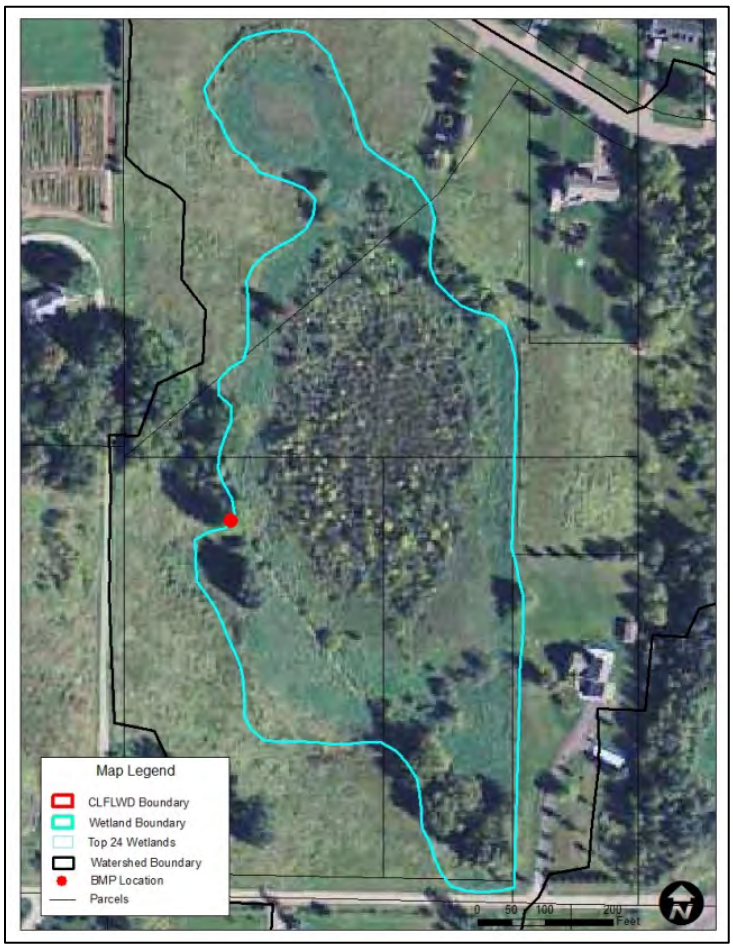
Ranking #20

Wetland Group #2

Soil Type	540;169B
NWI Wetland Code	PEM1A; inclusions: PEM1C;PSS1C
Wetland Type	Type 1; inclusions: Type 3, Type 6
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	8.8 acres
Pool Elevation	903
Berm Elevation	904
Watershed Size	31 acres
Watershed to Wetland Ratio	3.5:1
Receives water from	Upland
Flows to	Comfort Lake
Dominant Watershed Land Use	Open herbaceous
Suggested BMP	Grass spillway
Number of Landowners	4
Priority Ranking	Low



Total Phosphorus Reduction

2.2157 lb/yr

Engineer's Estimated Cost

$2,346.00

Cost/Lb Total Phosphorus

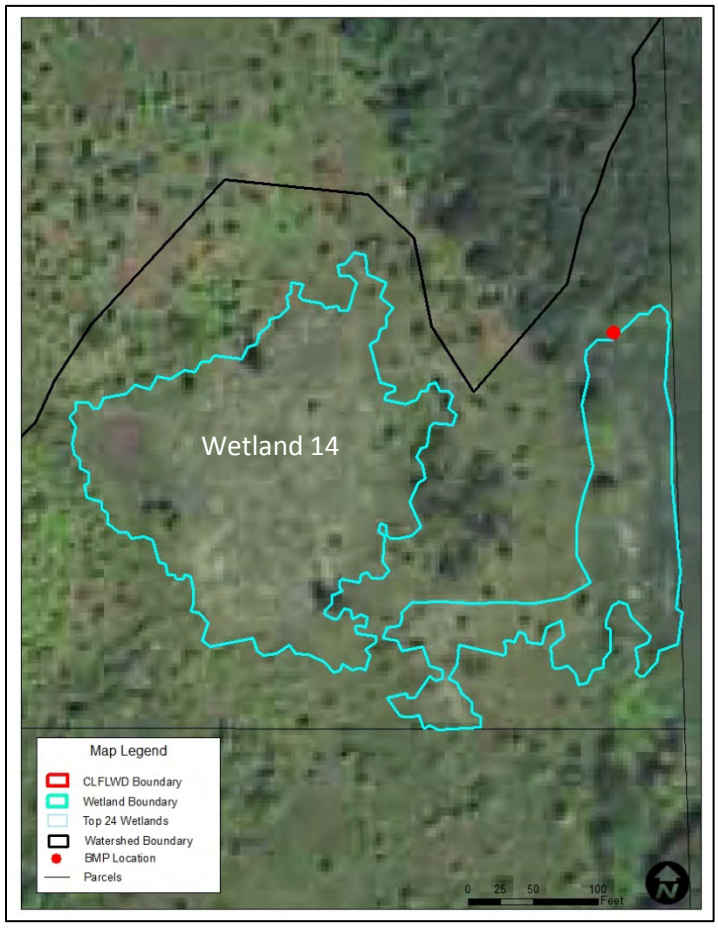
$1,058.81/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
Comfort Lake
0
100
200
400
Feet
N

Ranking #21

Wetland Group #14

Soil Type	75;132C
NWI Wetland Code	PEM1A
Wetland Type	Type 1
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	1.7 acres
Pool Elevation	925
Berm Elevation	926.5
Watershed Size	12.9 acres
Watershed to Wetland Ratio	7.6:1
Receives water from	Wetland 13
Flows to	Wetland 12
Dominant Watershed Land Use	Shrubland
Suggested BMP	Grass spillway
Number of Landowners	2
Priority Ranking	Low



Total Phosphorus Reduction

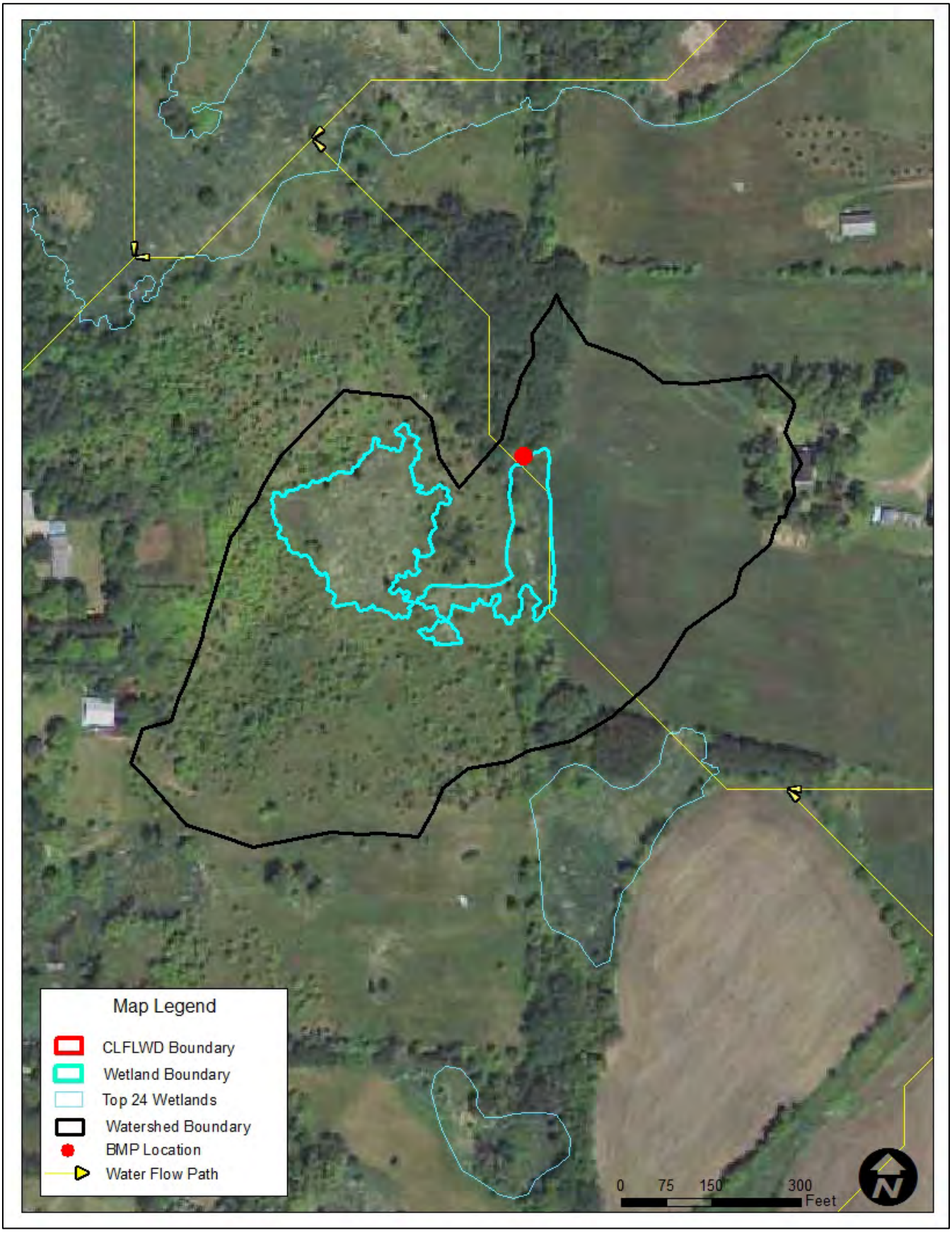
2.083 lb/yr

Engineer's Estimated Cost

$2,210.30

Cost/Lb Total Phosphorus

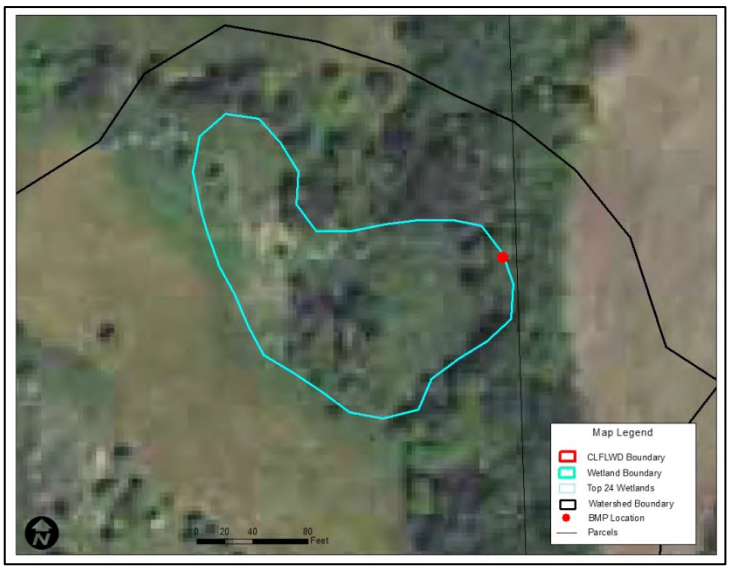
$1,061.11/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
75
150
300
Feet
N

Ranking #22

Wetland Group #15

Soil Type	132B;75
NWI Wetland Code	PEM1A; inclusion: PEM1C
Wetland Type	Type 1; inclusion: Type 3
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	0.6 acres
Pool Elevation	934.5
Berm Elevation	936
Watershed Size	12.6 acres
Watershed to Wetland Ratio	21:1
Receives water from	Upland
Flows to	Wetland 14
Dominant Watershed Land Use	Herbaceous
Suggested BMP	Grass spillway
Number of Landowners	1
Priority Ranking	Low



Total Phosphorus Reduction

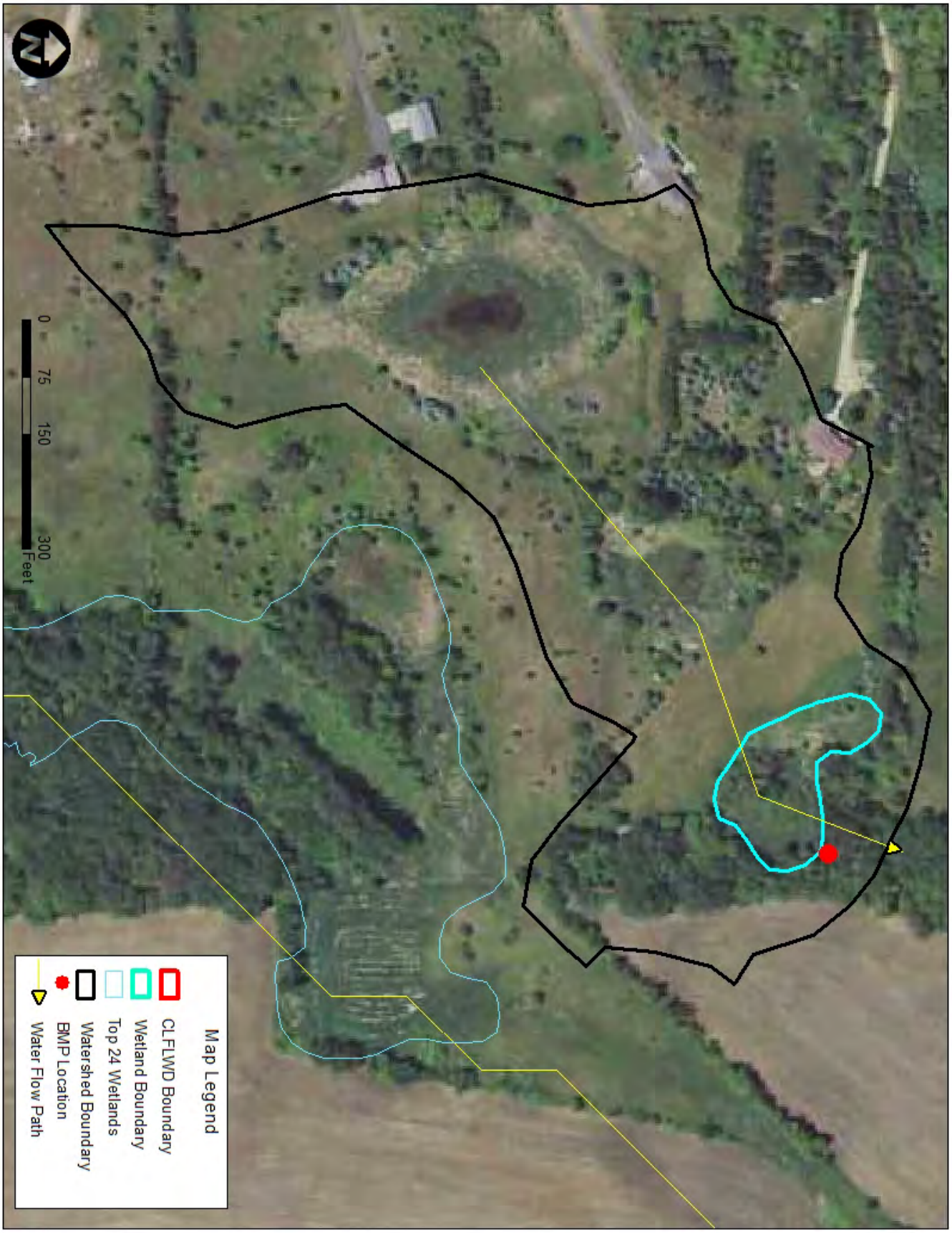
1.1488 lb/yr

Engineer's Estimated Cost

$1,623.80

Cost/Lb Total Phosphorus

$1,413.47/lb


N
0
75
150
300
Feet
Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path

Ranking #23

Wetland Group #11

Soil Type	540;132C
NWI Wetland Code	PEM1A; inclusions: PEM1C;PABG
Wetland Type	Type 1; inclusions: Type 3, Type 4
Dominant Vegetation	Cattails
Outlet Type	Swale
Wetland Size	5.2 acres
Pool Elevation	926
Berm Elevation	928
Watershed Size	28.9 acres
Watershed to Wetland Ratio	5.6:1
Receives water from	Wetland 6, Wetland 10
Flows to	Wetland 12
Dominant Watershed Land Use	Rural residential
Suggested BMP	6" Riser and 6" Tile
Number of Landowners	3
Priority Ranking	Low

Total Phosphorus Reduction

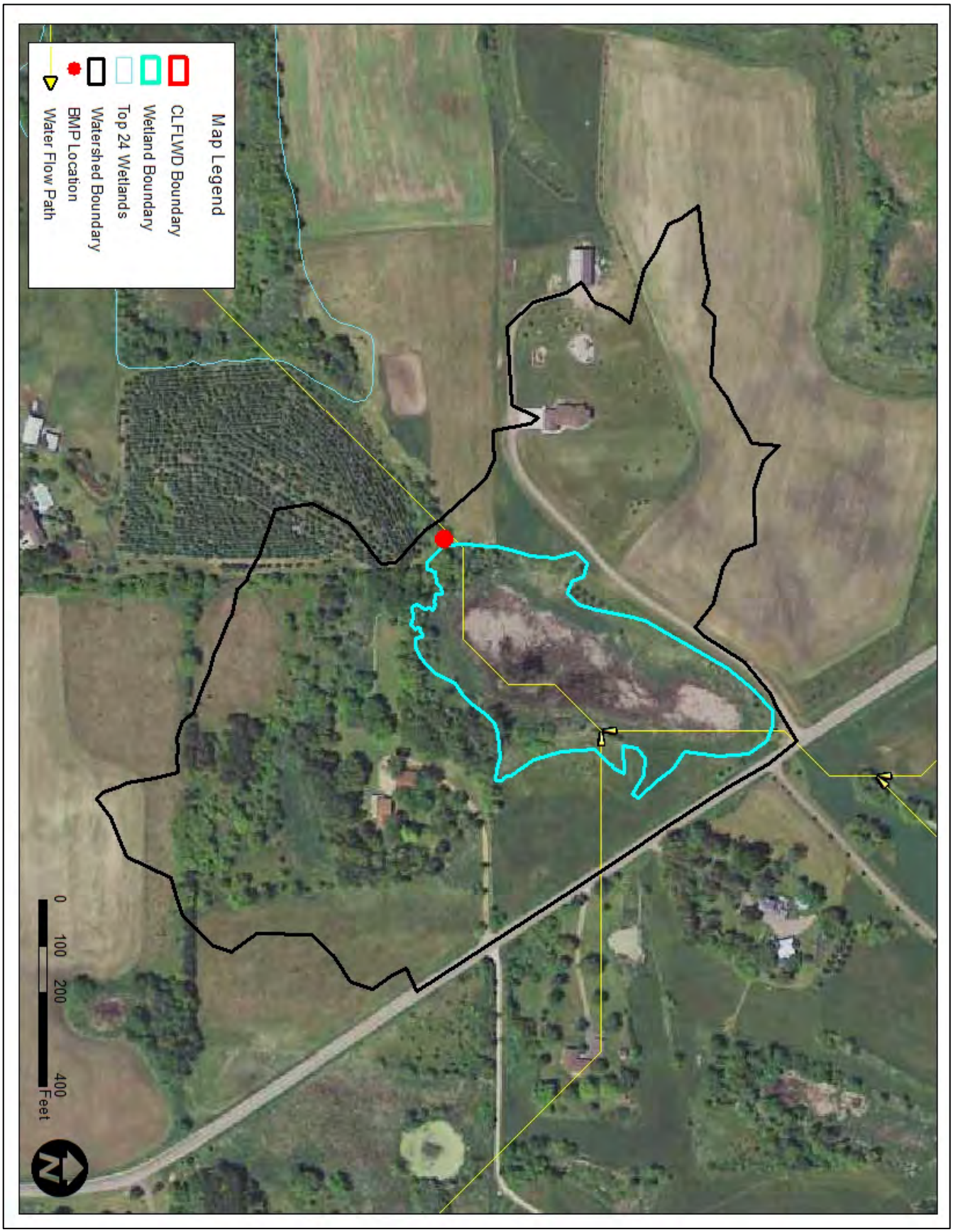
4.6209 lb/yr

Engineer's Estimated Cost

$6,949.45

Cost/Lb Total Phosphorus

$1,503.92/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
100
200
400
Feet
N

Ranking #24

Wetland Group #3

Wetland 3a

Soil Type	75
NWI Wetland Code	PEM1A; inclusion: PEM1C
Wetland Type	Type 1; inclusion: Type 3
Dominant Vegetation	Reed canary grass
Outlet Type	Ditch channel
Wetland Size	7.8 acres
Pool Elevation	922
Berm Elevation	923
Watershed Size	21.8 acres
Watershed to Wetland Ratio	2.8:1
Receives water from	Upland
Flows to	Wetland 3b
Dominant Watershed Land Use	Herbaceous
Suggested BMP	Rock spillway
Number of Landowners	2
Priority Ranking	Low

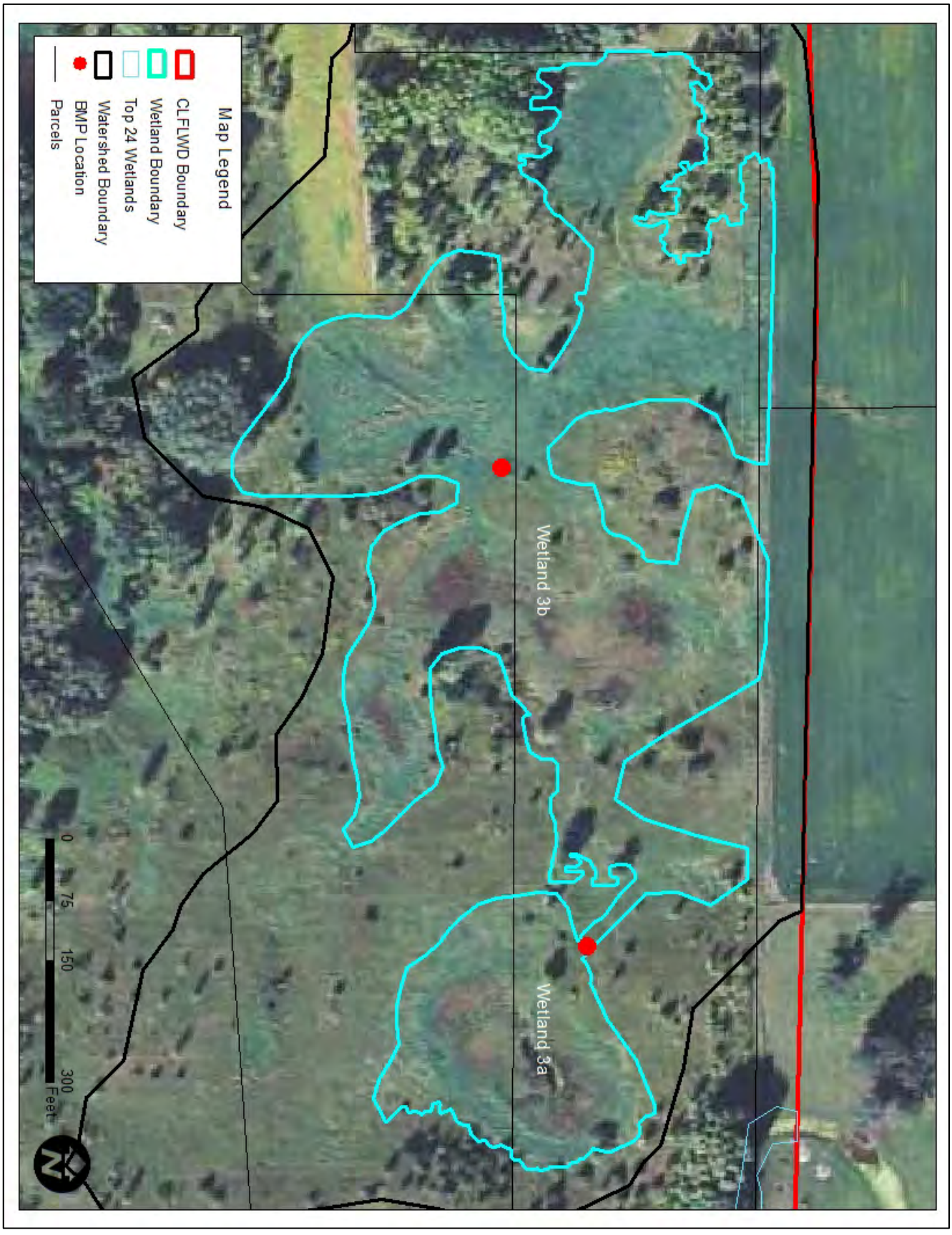
Wetland 3b

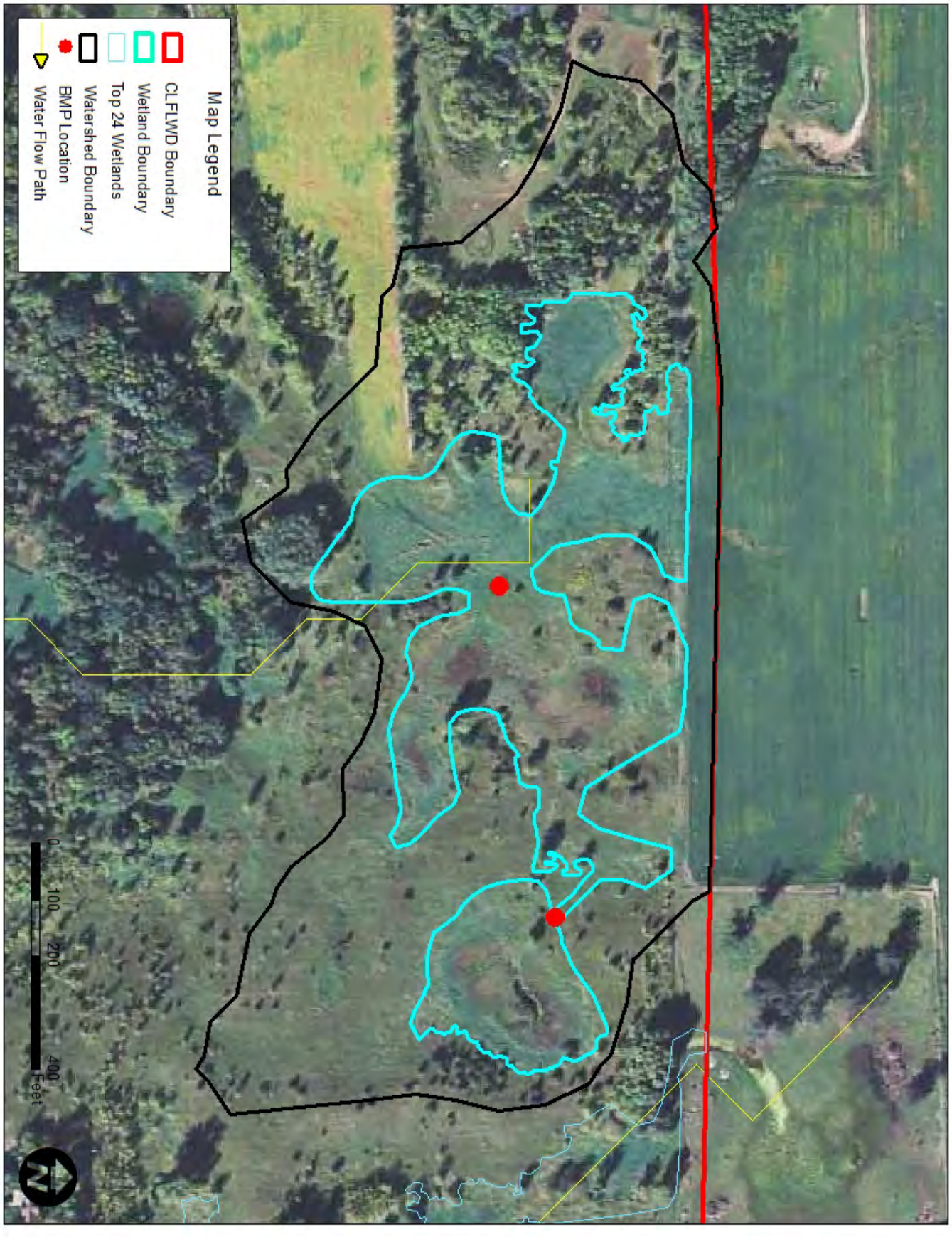
Soil Type	75;346;40C
NWI Wetland Code	PEM1A; inclusion: PEM1C
Wetland Type	Type 1; inclusion: Type 3
Dominant Vegetation	Reed canary grass
Outlet Type	Swale
Wetland Size	3.7 acres
Pool Elevation	917
Berm Elevation	918
Watershed Size	7.8 acres
Watershed to Wetland Ratio	2.1:1
Receives water from	Wetland 3a
Flows to	
Dominant Watershed Land Use	Herbaceous
Suggested BMP	Grass spillway
Number of Landowners	2
Priority Ranking	Low

Total Phosphorus Reduction	Engineer's Estimated Cost
1.2248 lb/yr	$2,187.30

Cost/Lb Total Phosphorus

$1,785.84/lb


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Parcels
Wetland 3b
Wetland 3a
0
75
150
300
Feet
N


Map Legend
CLFLWD Boundary
Wetland Boundary
Top 24 Wetlands
Watershed Boundary
BMP Location
Water Flow Path
0
100
200
400
Feet
N

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Appendix-Field Verification Sheets

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

1a - 1.5acres
6.4 acre W.S.

1b - 8.5acres
129.8acre W.S.

Evaluation Sheet

Wetland Identification: #1

Photograph numbers: 1 3, 4

NWI Wetland codes: 117.8

Existing wetland condition:

Soil type: Organic Matter Content:

Vegetation present: List dominant species first

Herbaceous: Reed canary MONOculture

Woody: Green Ash, Boxelder

Inlet condition:

Outlet condition: low, wide area - Not well defined channel
Standing water <6"
gully outlet into major ditch system

Notes: *Neighbors garage just above wetland line.

	TSS	TP
1a	6.76	8.30
1b	277.99	287.75

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: #2

Photograph numbers: None

NWI Wetland codes: _____

Existing wetland condition: shrubby

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary

Woody: shrubs, few trees

Inlet condition: culvert

Outlet condition: private property - could not access

Notes: ditch plug?

TSS TP
11.17 16.95

9.5
1.7/3.8
7.8/21.8

6 3.7/7.8

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: #3

Photograph numbers: _____

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary monoculture edges have natives

Woody: _____

Inlet condition: _____

Outlet condition: 40' across swale 3-4' depth small ditch 2' x 1'

Notes: ditch plugs

47.4 | 262.3
216.5 - 37.5
45.8 - 9.9

Drained Wetland Inventory

7/7/14

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: #4

Photograph numbers: #1 @ Walstroms (3)

NWI Wetland codes: _____

Existing wetland condition: Monoculture reed canary. Surface water present

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary

Woody: Aspen, Ash, boxelder, elm

Inlet condition: _____

Outlet condition: well defined deep channel

Notes:
Ditch plug(s)
May flood some low areas of fields.

	TSS	TP
4a	194.50	237.77
4b	73.95	82.50

6.2 / 73.2

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: #5

Photograph numbers: 2

NWI Wetland codes: _____

Existing wetland condition: saturated but No standing H_2O

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed Canarygrass Mono culture

Woody: _____

Inlet condition: _____

Outlet condition: 10' wide 2' deep channel

Notes: ditch plug

0.7 / 3.6
5.7 / 30.8

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: #6

Photograph numbers: 3 & 4

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary

Woody: _____

Inlet condition: _____

Outlet condition: ditch 

Notes: 20' across 5-6' deep
small cut in bottom

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 8

Photograph numbers: _____

NWI Wetland codes: _____

Existing wetland condition: _____

_____

_____

_____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary monoculture.

_____

Woody: _____

_____

Inlet condition: _____

_____

_____

Outlet condition: to lake - 6'x4' ditch channel

from one to other - 6-7' x 4.5' ditch

Notes:

Access to ditch between wetlands through Forest.

8a - 1.4/7.9
b - 1.9/32.8

1.7 / 159.9

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: #9

Photograph numbers: 5, 6, 7, 8

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Lake sedge in basin, Reed canary around edges

Woody: _____

Inlet condition: _____

Outlet condition: ditch 3-4' wide 2' deep water present. Flows to neighbors wetland

Notes: ditch plug.

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: #1D

Photograph numbers: _____

NWI Wetland codes: _____

Existing wetland condition: _____

_____

_____

_____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: _____

_____

Woody: _____

_____

Inlet condition: _____

_____

_____

Outlet condition: Culvert under road.

_____

_____

Notes:

a 4.4 + 0.7 = 5.1 / 20.4

b 3.6 ~~+5.7~~ = 9.3 / 186.3
3.6 - 126.8

c 2.7 - 34.9

d 2.9 - 24.6

5.2 | 28.9

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 11

Photograph numbers: _____

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: cattails

Woody: _____

Inlet condition: _____

Outlet condition: Swale - not well defined

Notes:

ditch checks

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 11

Photograph numbers: 9

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: cattails

Woody: _____

Inlet condition: _____

Outlet condition: Swale - Not well defined Channel

Notes: couldn't find defined ditch.
berm possible but worthwhile?

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: Caliguire/Edell 12

Photograph numbers: 1-8

NWI Wetland codes: ________

Existing wetland condition: Type 2, surface water present

Soil type: ________ Organic Matter Content: ________

Vegetation present: List dominant species first

Herbaceous: 99% Reed canary grass in bottom.
Edges - sedges, spirea, meadowrue, ferns, goldenrod

Woody: Edges only - Elm, ash, dogwood, poplar

Inlet condition: 2' diameter culvert draining Type 3/4 wetland

Outlet condition: 8-10' wide, 3' deep
stagnant

Notes: plenty of on-site material for building berm.
50' berm w/ emergency spillway
Easy access for dozer.

a 6.0 - 169.7
b 9.9 - 49.8
219.5

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 13

Photograph numbers: #10

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary

Woody: None

Inlet condition: _____

Outlet condition: swale - no defined channel

Notes: Would need long berm to plug.

1.17 + 0.22 = 1.39

a 1.1/7.6
b 0.6/5.3

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: #14

Photograph numbers: 11, 12, 13

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Smaller is reed canary
larger is cattails & reed canary

Woody: _____

Inlet condition: _____

Outlet condition: ditch 3'x3' dry
large ditch 5-6' x 2-3' deep

Notes: Both could be ditch plugs.
Homeowner interested.
Draintile present but clogged according to land owner

0.6 / 12.6

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 15

Photograph numbers: (1)

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary

Woody: _____

Inlet condition: _____

Outlet condition: ditch channel 5' x 3'

Notes: ditch plug

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: Lackas 16

Photograph numbers: 9- 13

NWI Wetland codes: _____

Existing wetland condition: Surface H_2O

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary 60%, sedges 40%

Woody: Oak, Ash, maple

spirea

Inlet condition: did not visit

Outlet condition: stagnet, culvert under road
1'x3' channel - very flat. Need very larg berm.

Notes:

7/5/11

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 17

Photograph numbers: (1)

NWI Wetland codes: _____

Existing wetland condition: Fields on all sides

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

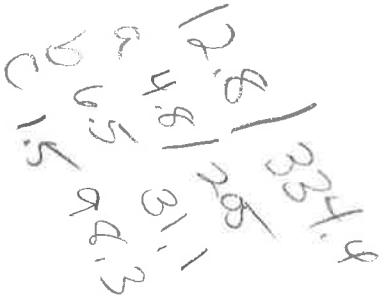
Herbaceous: _____

Woody: _____

Inlet condition: _____

Outlet condition: culvert under road. Ditch channel 5'x3'

Notes: Ditch plug.



12.6/211.7

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 18

Photograph numbers: (1)

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary in most areas
Open H2O in deepest

Woody: _____

Inlet condition: _____

Outlet condition: ditch 3' x 2'
Doesn't drain entire wetland - some places stay wet when ditch is dry

Notes: ditch plug

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 19 & 20 & 21

Photograph numbers: (1)

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary

Woody: _____

Inlet condition: _____

Outlet condition: Culvert outlet

Notes: Lots of ag runoff. Many potential spots to plug.

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 22

Photograph numbers: (1)

NWI Wetland codes: _____

Existing wetland condition: _____

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary

Woody: _____

Inlet condition: _____

Outlet condition: Deep channel 10-15' wide 6' deep standing H2O culvert under driveway

Notes:

22a - 13 | 23.9 - 16.4 | 45.0

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 23

Photograph numbers: (2)

NWI Wetland codes:

Existing wetland condition:

Soil type: Organic Matter Content:

Vegetation present: List dominant species first

Herbaceous: Reed canary

Woody:

Inlet condition:

Outlet condition: culvert - ditch channel deep 10'x6'
Standing water present

Notes: ditch plug

9 - 7.6 | 9.02
5 - 7.1 | 8.23
6.7 |

Drained Wetland Inventory

Field Verification Checklist

- Maps
- Camera and extra batteries
- Clipboard and evaluation sheets
- Soil sample bags
- Soil core auger
- Munsell color book

Evaluation Sheet

Wetland Identification: 24

Photograph numbers: (3)

NWI Wetland codes: _____

Existing wetland condition: standing H_2O, w/ rooted aquatic veg - not type 1/2?

Soil type: _____ Organic Matter Content: _____

Vegetation present: List dominant species first

Herbaceous: Reed canary / cattail on edges

Woody: _____

Inlet condition: _____

Outlet condition: ditch channel 4-5' x 2-3'

Notes: ditch plug

4/3/23