MINNEHAHA CREEK WATERSHED DISTRICT
QUALITY OF WATER QUALITY OF LIFE

MEMORANDUM

To: MCWD Board of Managers

From: Courtney Hall, Permitting Technician

CC: James Wisker, Director of Planning and Projects

Date: February 9, 2015

Re: Update on City of Minnetrista, Mader Family Trust, and MCWD Partnership

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Purpose:

To provide background and outline the discussion regarding the City of Minnetrista, Mader Family Trust, and MCWD Partnership for the upcoming Board meeting on February 12, 2015.

Background:

On October 9, 2014, the District executed a Memorandum of Understanding establishing a partnership with the City of Minnetrista and the Mader Family Trust to assess the feasibility and potential cost of wetland restoration and bank creation and its effect on future development of the Mader Family Trust land located at 8000 Highway 110 W in the city of Minnetrista.

Since execution of the MOU, District staff have developed a value-added concept plan that maximizes conservation areas of the property and potential revenue for the members of the Mader family.

District staff met with City of Minnetrista staff and members of the Family Trust on February 2, 2015 to present findings of the study and the concept plan. Presentation of the concept plan marked a junction point outlined in the MOU that merits further discussion of the District's role moving forward to achieve goals of the collaboration. At the meeting, members of the Family Trust expressed interest in continuing its partnership with the District to advance the proposed plan through the municipal and wetland banking concept plan approval process. Attached are letters of support for continuation of the partnership through concept plan approval from the City of Minnetrista and the Mader Family Trust.

Next Steps:

Next steps will be discussed at the Board Meeting on February 12, 2015.

If there are questions in advance of the meeting, please contact: Courtney Hall - chall@minnehahacreek.org or 952-473-2855

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7701 County Road 110 West
Minnetrista, MN 55364-9552
Email: minnetrista@ci.minnetrista.mn.us

February 5, 2015

James Wisker
Director of Planning and Projects
15302 Minnetonka Blvd.
Minnetonka, MN 55345

Dear Mr. Wisker,

Please consider this letter of support for the continued partnership between the City of Minnetrista, the Mader Family Trust and the Minnehaha Creek Watershed District. In accordance with the Memorandum of Understanding between these three parties, the City of Minnetrista has been actively participating in assessing the potential for a conservation subdivision and wetland bank on the "Mader" property located at 8000 Highway 110 West.

Building on past discussions, at the February 2, 2015 meeting between the three parties the District presented the opportunity for a 10 lot subdivision. The concept proposes to optimize the conservation and restoration of high value natural resources on site (restored wetland bank and contiguous upland) to increase the number of buildable lots beyond standard zoning. This proposal is consistent with the City of Minnetrista's cluster development provision.

Following recent discussions regarding the MCWD's value added model focused on responsive partnerships that integrate land-use and natural resource planning, the City of Minnetrista is excited about the potential for this project to serve as an example of what can be achieved through creative collaboration.

Working hand in hand with the landowner, the City of Minnetrista and the District have developed a plan that:

- incentivizes private investment in the creation of the first wetland bank in the watershed;
- creates the potential for the City to attain load reduction credit under state mandated total maximum daily loads (TMDLs);
- maximizes the tax base realized from the parcel while preserving key natural resources; and
- offers the greatest potential economic return for the landowner while meeting their goals of preserving the legacy of the landscape.

For the reasons cited above the City of Minnetrista supports the continuation of this partnership, and the District's efforts to assist the Mader Family Trust in advancing this plan through the municipal concept plan approval process.

Sincerely,

David Abel

David Abel, Community Development Director
City of Minnetrista

February 7, 2015

James Wisker
Director of Planning and Projects
15302 Minnetonka Blvd.
Minnetonka, MN 55345

Dear Mr. Wisker,

I am writing to follow up to the February 2, 2015 meeting between representatives of the Mader Family Trust, the Minnehaha Creek Watershed District (MCWD) and the City of Minnetrista. Under the Memorandum of Understanding executed between these three parties the District proposed to help investigate creative opportunities to accomplish our family's goals of preserving and enhancing the property's ecological resources while also maximizing economic value.

We were initially uncertain where this partnership with the watershed district might lead and if it would really be able to address the goals we had outlined. We first began conversation with the MCWD curious how natural resource regulations might apply or limit future development. However the District's work, through Courtney Hall, has exceeded our expectations.

We understand the options outlined by the District are not guarantees. However, the reports provided by the District in coordination with the City of Minnetrista offer a clear roadmap of how we might maximize economic value, while restoring the landscape and preserving our family's legacy. We are truly excited with the concept of restoring key natural features across half of the site as a strategy to maximize density and development potential as it directly addresses the goals of the Trust.

As we discussed with you and the City of Minnetrista, we would like the District to remain involved as it sees fit in providing assistance and advice to support the pursuit of concept plan approval for the development plan and wetland bank. We understand that there may need to be some resources expended on our behalf and that the District is evaluating how to best continue working in partnership with us and the City to advance this great plan.

We look forward to continuing to work with you in pursuit of our mutual goals. Thank you for all of your help.

Sincerely,

George Mader,
Trustee, Mader Family Trust

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TECHNICAL MEMORANDUM

TO: Minnehaha Creek Watershed District

FROM: Wes Boll, Wenck Associates, Inc.

DATE: January 27, 2015

SUBJECT: Mader Wetland Restoration Concept Plan and Feasibility Analysis

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Introduction

Wenck Associates, Inc. (Wenck) was contracted by the Minnehaha Creek Watershed District (MCWD) to conduct a feasibility analysis for a proposed wetland restoration on the Mader family property in the City of Minnetrista (Figure 1).

Wenck and MCWD staff conducted an off-site review to determine the cropping history and history of drainage on the subject property. A site visit was conducted to document existing conditions on the site and delineate the boundaries of existing wetlands. Hydrologic and hydraulic modeling was conducted to assess the existing and proposed hydrology of the subject property and potential effects the project could have on adjacent properties.

This technical memorandum summarizes the historical and existing conditions of the subject property, provides a concept plan for restoration, provides a feasibility discussion of the restoration, summarizes the potential credits that would be available from the project to be deposited in the MN Wetland Bank, and estimates costs for the project.

Historical Conditions

Wenck and MCWD conducted an off-site analysis of aerial photographs obtained from the Farm Service Agency from 1980 to 2013 to determine the cropping history and effectiveness of drainage features on the site. This analysis was conducted following the regulatory guidance for off-site wetland determination. For the purposes of discussion, the subject property was divided into investigated areas as shown on Figure 2. The results of the analysis are summarized in Table 1 and on Figure 7. Aerial photographs are found in Appendix A. Other data reviewed during the off-site investigation included LIDAR (Figure 3), soil survey (Figure 4), NWI and MCWD functional assessment of wetlands (FAW) (Figure 5).

Precipitation data from a station near the subject property was obtained from the MN Climatological Office and was used to determine if precipitation conditions were “normal”, “wet”, or “dry” compared to the 30 year normal precipitation data during the 3 months preceding the date the aerial photograph was taken. Each year of aerial photograph was reviewed to determine the cropping history and presence of wet signatures such as surface water, drowned out crops, crop stress, or changes in cropping patterns.

Results

Review of LIDAR (Figure 3) demonstrates that the investigated area on the subject property contains a large depressional area in the vicinity of investigated areas 4 and 5. Depressions are also noted in other potential investigated wetland areas. The site generally drains to the southeast through a culvert under Northview Drive.

The Hennepin County soil survey map (Figure 4) identifies the presence of the "all hydric" Houghton and Muskego soils in the topographically lowest portions of the site (Area 4 and 5). These soil series are typically very deep, very poorly drained soils, with an organic layer comprised of muck or peat to a typical depth of 48 to 80 inches.

The soil survey indicates that the "mostly hydric" Hamel soil series is present in other investigated wetland areas. The Hamel soil series typically consist of very deep, poorly drained loam and clay loam soils typically located on gradual slopes on the edge of depressional areas.

The NWI (Figure 5) identifies the area in the vicinity of Areas 1, 2, and 5 as shallow marsh (Type 3) basins. The MCWD FAW identifies the area encompassing Areas 1, 2, 3, 4, and 5 as a Manage 2 wetland basin.

Wetland Extent

As shown in Figure 6 and Table 1, the off-site investigation determined that Areas 1, 2, 3, 5, and 7 met wetland hydrology criteria as wetness signatures were present in greater than 50% of years with normal precipitation. These areas were also investigated during the site investigation to determine likely wetland status.

Cropping History

As shown in Figure 7 and Table 2, the off-site analysis demonstrates that Areas 4, 5, and 6 were cropped in 100% of the last twenty years, dating back to 1990. Other wetland areas ranged from being cropped 0% to 40% of the time during that same period.

Drainage History

A tile map provided by the property owner provides evidence that tile was installed on the site in 19XX. Figure 8 shows the approximate location of tile lines on the property. Review of aerial photographs dating back to 1938 (See Appendix A) demonstrates that the ditch was constructed prior to 1938.

Based on the assumed lateral effect of drainage from the ditch and tile lines as well as evidence of cropping history over much of the site, it appears that the ditch and tile likely effectively drained the majority of wetlands within Area 4 and Area 5 while the drainage was maintained historically.

<u>Existing Conditions</u>

A site visit was conducted with Wenck and MCWD staff on October 11, 2014 to document existing conditions. Wenck conducted soil borings to determine site hydrology, conducted a GPS elevation survey determine elevations of drainage features (ditch bottom, culvert inverts, ground surface, etc.), delineated existing wetlands on the site, and investigated any potential off-site drainage issues.

Results

Figure 9 summarizes the information collected during the site visit.

Two areas were delineated as wetlands during the site visit. Wetland 1 was delineated near the western edge of the subject property and extended past the project boundary to the west. Wetland 2 was identified and delineated in a drainage swale that drained in to the southwest corner of the depressional area. Additional potential wetland areas (Potential Wetland 3 and Potential Wetland 7) were identified in areas that met off-site wetland hydrology criteria but did not appear to conclusively meet wetland criteria during the site investigation. Further analysis may be necessary to determine the wetland status in these areas.

The site investigation confirmed that the majority of Area 4 and Area 5 are likely completely drained wetland basins. Soil investigation found organic soils to a depth of 42 inches. Saturation or free water was not observed in the borings within 36 inches of the surface, confirming that hydrology has likely been removed from these areas by the tile and drainage ditch. The soils observation confirmed the accuracy of the soil series mapped by the County soil survey, as deep organic soils were present.

The elevations of drainage features are shown in Figure 9 and cross-section in Figure 10. The “zero” distance of the cross-section is at the centerline of Northview Drive (elevation 967.48 feet). The culvert under Northview Drive acts as the outlet of the ditch at the downstream end of the property. The elevation of the culvert invert at this point is 956.77 feet. From this point the ditch passes below a field road with a top elevation of 962.54. The elevation of the culvert inlet under the field road is 956.1 feet. The ditch bottom is relatively flat for the first 500 feet upstream from the field road with a bottom elevation ranging from approximately 956.5 to 957 feet. Sediment appears to have accumulated in this stretch of the ditch. From this point, the ditch bottom begins a gradual slope up to 970 feet in elevation at the west property boundary (1400 feet from centerline of road). For comparision the elevation of the existing ground surface adjacent to the drainage ditch is approximately 960 to 961 feet.

While the drain tiles were not field located, observation of the conditions on-site demonstrated that the tiles appeared to effectively drain Area 4 and Area 5 as the majority of these areas did not meet the criteria for field indicators of wetland hydrology.

<u>Wetland Restoration Concept Plan</u>

Hydrologic Modeling

A HYDROCAD model was conducted to compare the existing hydrologic and hydraulic conditions against the future conditions following the proposed restoration. The model results are presented in Appendix B and Table 3 below. The subwatershed areas modeled are shown in Figure 11. The model results were used to approximate the maximum area that could be restored to wetland conditions and also were used to determine potential off-site impacts of the restoration.

The model compared the existing hydrologic conditions in the wetland and the ditch channel and wetland downstream of the site to the proposed conditions with a runout elevation of 961.0, 961.5, and 962.0 feet. Existing and proposed water elevations during the 1-, 10-, and 100-year 24 hour precipitation events as well as the inundation periods are shown in Table 3.

Table 3-Model Summary

Mader Wetland	1-yr		10-yr		100-yr	
	Elev. (ft.)	Inun. (hrs)	Elev. (ft.)	Inun. (hrs)	Elev. (ft.)	Inun. (hrs)
Existing	960.7	27	962.0	28	962.9	27
Proposed - 961.0'	961.5	40	962.4	35	963.3	35
Proposed - 961.5'	961.8	40	962.5	40	963.4	49
Proposed - 962.0'	961.9	40	962.7	45	963.5	60
DS Wetland Elevation	1-yr		10-yr		100-yr	
	Elev. (ft.)	Inun. (hrs)	Elev. (ft.)	Inun. (hrs)	Elev. (ft.)	Inun. (hrs)
Existing	961.2	30	963.3	27	964.9	30
Proposed - 961.0'	960.0	20	960.5	25	963.5	45
Proposed - 961.5'	960.0	15	960.0	20	962.5	45
Proposed - 962.0'	960.0	15	960.0	20	961.3	45

Review of site topography within the site subwatershed demonstrated that the proposed restoration would not alter drainage upstream of the site, as the ditch bottom at the upstream edge of the property is higher than the proposed maximum runout elevation of the proposed wetland restoration outlet.

The model results show that the proposed project would alter the water elevation during the 1-, 10-, and 100-year, 24 hour precipitation events downstream of the property. A wetland is present adjacent to the ditch in the subwatershed downstream of the property (Figure 12). However, given the sloped nature of this wetland, a likely groundwater connection contributing to wetland hydrology, and the fact that the hydrology of the wetland has already been altered by the existing ditch, the change in the precipitation event elevations would not likely alter the hydrology of the wetland. Further investigation may be necessary in this area to confirm that there would be no alteration to the hydrology in this area.

Restoration Plan

The data that was collected was used to develop a draft wetland restoration concept plan (Figure 13 and 14). The restoration concept plan considers upstream and downstream hydrology and proposes to restore the natural hydrology of the drained wetland in Areas 4 and 5. A potential restoration area is also shown in Area 3. Additional details to the plan such as specific breakdown of proposed plant communities are not addressed in detail in this memorandum.

The restoration plan proposes to break drain tiles and fill in the existing drainage ditch or construct a clay berm across the drainage ditch at the existing field road location. The berm would need to be engineered and constructed of a suitable clay material that would effectively impound water and not allow seepage. The maximum elevation of the runout elevation of the clay berm is proposed to be 962 feet. The final elevation of the berm would be determined based on additional evaluation of information. The clay berm would tie into the 964 or 966 elevation in the adjacent upland to the north and south.

A potential addition to the design could include an adjustable outlet structure that would allow for the control of the water elevation in the wetland. This would allow for increased flexibility of the hydrology and resulting vegetation communities in the restored wetland. The manipulation of water levels can also be an important and effective tool for increasing diversity in vegetation communities and managing invasive species.

It is anticipated that the berm would also be constructed with an emergency overflow with a maximum runout elevation of 962 feet. The channel downstream of the proposed berm would be lined with riprap or otherwise stabilized to prevent erosion and protect the road embankment.

This design would result in the maximum allowable wetland credits, flexibility of wetland types, and would avoid the need to alter the culvert under the existing road.

An additional option to restore hydrology on the site would be to fill in the existing drainage ditch in it's entirety to negate any potential lateral drainage effect that may exist following the restoration project. Ideally, fill material would be obtained on-site to reduce construction costs.

The model results demonstrate that with a runout elevation of 962 feet, the 1 year precipitation event elevation would be 961.9 feet, with a 10 year elevation of 962.7 feet. It is assumed that wetland conditions would develop above the 1 year event and below the 10 year event. Over most of the basin, it is anticipated that wetland conditions would develop to an elevation of approximately 962.5 feet. An exception is in the southwest corner of the proposed restoration area, where the groundwater gradient appears to follow a slope, with wetland conditions likely developing up to approximately 966 feet in places.

The actual final runout elevation of the wetland would depend on the preferred wetland hydrology regime and vegetation communities. The final runout elevation would likely be determined following regulatory review during the wetland bank application review process.

It is anticipated that the proposed restoration area would consist of a mix of wetland and upland vegetation communities. It is likely that the dominant wetland vegetation community types would be Type 2 fresh (wet) meadow, and Type 3 shallow marsh, with some Type 4 deep marsh also possible. The final composition of vegetation communities and vegetation plans would be developed during the full application phase of the project.

Proposed Credit Actions and Potential Wetland Bank Credits

While Figure 13 shows the approximate maximum extent of wetland area that would be restored, the actual amount of wetland credits available to be deposited in the MN wetland bank is dependent on the existing and historical condition of each area. WCA outlines the actions eligible for credit and identifies credit ratio as a percentage of area for each action in MN Statutes 8420.0526. The likely actions eligible for credit for the proposed restoration project include Upland Buffer Areas (Subpart 2), Restoration of Completely Drained or Filled Wetland Areas (Subpart 3), Restoration of Partially Drained or Filled Wetland Areas (Subpart 4), and Vegetative Restoration of Farmed Wetlands.

In summary, Subpart 2 allows up to 25% of credit for eastablishment of native, noninvasive vegetation in the upland buffer surrounding the wetland. In special cases, up to 50% credit is granted for the establishment of native, noninvasive vegetation if it can be demonstrated that the additional buffer will improve wetland sustainability and provide an increase in function. The area of upland buffer will be determined following an analysis of the proposed development of the property.

Subpart 3 allows 100% credit for the restoration of the natural hydrology regime and native, noninvasive vegetation on wetlands that have been completely drained or filled.

Subpart 4 allows credit to be granted for the restoration of the natural hydrology regime and native, noninvasive vegetation of wetlands that have been partially drained . Credits are granted in a percentage equal to the percent of the time the wetland area was cropped during the prior 20 year period, or i[tp 50 percent for all other degraded partially drained areas.

Subpart 5 allows credit to be granted up to 50% for the reestablishment of native noninvasive vegetation for wetland areas that were cropped in at least ten of the last 20 years.

The proposed restoration project is broken down into five proposed credit areas (plus an additional potential credit area) with boundaries shown on Figure 14. Please note that these areas would likely be further subdivided during the final application process as different actions eligible for credit may occur within each area. The proposed upland buffer area was obtained from an analysis of development options for the site. The upland buffer would vary in size depending on the slope and the proposed adjacent land use for the property. The actions eligible for credit and minimum and maximum potential credit allocations are shown for each proposed credit area in Table 3.

Table 3-Proposed Estimated Credit Allocation

			Credit Allocation			
			Minimum		Maximum	
Proposed Credit Area	Credit Action	Acres	% Credit	Credit Amount	% Credit	Credit Amount
A	Subpart 3	9.60	100	9.60	100	9.60
B	Subpart 3/4	9.80	90	8.82	100	9.80
C	Subpart 4/5	1.50	0	0.00	50	0.75
D	Subpart 2 (Upland Buffer)	19.5	25	4.87	25	4.87
E	Subpart 4/5	0.28	50	0.14	100	0.28

	Total Easement Size	40.68	**Total Credits:**	23.43	**Total Credits:**	25.30

Since hydrology appears to have been completely removed from Area A, it is potentially eligible to receive 100% credit under Subpart 3. Since the analysis of cropping history demonstrates that this area was cropped in each of the last 20 years, it also would qualify for 100% credit under Subpart 4.

Area B appears to qualify to potentially receive 100% credit under Subpart 4 since hydrology may not have been completely removed from this area, but a cropping occurred in each of the last 20 years.

Although it currently exhibits wetland hydrology and is not cropped, Area C may potentially qualify to receive up to 50% credit as it appears to be partially drained and has limited cropping history over the last 20 years.

The upland buffer established in Area D would likely receive 25% credit.

A credit release schedule would be developed to determine when the credits would be eligible for deposit into the state wetland bank. Generally, 15% of the credits are allowed to be deposited into the wetland bank following site establishment. The remainder of credits are typically deposited on a 3 to 5 year schedule depending on bank performance. A typical credit release schedule would propose depositing 15% of the credits following bank site establishment, 60% of the credits following the third year of monitoring and 100% of the credits following the fifth and final year of monitoring. The credit release schedule would likely be tied to performance standards.

Cost Estimate

The approximate costs to design, permit, and construct the wetland restoration and establish credits in the MN Wetland Bank are summarized by phase in Table 4. Please note that these costs are approximate and are subject to change based on changes to the plan based on regulatory requirements. The work associated with each phase is summarized below.

Table 4-Cost Estimate

Phase	Cost Estimate
Phase 1-Conceptual Design and Project Scoping	$5,500
Phase 2-Final Design and Permitting	$21,000
Phase 3-Construction/Vegetation Establishment	$80,000
Phase 4-Monitoring/Maintenance (5 years)	$126,000
Phase 5-Post Project Certification	$18,000
TOTAL	**$250,500**

Phase 1-Conceptual Design and Project Scoping
The work associated with this phase would include the preparation of the Scoping Document and Concept Plan for submittal to regulatory agencies. A regulatory meeting and site visit is also included in the cost estimate for this phase. Please note that much of the work required to complete the Scoping Document and Concept Plan has already been completed during the feasibility analysis.

Phase 2-Final Design and Permitting
The work associated with this phase includes the preparation and completion of the final Wetland Bank Application. Specific tasks would include additional hydrologic/hydraulic analysis, engineering and design, preparation of the vegetation establishment plan, preparation of construction documents, and attendance at regulatory meetings as required to receive approval of the Application.

Phase 3-Construction/Vegetation Establishment
This phase estimates the cost associated with abandoning drainage features on the site (removal of drain tile and blocking/filling of the existing drainage ditch) and establishing vegetation. The proposed estimate for vegetation establishment includes site preparation (herbicide application, seedbed preparation), native seed mix unit cost, and seed installation.

Phase 4-Monitoring/Maintenance
This phase includes an estimate for 5 years of monitoring and vegetation maintenance. Please note that the cost for vegetation maintenance assumes the worst case scenario that intensive management would be required for five years to establish a native vegetation community. If the site responds well and does not require intensive management for five years, the maintenance costs would be considerably less.

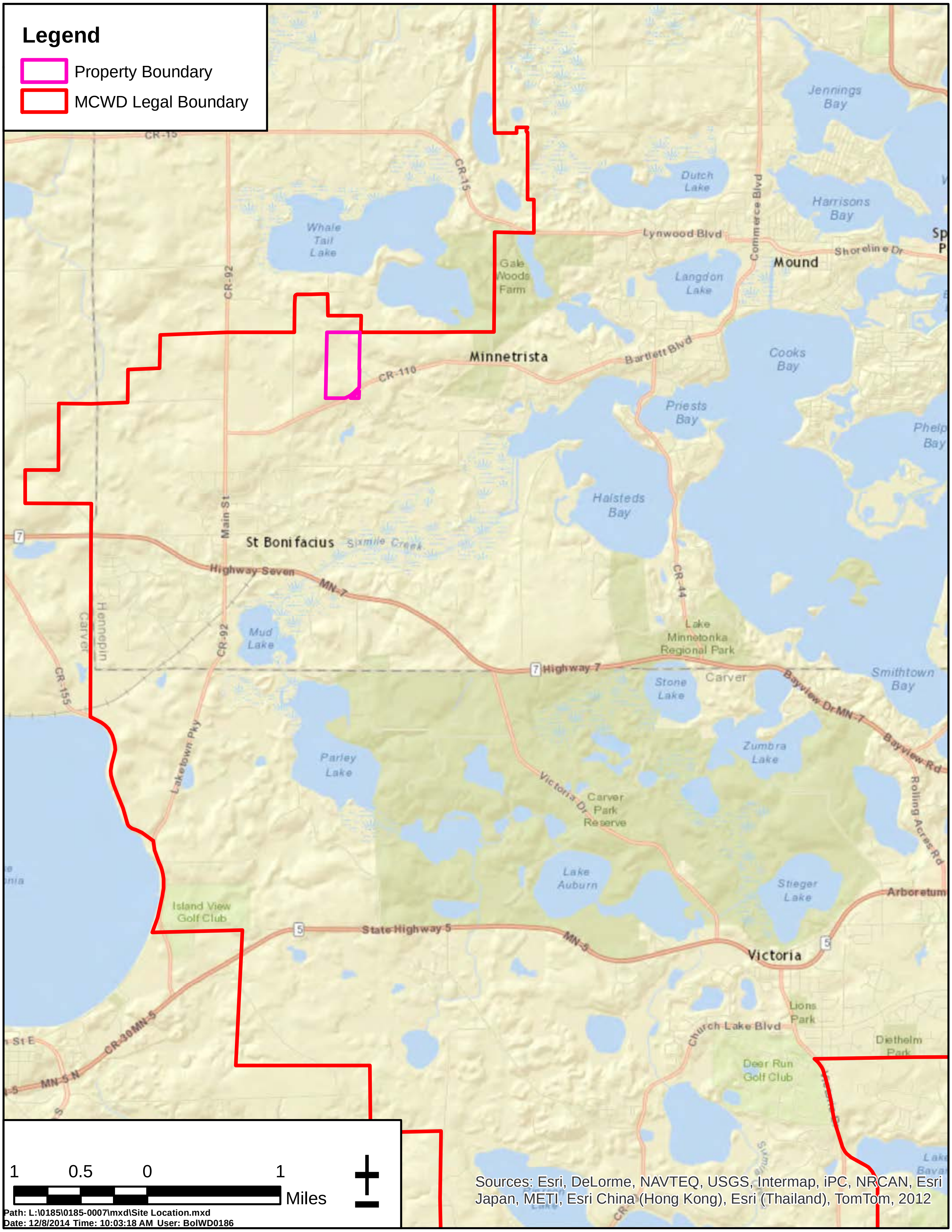
Phase 5-Post Project Certification
The work associated with this phase would include tasks necessary to deposit credits in the wetland bank. Specific tasks that would be completed include the completion of a legal survey, preparation of easement documents, a post project wetland delineation, and the facilitation of the final TEP review and certification of the project.

Estimated Credit Value
Given recent transaction prices and the current high demand for wetland bank credits, it is anticipated that wetland credits would likely sell for as high as $1.50 to $2.00 per sq. ft ($65,340 to $87,120). If 20 to 25 acres of wetland credits were deposited from the project, the estimated value would be $1.3 million to $2.2 million.

Conclusion
An off-site review of information and site investigation was performed on the Mader property to collect information to determine the feasibility of a wetland restoration on the site. Based on the information collected during this analysis, it appears that the subject property has good potential for a successful wetland restoration with a relatively minimal amount of construction costs. The review of the information for the site demonstrates that the wetland restoration could be successfully achieved by

breaking the existing drain tile and filling in the ditch or constructing a ditch plug with an adjustable outlet structure.

The actions taken to restore wetlands on the site would meet the requirements for actions eligible to create credits to be deposited in the MN Wetland Bank. It is estimated that approximately 23 to 25 credits would be generated from the project to be deposited in the MN State wetland bank.



MCWD

Site Location

Wenck

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1800 Pioneer Creek Center
Maple Plain, MN 55359-0429
1-800-472-2232

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Figure 1

MCWD

Off-Site Investigation Areas

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Figure 2

MCWD

LIDAR Map

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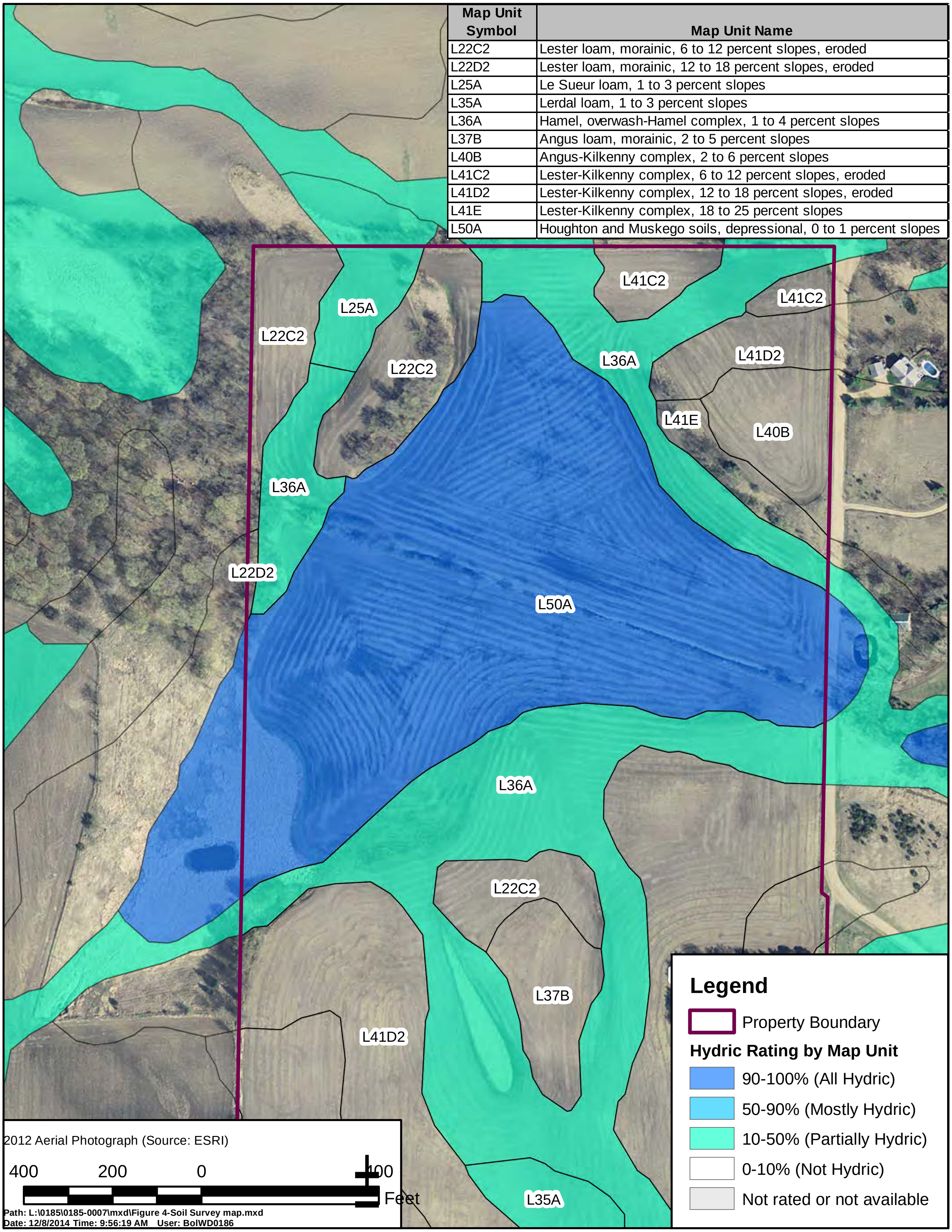
Figure 3

Map Unit Symbol	Map Unit Name
L22C2	Lester loam, morainic, 6 to 12 percent slopes, eroded
L22D2	Lester loam, morainic, 12 to 18 percent slopes, eroded
L25A	Le Sueur loam, 1 to 3 percent slopes
L35A	Lerdal loam, 1 to 3 percent slopes
L36A	Hamel, overwash-Hamel complex, 1 to 4 percent slopes
L37B	Angus loam, morainic, 2 to 5 percent slopes
L40B	Angus-Kilkenny complex, 2 to 6 percent slopes
L41C2	Lester-Kilkenny complex, 6 to 12 percent slopes, eroded
L41D2	Lester-Kilkenny complex, 12 to 18 percent slopes, eroded
L41E	Lester-Kilkenny complex, 18 to 25 percent slopes
L50A	Houghton and Muskego soils, depressional, 0 to 1 percent slopes



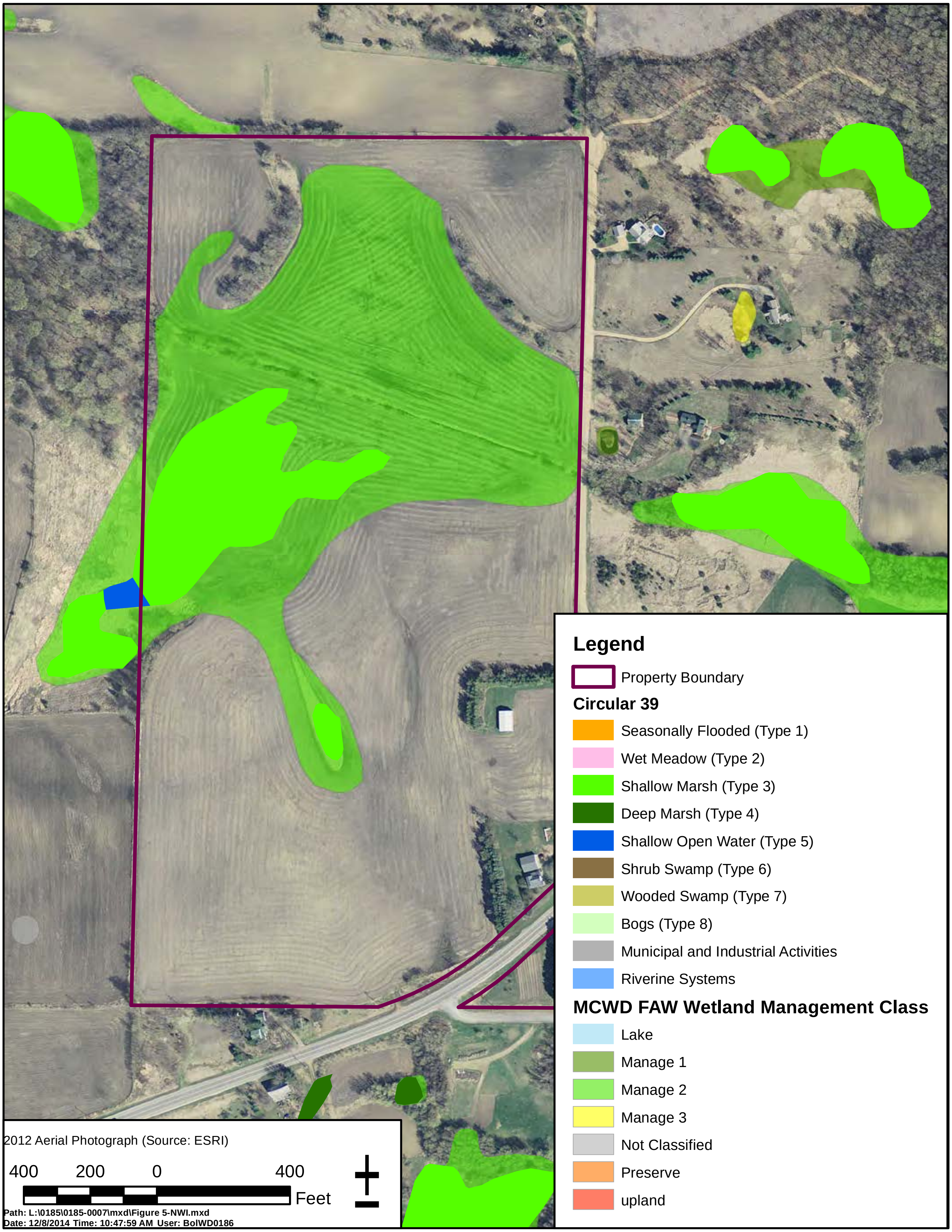
Legend

Property Boundary

Hydric Rating by Map Unit

- 90-100% (All Hydric)
- 50-90% (Mostly Hydric)
- 10-50% (Partially Hydric)
- 0-10% (Not Hydric)
- Not rated or not available

MCWD	Wenck	DEC 2014
Soil Survey Map	Engineers - Scientists, Business Professionals, www.wenck.com; 1800 Pioneer Creek Center, Maple Plain, MN 55359-0429, 1-800-472-2232	Figure 4



MCWD

NWI and MCWD FAW

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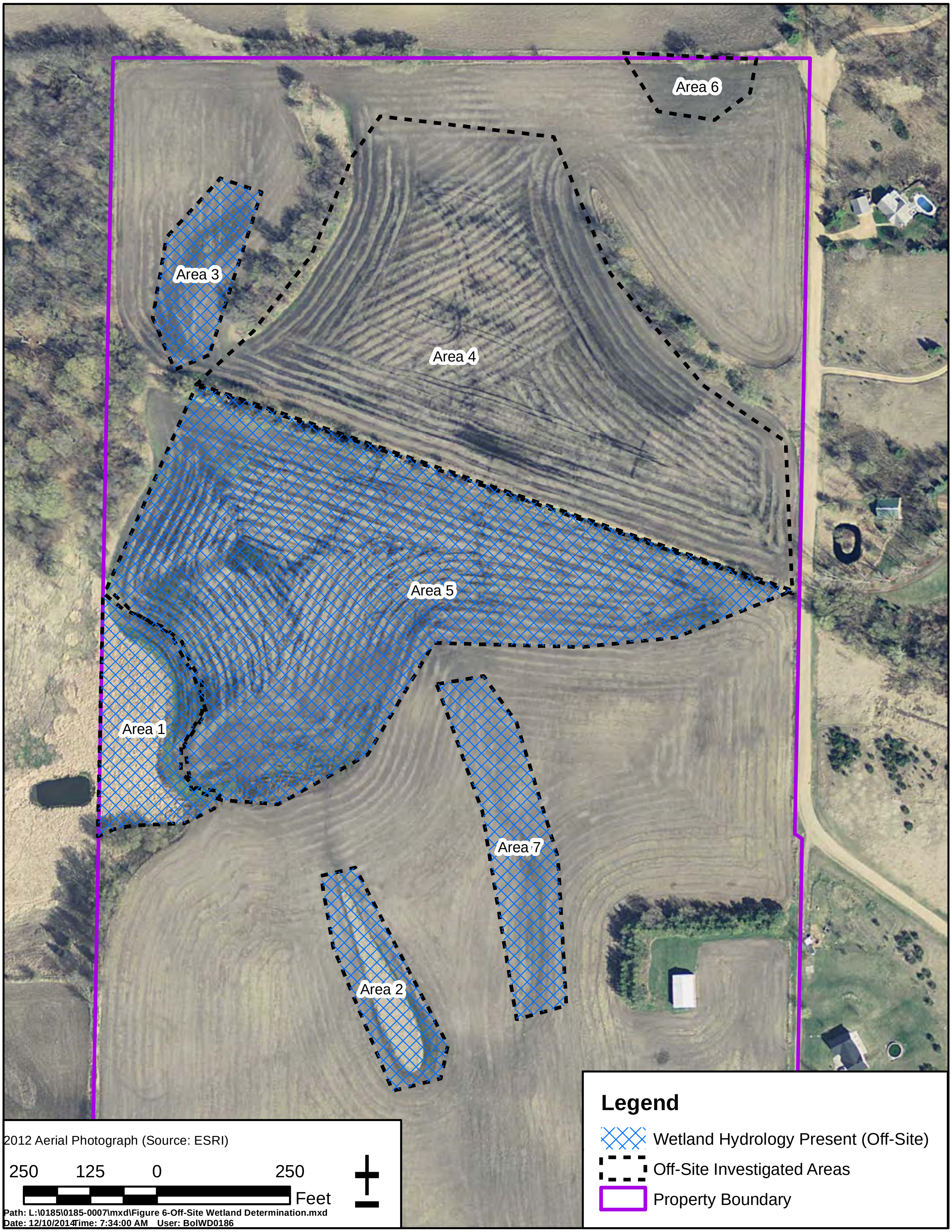
Figure 5



2012 Aerial Photograph (Source: ESRI)

250 125 0 250 Feet

Path: L:\0185\0185-0007\mxd\Figure 6-Off-Site Wetland Determination.mxd
Date: 12/10/2014 Time: 7:34:00 AM User: BolWD0186

Legend

- Wetland Hydrology Present (Off-Site)
- Off-Site Investigated Areas
- Property Boundary

MCWD

Off-Site Wetland Determination

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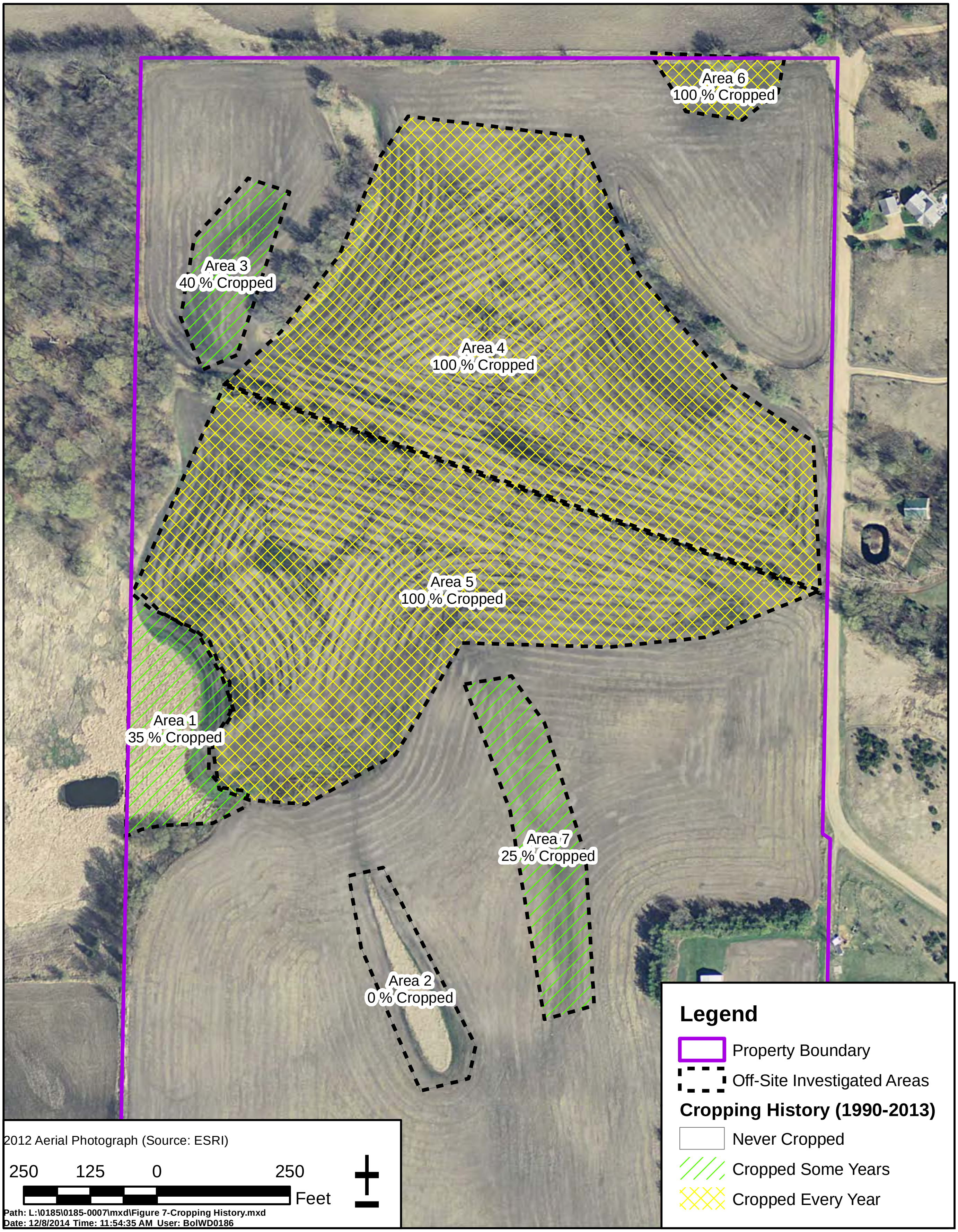
Figure 6



MCWD

Cropping History

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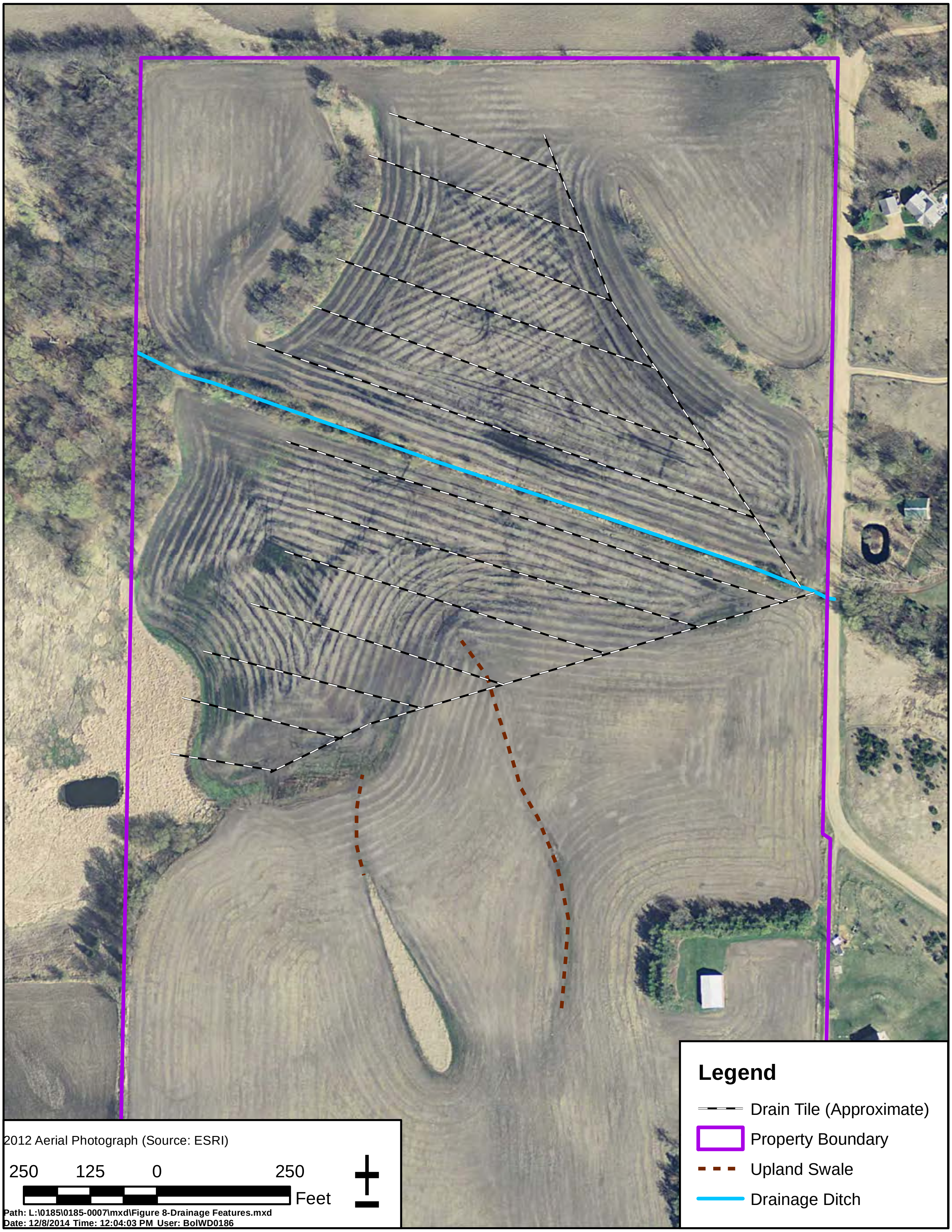
Figure 7



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Drainage Features

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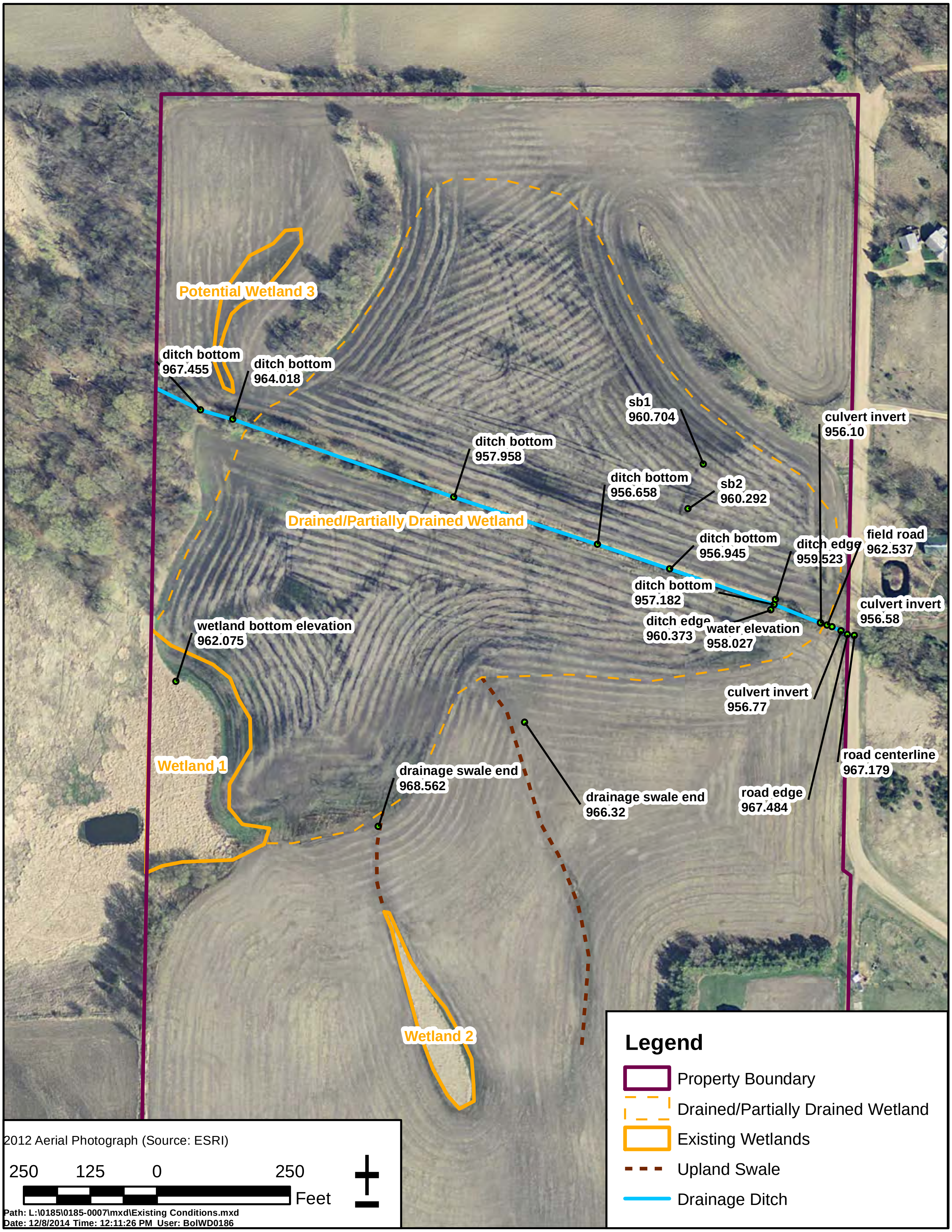
Figure 8



MCWD

Existing Conditions

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Figure 9

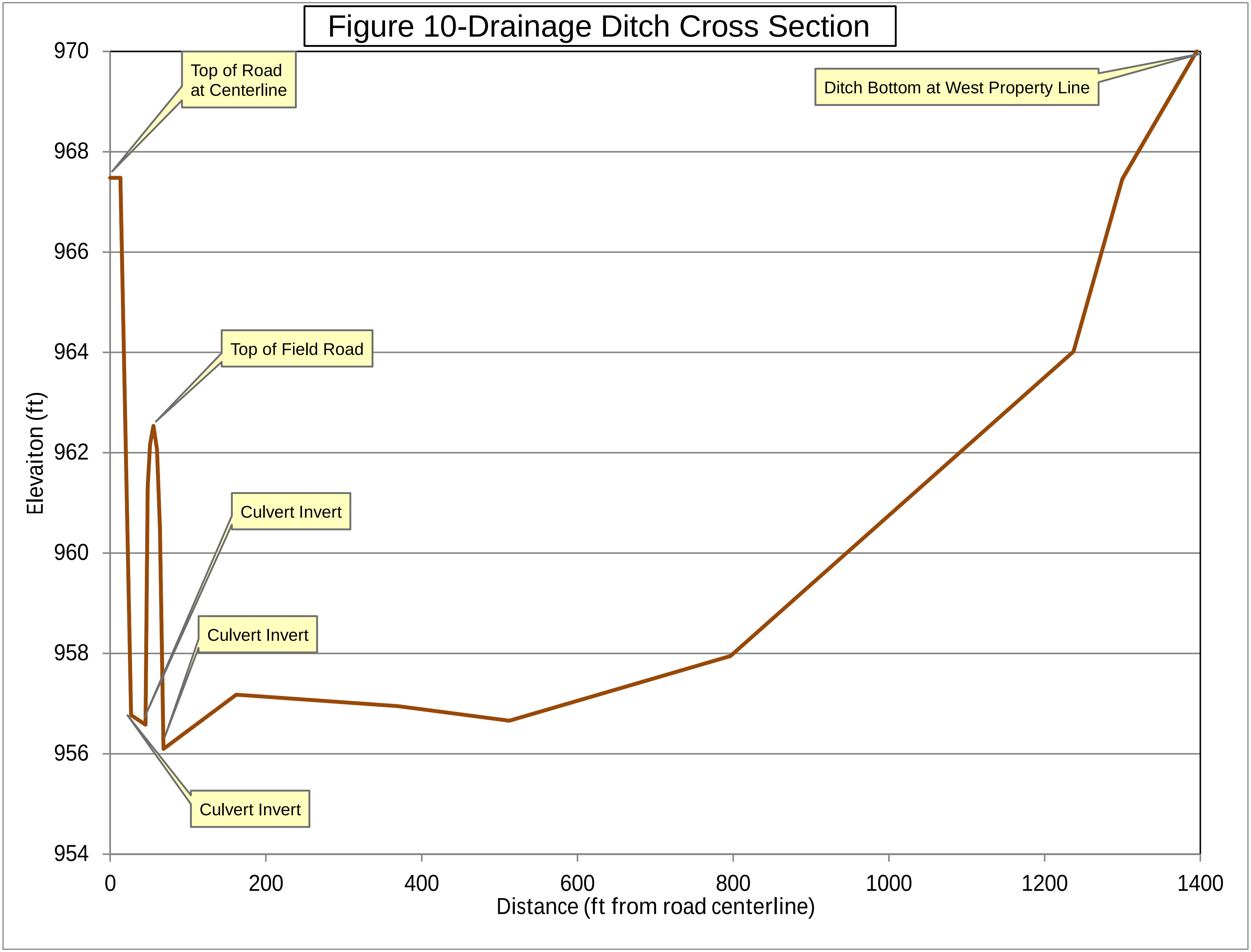
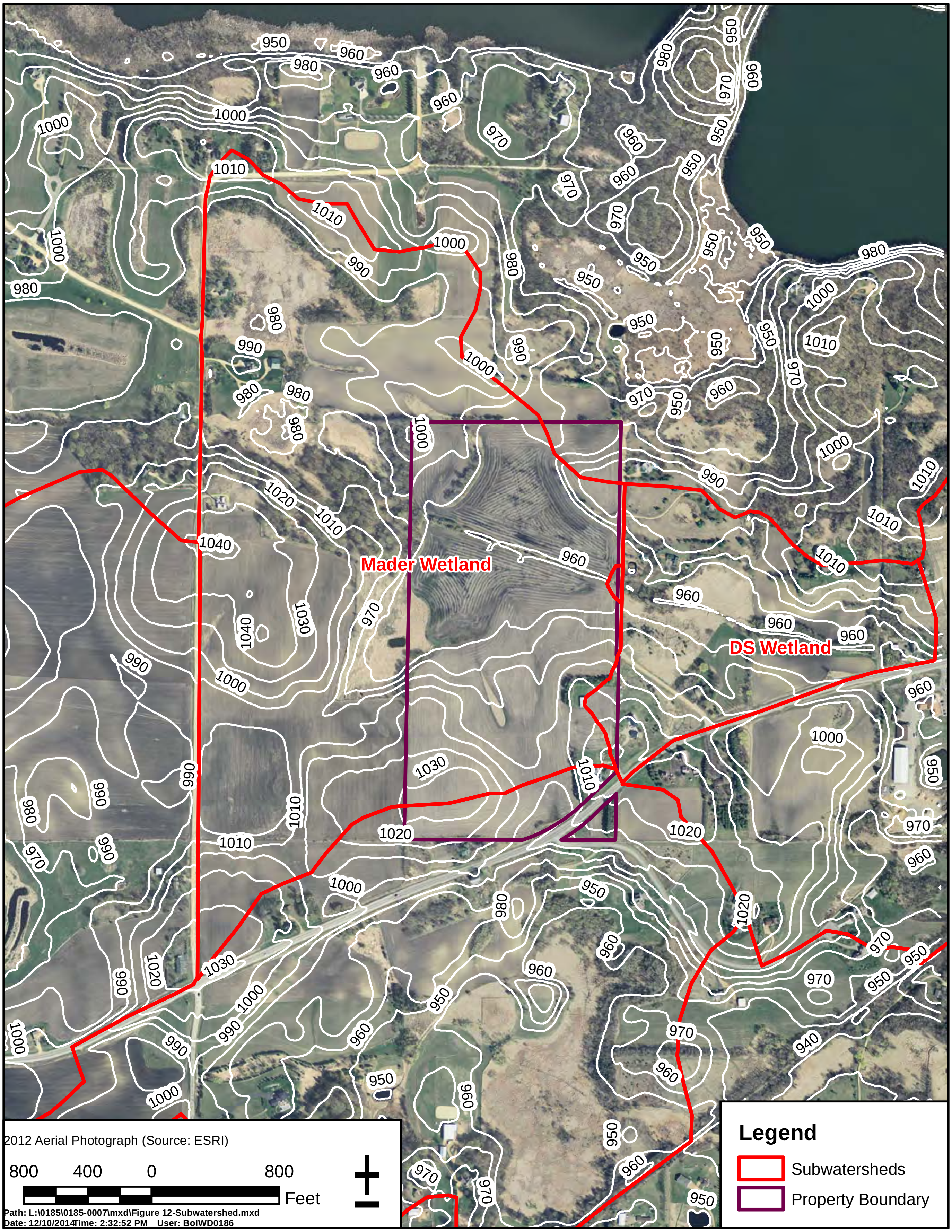


Figure 10-Drainage Ditch Cross Section
Top of Road
at Centerline
Ditch Bottom at West Property Line
Top of Field Road
Culvert Invert
Culvert Invert
Culvert Invert
Elevaiton (ft)
970
968
966
964
962
960
958
956
954
0
200
400
600
800
1000
1200
1400
Distance (ft from road centerline)



MCWD

Modeled Subwatersheds

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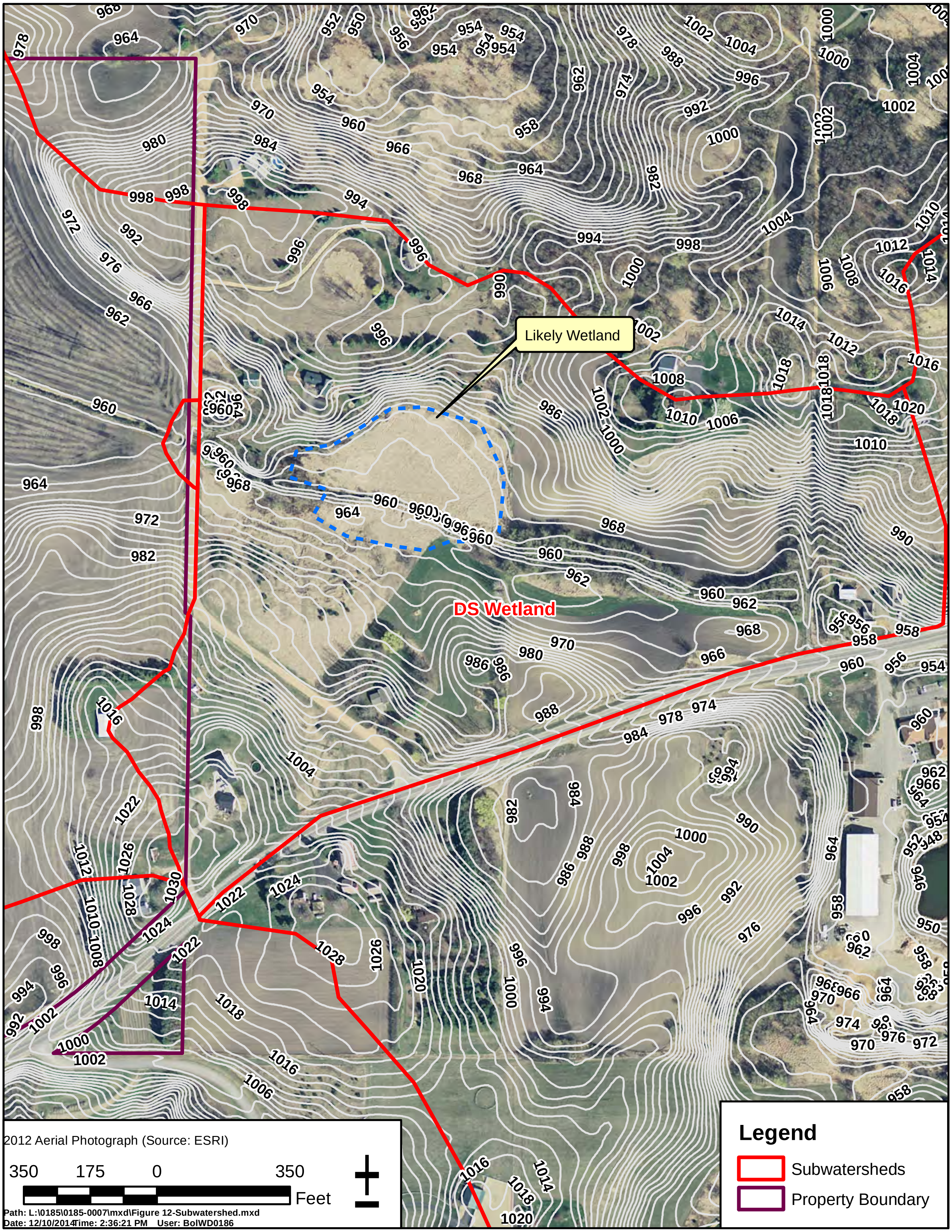
Figure 11



MCWD

Downstream Subwatershed

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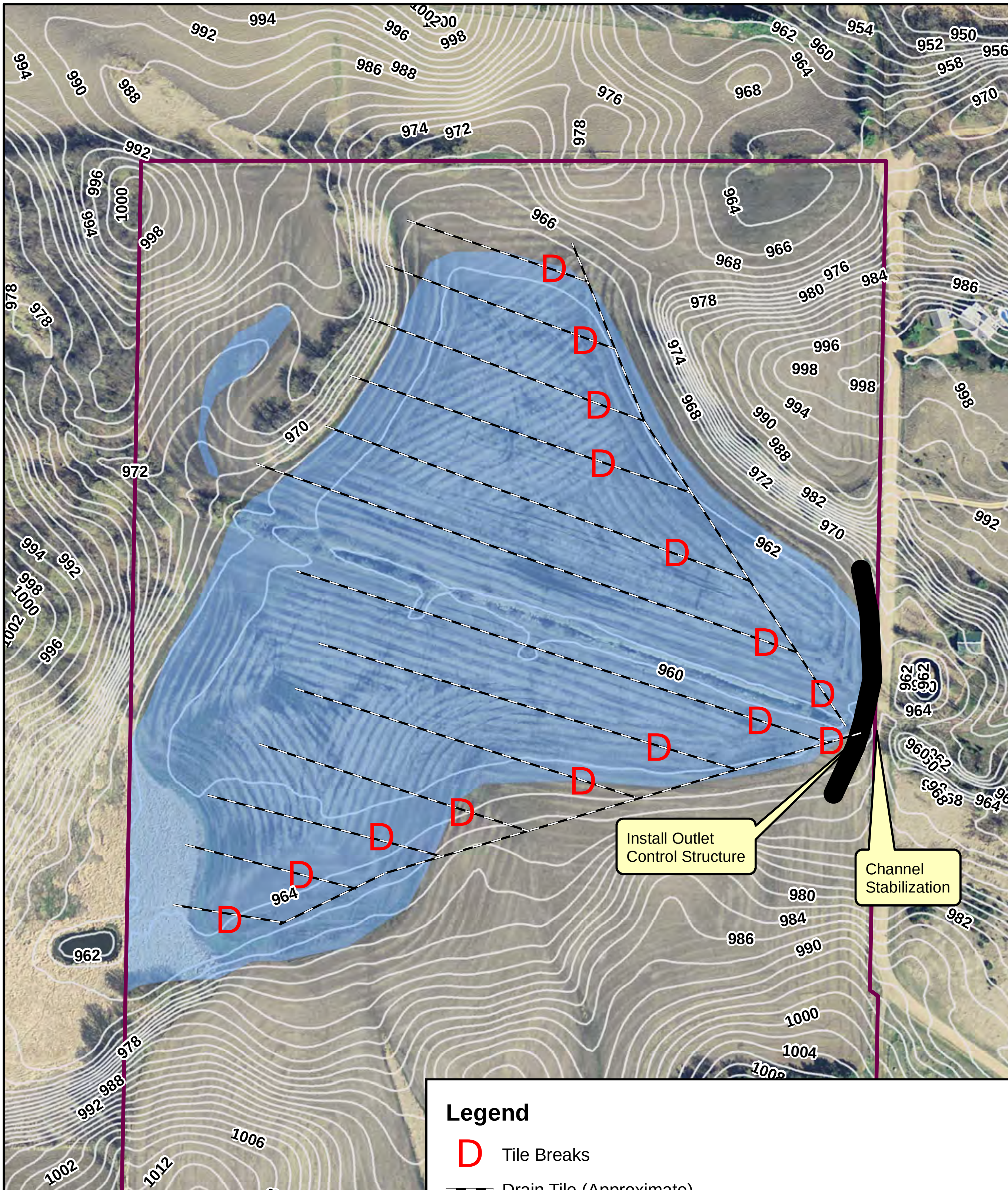
Figure 12



2012 Aerial Photograph (Source: ESRI)

250 125 0 250 Feet

Path: L:\0185\0185-0007\mxd\Concept plan.mxd
Date: 12/10/2014 Time: 7:32:59 AM User: BoIWD0186

Legend

- D Tile Breaks
- Drain Tile (Approximate)
- Property Boundary
- Anticipated Maximum Extent of Wetland (Runout Elevation 962)
- Proposed Berm

MCWD	Wenck	DEC 2014
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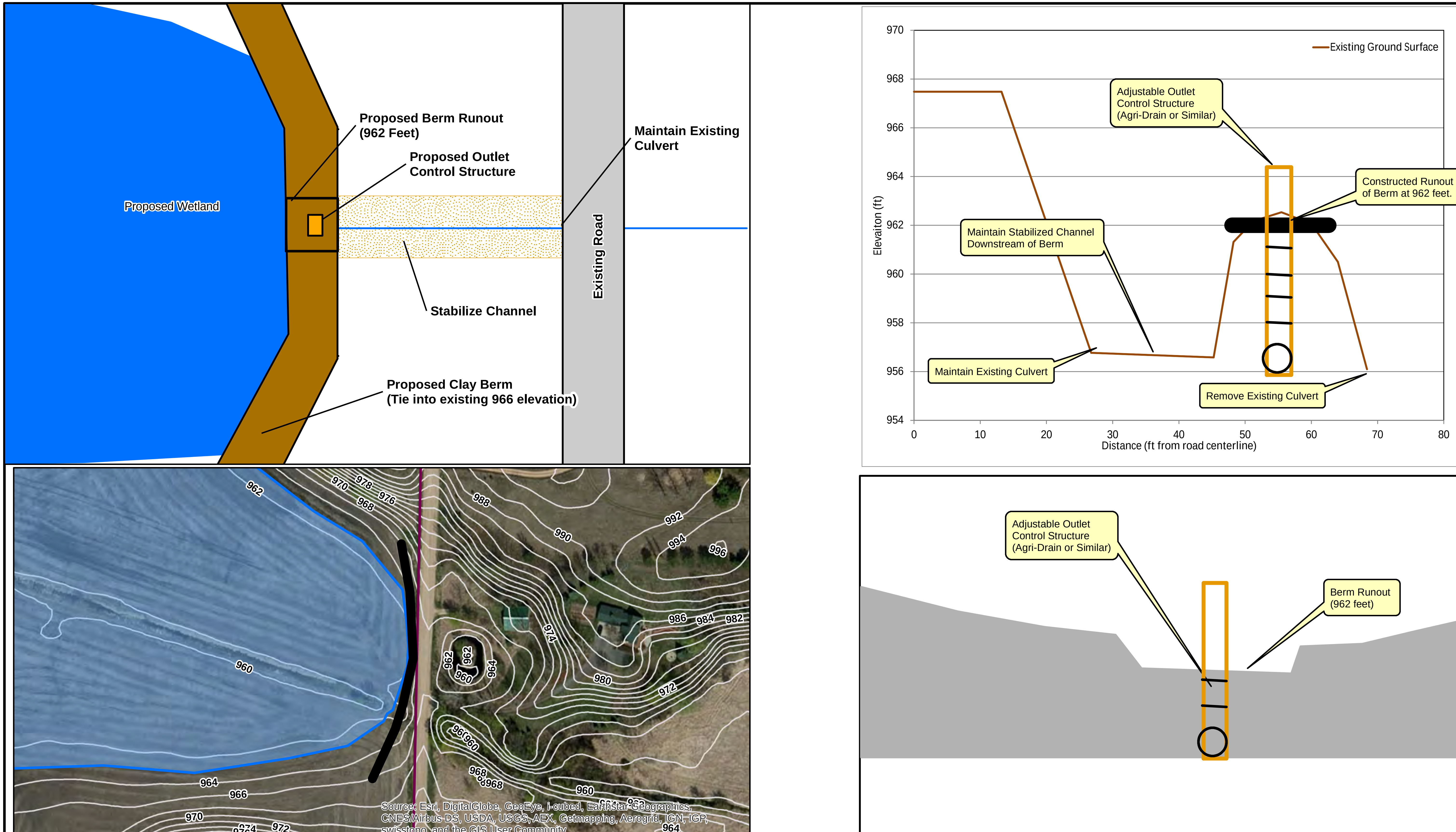
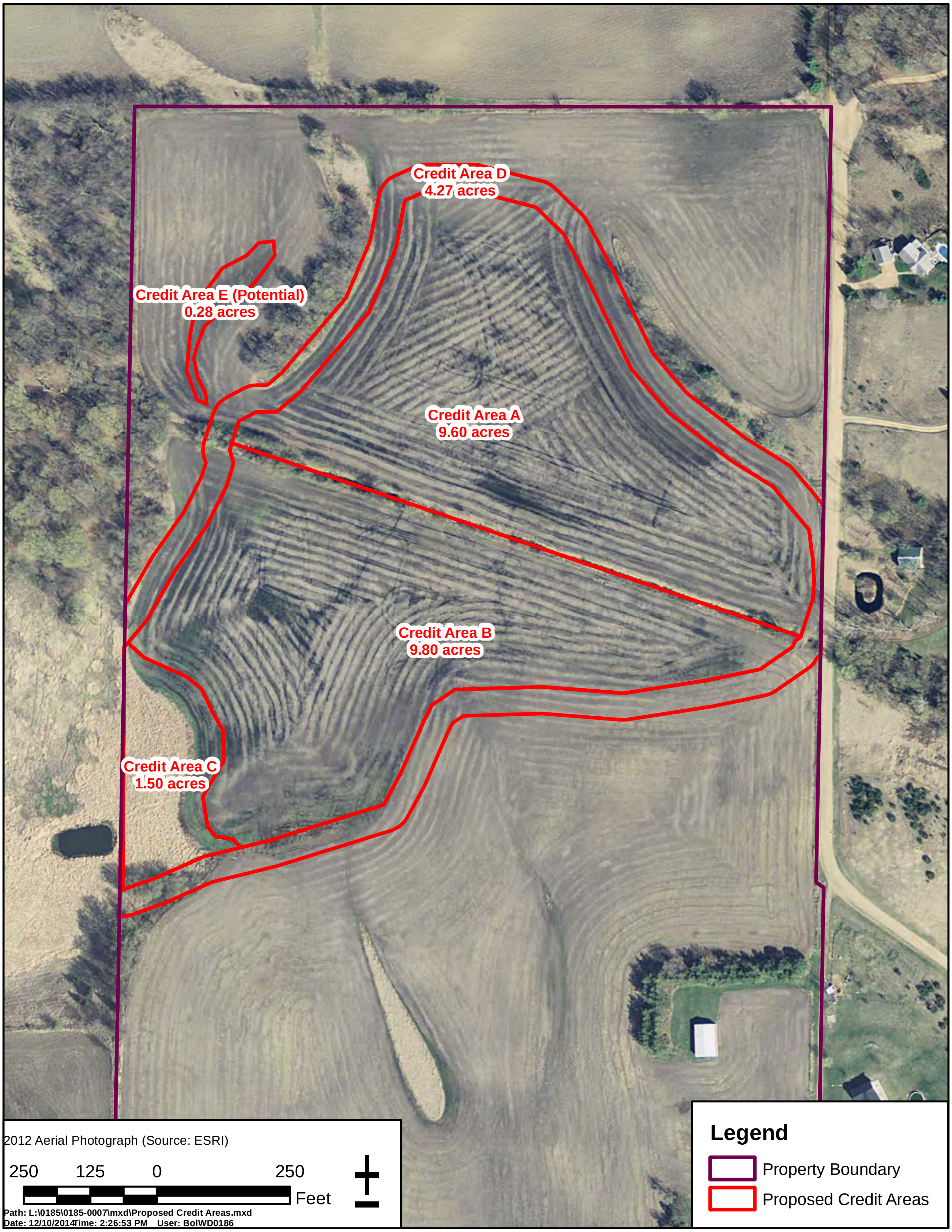


CLIENT NAME	Wenck	DEC 2014
Wetland Restoration Concept Plan Details	Engineers - Scientists Business Professionals www.wenck.com 1800 Pioneer Creek Center Maple Plain, MN 55359-0429 1-800-472-2232	Figure 14



MCWD

Proposed Credit Areas

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Figure 15

MINNEHAHA CREEK
WATERSHED DISTRICT

Technical Memorandum
Mader Wetland Bank
January 28, 2015

Prepared By:
Anthony R. DeMars, PWS
Cross River Consulting, LLC

Introduction

This technical memorandum is for the Mader property, located at 8000 County Highway 110, Minnetrista, Minnesota (Property) The Minnehaha Creek Watershed District (MCWD) is assisting the Mader Family Trust in evaluating the feasibility of developing a wetland bank on the 75 acre property. The focus of this technical memorandum is on evaluating options to combine a residential development and wetland bank while maximizing revenues to the Mader Family Trust. This technical memorandum describes site conditions, applicable land use/zoning, residential development alternatives, ecological restoration targets, and a framework for tying these elements together. This technical memorandum concludes with a review of costs and revenues associated with a combined residential development wetland bank conceptual plan.

Site Description

Existing Land Use

Land use is dominated by row crop agriculture, with cropped areas rotated between corn and soybeans. A residential home site and farm buildings are located on the southeast corner of the property. The northwest corner of the property contains a small area of oak woodland, which is associated with an area of steep slopes. Existing land uses can be seen on the aerial imagery shown in Figure 1 and are reflected by Minnesota Land Cover Classification (MLCCS) cover types shown in Figure 2.

Topography

The north half of the property contains a partially drained wetland basin that slopes gently to the east. Moderate to steep hillslopes extend down into wetland basin from the northwest and northeast. Elevations within the wetland basin range from 966 feet along the west property boundary, to 958 feet at the east boundary along Northview Drive. The remaining areas of the property are moderately rolling, with some isolated areas of steeper slopes. A drainageway with two small wetland basins extends from near County Highway 110, northwest to the large wetland basin to the north. Elevations on the south half of the property range from 1034 feet at the southwest corner of the property to 992 feet within the drainageway. Topographic features are shown in Figure 1.

Vegetation

Figure 2 shows MLCCS cover types and vegetation plot locations on the property and Table 1 summarizes recorded vegetation plot data. Within upland areas of the property, vegetative cover is dominated by agricultural row crops. Where hillslopes are steep, such as northwest and northeast of the wetland basin, oak woodland and nonnative grasses with scattered trees occur. A vegetation plot taken within this area (P5) shows a moderate diversity of woodland trees and shrubs with mostly weedy/invasive herbaceous species. The farmstead on the southeast corner of the property is bordered by trees and shrubs planted as part of a windbreak. The remaining upland areas of the property are planted to corn or soybeans with field edges dominated by introduced grasses. Vegetation plots within wetland or potential wetland areas include P1-P4 and P6-P7. Vegetation at all of these locations has been disturbed (either during the current growing season or in recent years) and is dominated by weedy annual grasses or herbs. Within the ditch and along the edges of the main wetland basin, scattered native wetland plants and occasional trees occur. Reed canary grass is generally dominant in wetland areas that have not recently been cultivated and is present at P4, P6 and P7.

Soils

Soils on the property are shown in Figure 3 and summarized in Table 2. Upland areas on the north half of the property are dominated by moderate to well drained Lester and Lester-Kilkenny complex soils. These soils are associated with hillslopes and hilltops and generally correspond to areas with moderate to steep slopes.

The somewhat poorly drained Hamel soils are associated with drainageways, depressions and extend around both the north and south sides of the main wetland basin. Soils in the wetland basin soils are very poorly drained Houghton and Muskego soils. Soils on the south half of the property are dominated by Lester-Kilkeny complex and Hamal soils.

Table 2
Soils Summary

MUSYM	Soil Name	Hydric Class	Drainage Class	Pre-settlement Plant Community
L22C2	Lester loam, morainic	Partially hydric	Well drained	Oak Savanna-Woodland
L41C2	Lester-Kilkenny complex	Partially hydric	Moderately well drained	Oak Savanna/Prairie
L36A	Hamel, overwash-Hamel complex	Partially hydric	Somewhat poorly drained	Wet/Mesic Prairie
L50A	Houghton and Muskego soils, depressional	All hydric	Very poorly drained	Wet Meadow/Shallow Marsh
L37B	Angus loam, morainic	Partially hydric	Well drained	Oak Savanna/Prairie
L41E	Lester-Kilkenny complex	Partially hydric	Well drained	Oak Savanna/Prairie
L35A	Lerdal loam	Partially hydric	Somewhat poorly drained	Oak Savanna/Woodland

Hydrology
Hydrologic features are described in the technical memorandum prepared by Wenck Associates.

Land Use and Zoning

The property is zoned as Agricultural Preserve (AP), which permits one residential unit/40 acres. Given that the property is 77.48 acres, no additional residential units (besides the existing one at the southeast corner) are permitted under current zoning. Under Section 505.31(3) of the City Code, the city council may allow either ten acre lots or cluster development lots for parcels zoned AP that are located east of County Road 92. It is assumed that one of the Mader Family goals for the property is to subdivide into either 10-acre lots or smaller lots under the cluster development option. The following is a brief discussion of these two alternatives.

Ten Acre Lot Development
With 10-acre lots, the maximum number of potential lots that can be generated on the property is seven. The partially drained wetland, and possibly the steep slopes located within the north half of the property, would likely reduce the number of 10-acre lots from seven to six. If the north half the property is used as a wetland banking site, the additional restrictions posed by wetland buffers, required as part of the wetland bank, could additionally reduce the number of 10-acre lots. A final consideration is infrastructure cost. Road construction costs for a 10-acre lot development may be considerably lower (than cluster development), since a city street design is not required and most of the lots could potentially be accessed from Northview Drive and County Road 110. Given the configuration of existing roads; however, it is likely that at least some road construction would be required to accommodate a 10-acre lot development. All ten acre lots must contain suitable building sites, which generally exclude wetland, floodplain, organic soils, steep slopes, etc. Lots must also contain primary and secondary septic areas and must have driveway access from a public road.

Cluster Development

Under the cluster development provision, the minimum lot size is 2.5 acres and maximum lot size is 5 acres, with maximum overall density based on one unit/6.66 acres. Based on these criteria, the maximum number of cluster lots that could be created on the property is eleven; however, the actual number would likely be reduced to ten, once road construction, steep slopes and stormwater facilities are factored in, An additional city requirement for cluster developments is that a minimum of 50 percent of the development property must be preserved as open space, and of this, 50 percent must be "usable open space". Open space, as defined by the city means "land which is preserved through the use of restrictive deed covenants, public dedications, or other methods" as approved by the city. The city defines usable open space as land that is: above the 100-year floodplain elevation; above the ordinary highwater level of public waters; and, that is not wetland. According to city planning staff, there are no restrictions on the use of open space for wetland banking.

In addition to open space, the city also requires that land (or cash in lieu of) be made for public parkland dedication, with the acreage of park dedication based on the number of lots in the development. With ten lots, the city requires a 5% dedication, or 3.87 acres. City planning staff has indicated that for this property, cash in lieu would be required. The cluster development provision also requires that lots be served by a single, city street that has a minimum width of 24 feet and a bituminous surface. The city street must be located within a 50 foot wide outlot. As with ten acre lots, all lots within the cluster development must contain suitable buildable areas, primary and secondary septic areas, and driveway access from a public road or city street constructed as part of the subdivsion.

Revenue Comparison: 10-Acre Lot vs. Cluster Development

Representatives of the Chaska office of Coldwell Banker were consulted on the potential value of residential lots based on current market conditions. The estimated per-lot value for three to four acre lots was estimated to range between $145,000 and $175,000, depending on lot acreage, suitability of building site, proximity to County Road 110 and views from the lot. Using an average value of $160,000 per lot, total revenues (if all ten lots are sold) would be $1,600,000. For comparison, Coldwell Banker also provided estimates of what ten acre lots would sell for. The value of ten acre lots was estimated at $200,000 per lot. If six ten acre lots were created under a standard lot/block development, the revenues generated would be $1,200,000, or $400,000 less than the cluster development. It is important to note that at least part of the additional revenue generated from a cluster development is likely to be offset by higher development costs (primarily for road construction and design).

In summary, there are three options available to develop residential lots on the property: 1) existing AP zoning, which does not provide for any additional residential units; 2) ten-acre lot density, which would potentially yield six lots; and 3) cluster development, which would potentially yield ten lots. Assuming that development of a wetland banking site is possible with either ten-acre lots or cluster development, the additional lots generated from the cluster development option will likely generate significantly more revenues, and are thus assumed to be the preferred development option.

Concept Plan

The cluster development option is assumed to be the chosen development approach for the concept plan. The concept plan incorporates a potential layout of residential lots, consistent with city zoning under the cluster development provision and recommends potential ecological restoration elements for the wetland bank and dedicated open space. The concept plan is shown in Figure 4 and is developed to achieve the following outcomes:

1. Focus residential development within areas of the property with good suitability (e.g. drainage, topography, road access) for residential development.
2. Develop wetland bank within drained wetland, that otherwise has limited suitability for other uses, such as residential development.
3. Incorporates wetland buffers, as required by the City, MCWD and MN Rules 8420.0522.
4. Utilize city zoning tools (Section 505.31.3) to increase residential unit density while protecting natural resources within dedicated open space.
5. Minimize development and infrastructure costs, while maximizing potential revenues from combined residential development-wetland bank project.

<u>Concept Plan Assumptions</u>

The following assumptions were used to develop the concept plan:

- Property acreage: 77.48 acres
- Zoning: Agricultural Preserve
- Maximum Overall Density (one dwelling/6.66 ac.): 11.63 units
- Lot size; 2.5-5 acres
- Individual septic and water
- Parks and open space dedication (city requirements)
    - Open Space (50%): 38.72 acres is minimum requirement
    - Usable open Space (25%): 19.36 acres is minimum requirement
    - Park dedication (5%): 3.87 acres (to be incorporated as part of usable open space)

<u>Residential Development</u>

The proposed concept plan (see Figure 4) includes creation of ten residential lots ranging in size from 2.8 to 4.7 acres, with lots configured to maximize potential building sites, views and other natural amenities of the property. Approximately 1,300 feet of 24-foot wide bituminous roadway would extend from the County Highway 110 at the southeast corner of the property to seven of the lots. The remaining lots would be accessed directly from Northview Drive. Lot acreages on the southeast corner of the property are larger and intended to accommodate drainage easements and stormwater treatment facilities, as required by the MCWD Stormwater Management Rule, and City of Minnetrista subdivision and zoning regulations. Stormwater facilities, which could include wet ponds, infiltration swales and drainageways, would be located within the drainageway that extends from near the intersection of County Highway 110 and Wind Ridge Trail, northwest to the south lobe of the wetland bank area. As recommended by the City, the triangular area of the property located south of County Road 110, would be incorporated into the southeast lot and farmstead.

<u>Open Space and Wetland Bank</u>

As shown in the concept plan, 19.6 acres of usable open space and 22.3 acres of non-usable open space are proposed. These acreages exceed the city open space requirements for a cluster development in the AP zone district.

To address the city requirement for park dedication, public use or access is proposed on open space located north of the wetland bank area. Portions of this area could potentially be used as a trail corridor that connects into other blocks of open space as adjoining parcels are developed.

Development of the wetland bank will require that wetland restoration areas and adjacent upland buffers be restored to native plant communities. The type of native plant communities that can be restored are largely determined by site conditions, including: soils, slope, aspect, hydrology, and current/past land uses. Presettlement vegetation (what existed before European settlement) also informs what types of native plant communities are best suited to the local area. Restoration goals (or targets) can also incorporate features that add value to the property and residential development. Examples include: creating view corridors, boulevard plantings, use of vegetation to maintain visibility, screening or buffering between lots, and use of tree, shrub and herbaceous species that add color and texture to the landscape. Potential restoration targets in wetland areas include shallow emergent marsh, wet meadow, sedge meadow and wet prairie. Potential upland buffer restoration targets include mesic prairie, oak savanna and oak woodland.

Restoration of wetland plant communities within the wetland bank could involve hydrologic restoration (described in the Wenck Associates Technical Memorandum), management of invasive weeds, and seeding/planting of herbaceous and woody plants. Restoration of upland buffer areas could be focused on retaining existing forest and woodland, control of buckthorn shrubs and herbaceous weeds, and seeding and planting of native trees, shrubs and herbaceous species. Within both the wetland and upland buffer areas, ongoing management will be required to control invasive plants through techniques that may include controlled burns, herbicide applications and mechanical removal (e.g., cutting, mowing).

Cost Estimates and Potential Revenues

Table 3 is an excerpt from the Wenck Technical Memorandum and summarizes the minimum and maximum credit allocation within proposed credit areas. The acreages shown for proposed credit areas A, B, C and E correspond to nonusable open space. Acreages for credit area D corresponds to usable open space (see Figure 4).   Please refer to the Wenck Technical Memorandum for a more detailed discussion of how wetland crediting is applied.

Table 3
Summary of Estimated Wetland Credits[1]

			Credit Allocation			
			Minimum		Maximum	
Proposed Credit Area	**Credit Action**	**Acres**	**% Credit**	**Credit Amount**	**% Credit**	**Credit Amount**
A	Subpart 3	9.60	100	9.60	100	9.60
B	Subpart 3/4	9.80	90	8.82	100	9.80
C	Subpart 4/5	1.50	0	0.00	50	0.75
D	Subpart 2	19.5	25	4.87	50	9.75
E	Subpart 4/5	0.28	50	0.14	100	0.14
Total Easement Size[2]		40.68	**Total**	23.43	Total	30.04

[1]Wenck Technical Memorandum

[2] Corresponds to open usable and nonusable open space shown in Figure 4

A review of wetland credit sales in the Mississippi (Metro) Watershed and Hennepin County by MCWD determined that the current, average value of wetland credits is $51,200.00. Based on restoration of 21.2 acres of wetland and 19.5 acres of upland buffer, potential revenues from wetland credits could range from $1,119,616.00 to $1,538,048.00. Since these estimates reflect potential revenues based on the future sale of wetland credits and do not reflect holding costs, the discounted value of the wetland credits in today's dollars would be lower; however, it is reasonable to assume that the future value of wetland credits will continue to rise, offsetting holding costs. The estimated costs for the wetland bank are based on technical analysis completed by MCWD, Wenck and Associates and Cross River Consulting, and include a desktop review of available data, wetland delineations, onsite evaluation of hydrology, soils and vegetation, hydrologic modeling and analysis, and preliminary design work. As shown in Table 4, estimated costs for the wetland bank total $250,500.00.

The estimated costs for the cluster development are not based on technical analysis, engineering or design work, and thus, should be viewed as very preliminary, and subject to verification. Estimated costs to subdivide the property into a cluster development include costs for subdivision platting and surveying, road design and construction, stormwater facility design and construction, and local land use and construction permits. Total estimated costs for the cluster development are $325,000.00.

The potential combined revenues from the wetland bank and cluster development are $2,813,736.00. The combined, estimated costs for the cluster development and wetland bank are $575,500.00. Net revenues in today's dollars for the wetland bank and cluster development are estimated at $2,238,236.00.

Table 4
Summary of Estimated Revenues and Costs

ESTIMATED REVENUES					
Project Element	**Item**	**Quantity**	**Unit**	**Value/Unit**	**Total**
Wetland Bank	Restoration Credits	18.56	Ac	$51,200.00	959,272.00
	Buffer Credits	4.97	Ac	$51,200.00	254,464.00
Cluster Development	Residential Lots	10	Lot	$160,000.00/Lot	1,600,000.00
				Total Estimated Revenues	**$2,813,736.00**
ESTIMATED COSTS					
Wetland Bank	Design & Engineering (Phase 1, 2 & 5) [1]				44,500.00
	Construction & Maintenance (Phase 3 &4) [1]				206,000.00
				Subtotal	250,500.00
Cluster Development	Subdivision Platting, Road Design, Engineering & Surveying				55,000.00
	Local Permits & Approvals (SWPPP, MCWD, City of Minnetrista)				10,000.00
	Construct 1,300 LF of 24' Bituminous Road ($150.00/LF)				195,000.00
	Stormwater Improvements (volume, rate control and water quality)				65,000.00
				Subtotal	$325,000.00
				Total Estimated Costs for Wetland Bank and Cluster Development	**$575,500.00**
				POTENTIAL REVENUES (Estimated Revenues – Estimated Costs)	**$2,238,236.00**

[1]Wenck Technical Memorandum

Table 1
Mader Open Space
Preliminary Vegetation Plot Data

Location	Native Status	Physiognomy	Scientific Name	Common Name	Stratum	Abundance	Distribution
P1		D	Ulmus americana	American elm	T	O	P
	I	G	Phalaris arundinacea	reed canary grass	H	A	TO
		H	Ambrosia trifida	great ragweed	H	C	P
	I	H	Chenopodium album	white lamb's quarters	H	A	TO
	I	H	Glycine max	Soybean	H	A	TO
P2		D	Acer negundo	box elder	T	O	E
	I	G	Phalaris arundinacea	reed canary grass	H	A	TO
		H	Alisma triviale	common water plantain	H	O	P
		H	Ambrosia trifida	great ragweed	H	C	TO
		H	Echinocystis lobata	wild cucumber	C	O	P
	I	H	Urtica dioica	stinging nettle	H	O	P
P3		G	Panicum capillare	Witchgrass	H	O	P
	I	H	Amaranthus spp.	Pigweed	H	O	TO
		H	Ambrosia trifida	great ragweed	H	O	TO
		H	Bidens vulgata	common beggarticks	H	O	P
	I	H	Cirsium arvense	Canada thistle	H	O	TO
	I	H	Cyperus esculentus	Yellow Nutsedge	H	O	TO
		H	Epilobium coloratum	purple-leaved willow herb	H	O	TO
		H	Geum aleppicum	Yellow Avens	H	O	TO
		H	Lycopus uniflorus	northern bugleweed	H	O	TO
	I	H	Taraxacum officinale	common dandelion	H	O	TO
	I	H	Urtica dioica	stinging nettle	H	O	P
	I		Brassica spp.	Mustard	H	O	TO
P4	I	G	Phalaris arundinacea	reed canary grass	H	A	TO
P5		D	Acer negundo	box elder	S/T	C	TO
		D	Acer saccharum	sugar maple	T	O	TO
		D	Celtis occidentalis	hackberry	S/T	C	TO
	I	D	Lonicera tatarica	tartarian honeysuckle	S	C	P
		D	Quercus macrocarpa	bur oak	T	C	TO
	I	D	Rhamnus cathartica	common buckthorn	S	C	TO
		D	Rhus glabra	smooth sumac	S	C	E
		D	Ribes cynosbati	prickly gooseberry	S	C	P
		D	Symphoricarpos albus	snowberry	S	A	TO
		D	Tilia americana	basswood	S	R	I
	I	D	Ulmus pumila	Siberian elm	T	C	E
		D	Ulmus rubra	red elm	T	O	TO
		D	Zanthoxylum americanum	prickly ash	S	C	TO
	I	H	Alliaria petiolata	garlic mustard	H	C	TO
		H	Laportea canadensis	woodnettle	H	O	TO
	I	H	Leonurus cardiaca	common motherwort	H	C	P
		H	Osmorhiza claytonii	Clayton's sweet cicely	H	O	TO
		H	Solidago canadensis	Canada goldenrod	H	C	E
	I	H	Verbascum thapsus	common mullein	H	C	E
P6	I	G	Phalaris arundinacea	reed canary grass	H	A	TO
P7	I	G	Phalaris arundinacea	reed canary grass	H	A	TO
P8	I	H	Amaranthus spp.	Pigweed	H	A	TO
		H	Ambrosia trifida	great ragweed	H	C	TO
	I	H	Glycine max	Soybean	H	A	TO
	I	H	Trifolium pratense	red clover	H	C	TO
	I	H	Typha x glauca	hybrid cattail	H	C	P

Native Status: I-Introduced/Invasive
Physiognomy: D-deciduous, H-herbaceous, G-graminoid, C-climbing (vine)
Stratum: T-tree, S-shrub, H-herbaceous, V-vine
Abundance: A-abundant, C-common, O-occasional, R-rare
Distribution: TO-throughout, P-patches, E-edge, EW-wetland edge, EU-upland edge, ER-river edge, I-individual

Figure 1
Mader Property
Aerial Imagery and Topography

N

Feet
0 100 200 400

Figure 2
Mader Property
MLCCS Land Cover
and Vegetation Plots

Simplified Land Cover

- Medium-tall grass altered/non-native dominated grassland
- Row Crops
- Row Crops on Hydric Soils
- Short grasses and mixed trees with 11-25% impervious cover
- Vegetation Plots
- Parcel Boundary

N

Feet
0 100 200 400

**Figure 3
Mader Property
Soils Map**

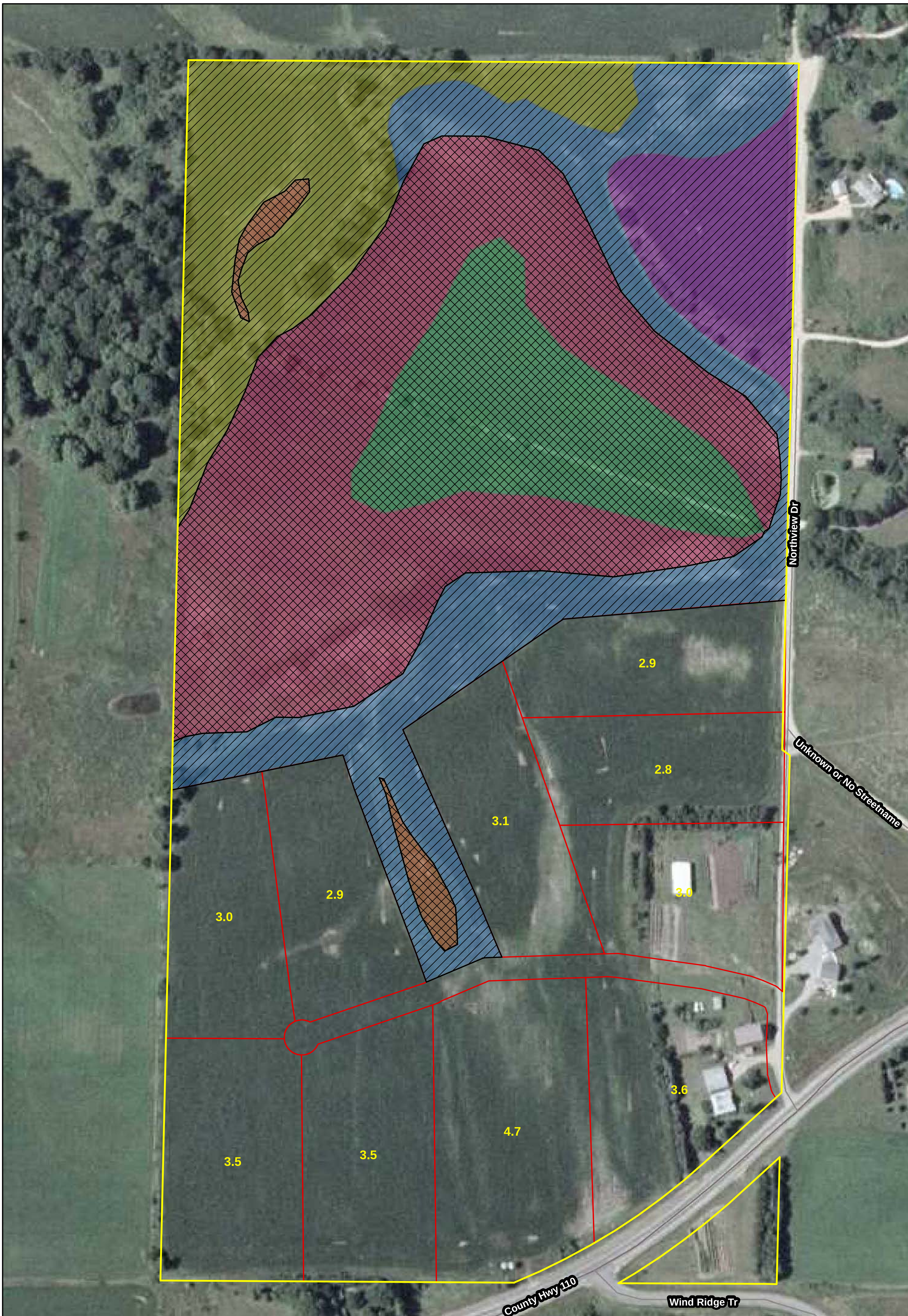

Figure 4
Mader Property
Conceptual Plan

Parcel Boundary
Residential Lots
Usable Open Space (19.6 ac.)
Nonusable Open Space (22.3 ac.)

Open Space Restoration
Wet Meadow
Shallow Emergent Marsh
Sedge Meadow
Wet/Mesic Prairie
Mesic Oak Savanna
Oak Woodland

N

0 100 200 400 Feet