Technical Memorandum

Date:	December 18, 2014
Project:	Marshall Solar Energy Project
Author::	Michael Swenson HDR
Subject:	Wetland Delineation

Introduction

This memorandum documents the methodology and results of the delineation of potential wetland areas located within the proposed Marshall Solar Energy Project by HDR Engineering, Inc. (HDR). Marshall Solar, LLC is proposing to build a utility scale photovoltaic solar project in Lyon County, Minnesota. The results of this delineation will be used in the design and implementation of the solar facility.

A draft of this memorandum was reviewed by both the Lyon County Soil and Water Conservation District and the U.S. Army Corps of Engineers. Revisions to the memorandum were prepared based on comments received from both regulatory agencies (Appendix C).

Location

The proposed project is located in Sections 28 and 33 Range 40W Township 112N in Lyon County approximately four miles east of the city of Marshall. Major roadways in the area include County Highways 9 and 11 and State Highway 19. The 504-acre study area is located adjacent to 290th Street and 320th Avenue, one-half mile north of State Highway 19, and adjacent to Highway 9. A 69 kilovolt (kV) and a 115 kV transmission line are located through the middle of the study area and an additional 115 kV transmission line is located adjacent to the western boundary (Figure 1). A new 345 kV transmission line traverses the study area from east to west just north of the homestead along 290th and enters the existing substation from the east (Not pictured in Figure 1). The site is currently in agricultural (row-crop) production, and is surrounded by agricultural land.

Methods

An initial offsite evaluation for the presence of wetlands was performed using available information, including United States Geological Survey (USGS) topographic maps, United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Mapping, Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) Database, and Farm Service Agency (FSA) National Aerial Imagery Program (NAIP). Because the site is in agricultural production, and therefore lacks normal circumstances for assessing the plant community over most of the site, HDR performed an historical aerial photo review of the project area to identify potential wetlands via indicators of possible wetland hydrology. The review was

performed in accordance with mapping conventions recognized by the Minnesota Board of Water and Soil Resources (BWSR 2010). According to the BWSR guidance, “In general, review of aerial imagery for assessing wetland hydrology is more accurate in agricultural fields that were planted with annually seeded row crops such as soybeans and corn. These fields will often show signs of crop stress, standing water, or drowned out crops in summer aerial imagery when wetland hydrology is present.” Areas identified as having signs of crop stress, standing water, or drowned out crops on aerial imagery were assessed for wetland hydrology using the BWSR guidance, and then examined during onsite field inspections.

Onsite wetland delineation was conducted using the “Routine Determination, Onsite Inspection Necessary” method outlined in the 1987 United States Army Corps of Engineers (USACE) Wetlands Delineation Manual (USACE 1987) and the Midwest Regional Supplement (USACE 2012).

In general, wetland delineations conducted under normal circumstances are based on the presence of the following three parameters:

- The area must exhibit indicators of wetland hydrology
- The area must have a predominance of hydrophytic vegetation
- Hydric soils must be present

Sample plots were collected at locations identified in the field within the study area as having potential for wetland hydrology indicators (i.e. depressional features, areas of standing water, areas showing crop stress, etc.) and evaluated for all potential wetlands to determine if they met the wetland criteria. At each plot location, a soil pit was dug for observation of soil and hydrology characteristics. Hydric soil and wetland hydrology characteristics were identified using methods described in the *1987 Manual* and *Midwest Regional Supplement.* The vegetation was analyzed for plant species dominance in a 6-foot radius from the sample pit for the herbaceous layer. The wetland indicator status of plants was identified using the USACE *National Wetland Plant List of 2014-Midwest Region (Lichvar and Kartesz 2009)*. Data points were mapped using a GPS unit with sub-meter accuracy.

Results

Desktop Analysis Results

The SSURGO Database for Lyon County indicates the soils on the site as shown on Figure 2 and listed in Table 1, along with the hydric status of each mapped soil. The NWI did not indicate any mapped wetlands within the proposed study area (Figures 3 and 4). U.S. Geological Survey (USGS) digital mapping (USGS 1993) indicated the presence of two unnamed streams located within the study area (Figure 2), draining into mapped Minnesota Department of Natural Resources (DNR) Public Waterways (PWI) unnamed feature to the northeast, and Clear Creek to the southeast (Figures 1 and 2). These streams appeared on the aerial photography to be excavated perennial drainage ditches, which was later confirmed during field investigations.

Table 1. Study Area Soils

Map Unit Symbol	Soil Map Unit Name	Hydric Category
86	Canisteo clay loam	Hydric
127	Sverdrup sandy loam, 0 to 2 percent slopes	Nonhydric
127B	Sverdrup sandy loam, 2 to 6 percent slopes	Nonhydric
246	Marysland loam	Hydric
276	Oldham silty clay loam	Hydric
339	Fordville loam, 0 to 2 percent slopes	Nonhydric
339B	Fordville loam, 2 to 6 percent slopes	Nonhydric
341	Arvilla sandy loam, 0 to 2 percent slopes	Nonhydric
341B	Arvilla sandy loam, 2 to 6 percent slopes	Nonhydric
341C	Arvilla sandy loam, 6 to 12 percent slopes	Nonhydric
421B	Ves loam, 1 to 4 percent slopes	Predominantly Nonhydric
421B2	Ves loam, 3 to 6 percent slops, eroded	Nonhydric
423	Seaforth loam, 1 to 3 percent slopes	Predominantly Nonhydric
953C	Arvilla-Storden-Ves complex, 6 to 15 percent slopes	Nonhydric
954C2	Storden-Ves loams, 5 to 12 percent slopes, eroded	Predominantly Nonhydric
1029	Pits, gravel	Nonhydric
L84A	Glencoe clay loam, depressional, 0 to 1 percent slopes	Hydric

Source: SSURGO Soil Data for Lyon County, Minnesota. USDA NRCS (2014).

Historical Aerial Photography Interpretation results

A review of historical climate data for the study area was performed against the dates of historical aerial photos readily available through the FSA NAIP. BWSR guidance states that historical photographs should be reviewed for indicators of wetland hydrology when normal precipitation conditions are present. Normal conditions are determined by considering precipitation data from the three months prior to the date of the imagery and weighing that data based on the length of time since the precipitation contributed to the water budget (i.e. more recent precipitation is given greater weight). The Minnesota Climatology Working Group (MNCWG, 2014) has an online calculator that provides a multi-month precipitation score for each aerial image reviewed. Scores of 6 to 9 are considered “dry”, 10 to 14 “normal”, and 15 to 18 “wet”. Of the publicly available FSA NAIP aerial photos, 2003, 2004, 2005, 2006, 2008 and 2010 had normal precipitation multi-month scores and therefore were selected for use in the historical aerial photography review (Table 2).

Table 2. Historical Aerial Photography Information

Year of Photo	Date of Photo	MNCWG Multi-Month Score
2003	August, 26	12 – Normal
2004	July, 8	13 – Normal
2005	August, 7	12 – Normal
2006	July, 14	11 – Normal
2008	July 13	13 – Normal
2010	June, 16	10 – Normal

For an aerial signature (location with crop stress, drownout, or standing water) to test positive for potential wetland hydrology, signs of wetland hydrology must be present in more than 50% of the years of historical photography reviewed. Crop stress is a difference in vegetative vigor of planted crops as compared to surrounding conditions, and can be caused by wetness. It is often seen as a different color than surrounding vegetation of the same type on aerial photos. In reviewing the aerial photography against the LiDar elevation information it was apparent that many areas that show signs of crop stress in the study area occur along slopes and hilltops. This stress is likely due to excessively drained and poor soil conditions along the slopes within the study area rather than being associated with depressional areas or mapped hydric soils where crop stress would be considered indicative of wetland hydrology (Figure 3.1). Therefore, only areas where crop stress was observed in areas with corresponding geomorphic landscape position (depressional areas) were considered as potential signatures of wetland hydrology.

Of the six years of aerial photographs in Table 2, no areas had crop stress in the 2003, 2005, 2006 or 2010 photos. Crop stress was identified in 2 locations in the 2004 photo (Figure 3.2) and in 3 locations the 2008 photo (Figure 3.3), for a total of 5 distinct areas that had crop stress,

but no areas had signs of crop stress in more than one year. No areas on the site meet the requirement of having signs of crop stress in 50% of the aerial photos reviewed (at least 3 photos) and therefore there is insufficient evidence that wetland hydrology is present at these locations.

Wetland Delineation Results

HDR visited the study area on June 11th, 2014 to perform additional investigation and to reaffirm the findings of the initial desktop review. The field investigation indicated that the entire area of the proposed project is comprised of row cropped agricultural field. No native vegetation was identifiable onsite. Three areas of significant crop stress/standing water were identified onsite (Figure 4). Two of these areas (WDP 2 and WDP 3) corresponded with areas of crop stress in the aerial photo review, but WDP 1 did not have signs of crop stress in the aerial review. The remaining three areas with signs of crop stress in the aerial photo review were all observed to have healthy crops with no standing water or crop stress at the time of the site visit.

WDP1, 2 and 3 were investigated and all determined to be non-wetlands. Field investigation did not identify indicators of hydric soils or hydrophytic plant communities on site at the three locations. The multi month precipitation score for the time of the onsite investigation was listed as 12, which is considered “normal” (MNCWG 2014); however, during the 10 days prior to the onsite investigation the site received a total of 4.58 inches of rainfall (USDA 2014). The average rainfall for this area is 3.4 inches for the entire month of June. This excessive rainfall resulted in extremely wet conditions at the time of the investigation, which was the cause for standing water to be located at the areas investigated. HDR collected USACE determination data forms at all three investigated locations, and these data forms are included in Appendix A. Locations of the data points are included in Figure 4. Ground level photography of the three investigated locations is shown in Appendix B.

Two excavated perennial drainage features are located on the site, one near the northern boundary and the second near the southern boundary. Both of the features are heavily impacted by channelization to facilitate agricultural drainage. The features are approximately 7 to 10 feet deep with 2:1 side slopes that are vegetated with a mixture of reed canary grass (*Phalaris arundinacea*) near the base of the slope and smooth brome (*Bromus inermis*) near the top of the slope. The features are approximately 2 feet wide and the substrate composition is primarily silt with some sand mixed in. Multiple drain tile outlets were observed that discharge to the drainage features. Photos of the drainage features are shown in Appendix B.

Open drainage tile inlets were observed within the study area at multiple locations (See Figure 4). It is likely that the installation of an artificial drainage system within the study area has created a new normal hydraulic regime that does not allow for wetland hydrology to occur onsite.

Conclusions

Two perennial drainage features are located within the study area. HDR did not identify any wetland areas within the study area. Historical aerial photography review did not identify any

areas of potential wetland hydrology. The onsite review resulted in three locations being identified as potential wetlands. All three locations lacked both hydrophytic vegetation and indicators of hydric soils, and did not have sufficient evidence of wetland hydrology from the aerial photography review. Therefore, it is the opinion of HDR that these areas do not meet the mandatory criteria for a wetland as defined by the *1987 Manual*. Overall the study area has been significantly altered for agricultural activities. The entire site is a monoculture of seeded row crops with no apparent native vegetation onsite resulting in no wetland plant communities. The hydrology of the site has been altered by the installation of a comprehensive below ground tile drainage system and the excavation of two drainage ditches. These alterations to hydrology have resulted in new normal hydrologic conditions that have effectively drained the site, allowing efficient crop production in years with normal precipitation, and no longer allow for wetland hydrology to occur onsite. Although a significant portion of the site is mapped as hydric soils, alterations to hydrology have also changed the soil moisture regime resulting in nonhydric soil conditions.

At this time HDR, on behalf of NextEra, is requesting concurrence with the results of the delineation from the US Army Corps of Engineers – St. Paul District Regulatory Office and the Lyon County Soil and Water Conservation District (Local Government Unit in charge of administering the Minnesota Wetland Conservation Act within Lyon County).

References

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NRCS. 2014. *Soil Survey Geographic (SSURGO) Database* for Lyon County, Minnesota. http://datagateway.nrcs.usda.gov.

Robert W. Lichvar and John T. Kartesz. 2014. North American Digital Flora: National Wetland Plant List, version 2.4.0 (https://wetland_plants.usace.army.mil). U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH, and BONAP, Chapel Hill, NC.

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_____. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

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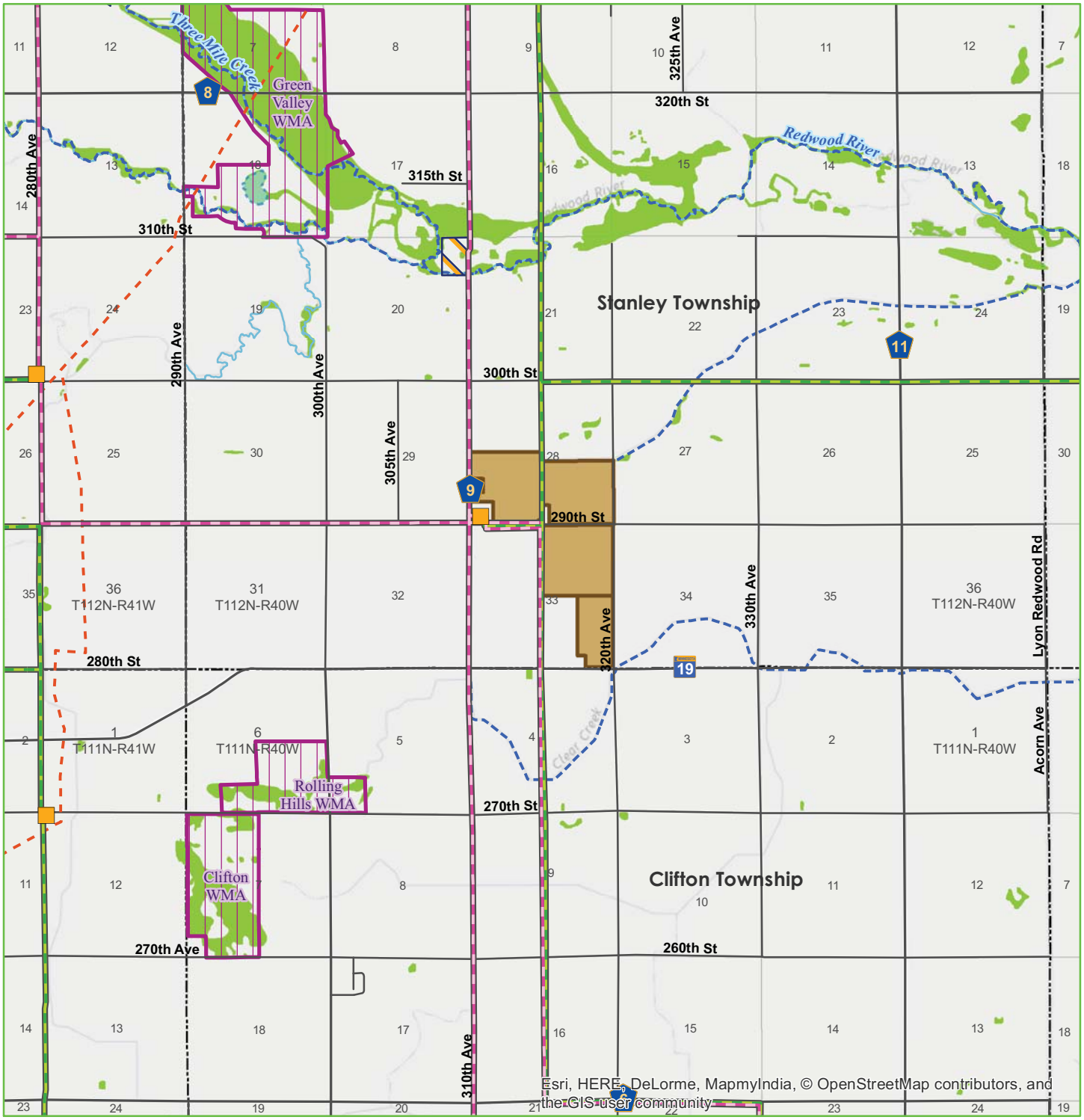
USFWS. 1956. *Wetlands of the United States*. Circular 39. 67pp.

_____. 1977 to Present. *National Wetlands Inventory*. https://www.fws.gov/wetlands.

USGS. 1999. Dudley quadrangle, Minnesota. Photorevised 1993. 1:24,000. 7.5 Minute Series. Reston, Virginia: United States Department of the Interior.

Figure 1: Study Area Location
Marshall Solar Facility



Legend

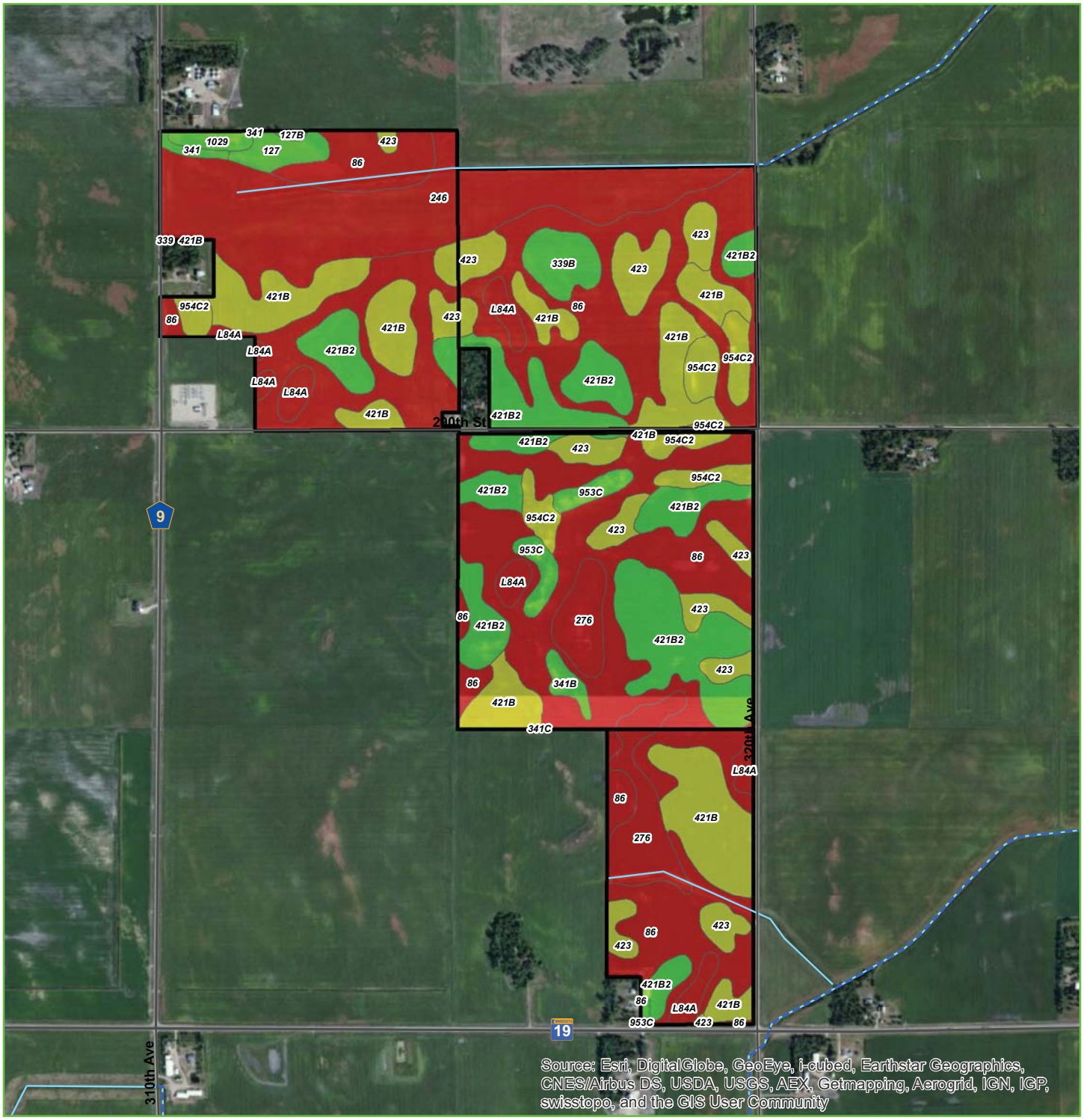
- Study Area
- **Existing Transmission**
- 69kV AC
- 115kV AC
- Substation
- Pipeline
- PWI Stream
- River / Stream
- PWI Basin
- PWI Wetland
- Waterbody
- NWI Wetland
- Wildlife Management Area
- NRCS Easement
- City / Township Boundary
- Section Line

N

0 0.25 0.5 1
Miles

Document Path: \\mspe-gis-file\GISProj\NextEra\241352_Marshall\map_docs\draft\Wetland_1_location.mxd

Figure 2: Study Area Soils
Marshall Solar Facility



Legend

- Study Area
- **Study Area Soils - Hydric Rating**
  - Hydric
  - Predominantly Nonhydric
  - Nonhydric
- PWI Stream
- River / Stream
- Waterbody

N

0 500 1,000 2,000
Feet

Document Path: \\mspe-gis-file\GISProj\NextEra\241352_Marshall\map_docs\draft\Wetland_2_soils.mxd

Figure 3.1: Study Area Elevation
Marshall Solar Facility

Legend

- Study Area
- Contour
- PWI Stream
- River / Stream
- Waterbody
- NWI Wetland

N

0 500 1,000 2,000
Feet

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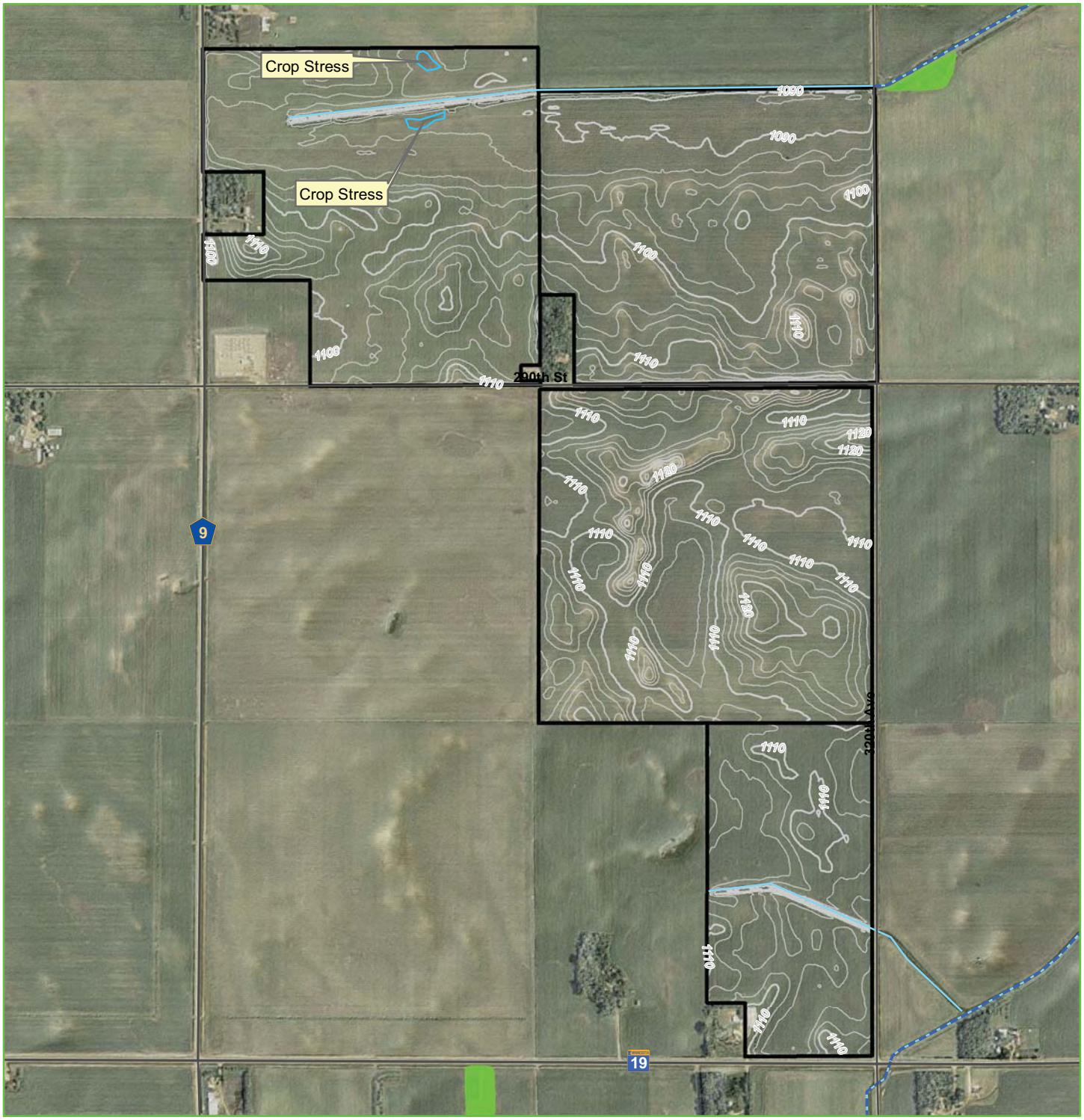
Figure 3.2: 2004 Historical Air Photo Review
Marshall Solar Facility


Crop Stress
Crop Stress
1090
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1120
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1120
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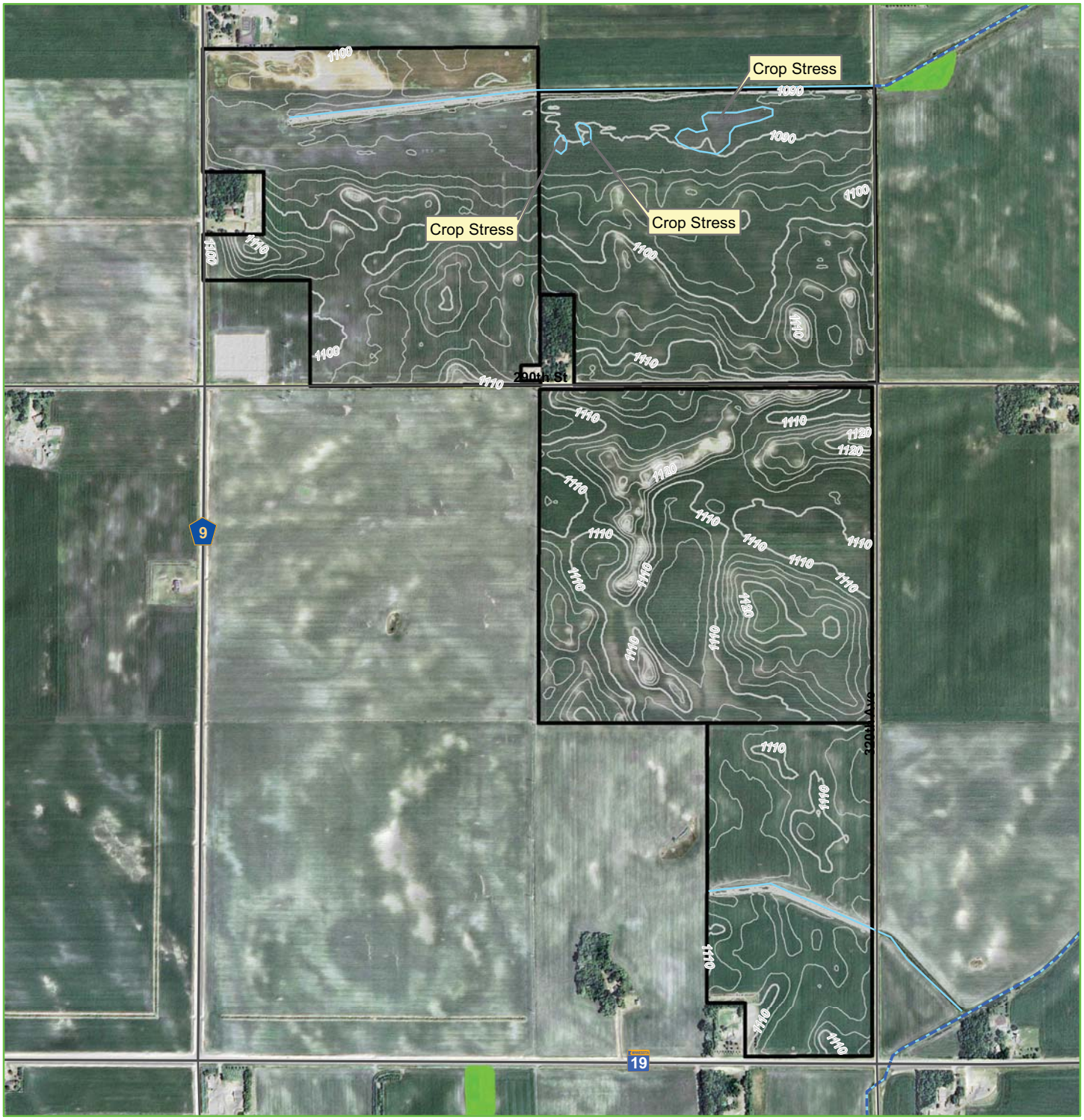
Figure 3.3: 2008 Historical Air Photo Review
Marshall Solar Facility



Legend

- Study Area
- Contour
- Wetland Signature
- PWI Stream
- River / Stream
- Waterbody
- NWI Wetland

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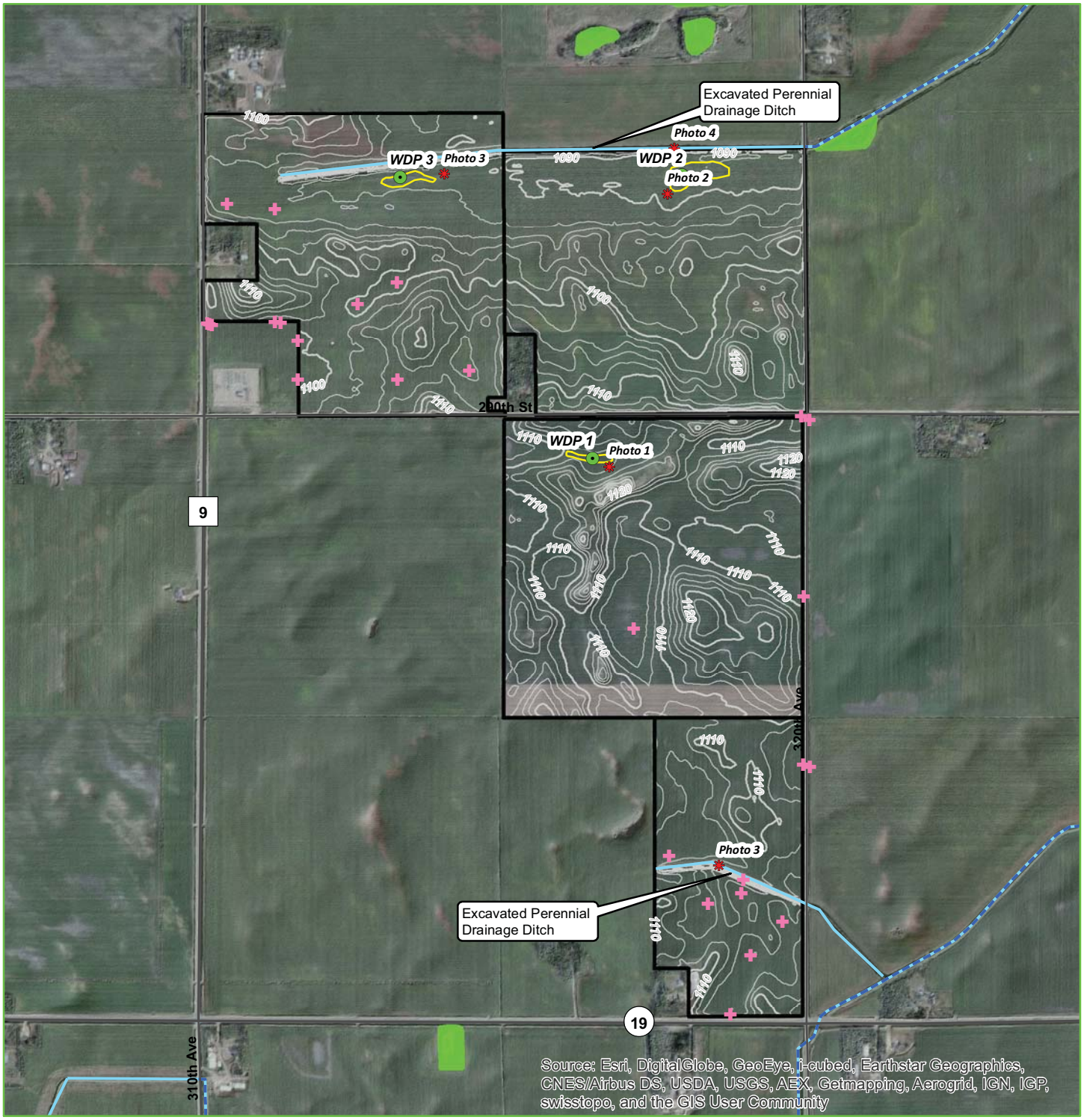
Figure 4: Onsite Review
Marshall Solar Facility



Legend

- Study Area
- Contour
- Field Reviewed Location
- WDP
- PWI Stream
- River / Stream
- Waterbody
- NWI Wetland
- Photo Point
- Drainage Tile Inlet

N

0 500 1,000 2,000
Feet

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Appendix A – Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Marshall Solar City/County: Lyon County Sampling Date: 6/11/2014

Applicant/Owner: NextEra State: MN Sampling Point: WDP 1

Investigators: M Swenson B Adamich Section, Township, Range S 28 T 112 R 40

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 44.470941 Long: -95.66004 Datum: WGS 1984

Soil Map Unit Name: Arvilla-Storden-Ves complex, 6 to 15 percent slopes NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation X, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Plot is located within the boundary of an area identified as a potential wetland via offsite review. Plot is made up entirly of corn row crops, no indicators of hydric soils are present.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Zea mays	35	Y	UPL
	35 =Total Cover		
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	35	x 5 =	175
Column Totals:	35 (A)		175 (B)

Prevalence Index = B/A= 5.00

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Vegetation is comprised entiriely of row crops.

SOIL

Sampling Point: WDP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 6	10YR 2 / 1	100					CLAY LOAM	
6 to 19	10YR 4 / 3	95	10YR 5/6	5	C	M	CLAY	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
No indicators of hydric soils are present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Although drainage infrastructure is located onsite in the form of open tile inlets, it is unkown if lateral drains have been installed within the property. The plot is not located within the setback distance of any of the known drainage infrastructure. Therefore geomorphic position still applies.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Marshall Solar City/County: Lyon County Sampling Date: 6/11/2014

Applicant/Owner: NextEra State: MN Sampling Point: WDP 2

Investigators: M Swenson B Adamich Section, Township, Range S 28 T 112 R 40

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 44.477978 Long: -95.65922 Datum: WGS 1984

Soil Map Unit Name: Marysland Loam NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation X, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Plot is located within a drown out depression within a corn field. Recent rain falls most likely have caused ponded water within the corn field. No indicators of hydric soils nor hydrophytic vegetation were present, therefore this plot is not located within a wetland.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Zea mays	35	Y	UPL
	35 =Total Cover		
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	35	x 5 =	175
Column Totals:	35 (A)		175 (B)

Prevalence Index = B/A= 5.00

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WDP 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 9	10YR 2 / 1	100					CLAY LOAM	
9 to 20	2.5Y 5 / 3	90	10YR 4/6	10	C	M	CLAY	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
No indicators of hydric soils are present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	X	No		Depth (inches):	0.5
Water Table Present?	Yes		No	X	Depth (inches):	0
Saturation Present?	Yes		No	X	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present in the form of suface water. Geomorphic position is not applicable as the wetland plot location is located within the setback distance of the drainage ditch as defined by the USDA NRCS Minnesota Drainage setback table for Lyon County.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Marshall Solar City/County: Lyon County Sampling Date: 6/11/2014

Applicant/Owner: NextEra State: MN Sampling Point: WDP 3

Investigators: M Swenson B Adamich Section, Township, Range S 28 T 112 R 40

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 44.47795 Long: -95.668655 Datum: WGS 1984

Soil Map Unit Name: Marysland loam NWI Classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation X, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Plot is located within a drown out depression within a corn field. Recent rain falls most likely have caused ponded water within the corn field. No indicators of hydric soils nor hydrophytic vegetation were present, therefore this plot is not located within a wetland.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Zea mays	35	Y	UPL
	35 =Total Cover		
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	35	x 5 =	175
Column Totals:	35 (A)		175 (B)

Prevalence Index = B/A= 5.00

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Vegetation comprised entirely of row crops.

SOIL

Sampling Point: WDP 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 15	10YR 2 / 1	100					CLAY LOAM	
15 to 22	10YR 5 / 3	90	10YR	10	C	M	CLAY	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
No indicators of hydric soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
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- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	X	No	____	Depth (inches):	0.5
Water Table Present?	Yes	X	No	____	Depth (inches):	0
Saturation Present?	Yes	X	No	____	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present in the form of suface water. Geomorphic position is not applicable as the wetland plot location is located within the setback distance of the drainage ditch as defined by the USDA NRCS Minnesota Drainage setback table for Lyon County.

Appendix B – Photo Log

Photo 1. WDP 1 –Orientation north west

Photo 2. WDP 2 – Orientation west

Photo 3. WDP 3 – Orientation northwest

Photo 4. Southern Drainage Feature – Orientation west

Photo 4. Northern Drainage Feature – Orientation west

Appendix C – Agency Correspondence

DEPARTMENT OF THE ARMY
St. Paul District, Corps of Engineers
180 Fifth Street East, Suite 700
St. Paul MN 55101-1678

REPLY TO
ATTENTION OF

DEC 05 2014

Operations
Regulatory (2014-04024-BGO)

Mr. Michael Swenson
HDR Engineering, Inc.
701 Xenia Avenue South, Suite 600
Minneapolis, Minnesota 55416

Dear Mr. Swenson:

This letter is in response to your correspondence dated November 11, 2014, requesting Corps of Engineers concurrence with the delineation of aquatic resources completed on the 505-acre Marshall Solar Energy Project property. The project site is located in Section 28 and 33, T. 112N., R. 40W., Lyon County, Minnesota.

We have reviewed the Marshall Solar Energy Project Delineation and we require more information before we are able to concur that the limits of the aquatic resources have been accurately identified in accordance with current agency guidance including the *Corps of Engineers Wetland Delineation Manual* (1987 Manual) and the Regional Supplement to the Corps of Engineers Wetland Delineation manual: Midwest Region.

The specific comments we have about the delineation include:

1. Page one of the delineation report correctly states that due to the site being cropped, normal circumstances are not present. However, the data sheets state that Normal Circumstances are present. The data sheets should be revised.
2. Under the aforementioned circumstances being not normal, an assessment of the vegetative community on-site was not necessary. It is recommended, but not required, that reference sites in reasonable proximity with vegetation under normal circumstances located on the same landscape position and soil type be used to characterize the vegetation that would "normally occur" in the cropped field where the samples were taken.
3. Hydric soil interpretations are now listed in WEB Soil Survey as 5 categories. Figure 2 should be resubmitted with a 5 category listing of hydric soil.
4. The locations of the observed open drainage inlets and drainage ditches should be indicated on a separate Figure.
5. The report cited the presence of drainage infrastructure. If the sample point is within the setback distance of functioning drainage infrastructure, hydrology indicator D2, geomorphic position, cannot be used. If D2 is used, documentation must be provided that a functioning drain is beyond the setback distance.

6. The location of the photographs should be noted on a Figure, such as Figure 4.

Please make note of the comments above and coordinate with the regulatory project manager listed below to further explain or evaluate this delineation. Based on this evaluation, we believe it will not be necessary to visit the project site during the growing season to evaluate the delineation.

In the interim, please be aware that pursuant to Section 404 of the Clean Water Act, the Corps of Engineers has regulatory jurisdiction over the discharge of dredged and fill materials, including discharges associated with mechanical land clearing, in all waters of the United States, which includes most wetlands. In addition, the Corps regulates all work in navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act. Work performed below the ordinary high water mark in waters of the United States, or the discharge of dredged or fill material into wetlands, without a Department of the Army permit could subject you to enforcement action. Receipt of a permit from a state or local agency does not obviate the requirement for obtaining a Department of the Army permit.

If you have any questions, please contact Benjamin Orne in our St. Paul office at (651) 290-5280. In any correspondence or inquiries, please refer to the Regulatory number shown above.

Sincerely,

Benjamin Orne

Benjamin Orne
Project Manager

cc:
Luke Olson, Lyon SWCD
Jennifer Field, NextEra Energy Resources, LLC

Swenson, Michael

From: Luke K. Olson <LukeOlson@co.lyon.mn.us>
Sent: Friday, November 21, 2014 8:47 AM
To: Swenson, Michael
Subject: Marshall Solar Application

Hi Michael,

I have reviewed the application and delineation materials for the Marshall Solar project and forwarded these materials on to appropriate staff with the BWSR, DNR, and ACOE. The project area has a drainage ditch (JD 18) running through the property. The report that was sent was very thorough but did not highlight whether the ditch met the required features of a wetland. The report should address the wetland/upland status in the ditch as well.

If you could take a look at this for the Technical Evaluation Panel, that would be great! Call or email if you have any questions on what I am looking for.

Respectfully,

Luke Olson
Conservation Planning Technician
Lyon County SWCD
1424 E College Drive
Marshall, MN 56258
Phone: 507.537.0396