

September 4, 2018

Mr. Rob Williams, RLA
TDI Associates, Inc.
N8 W22350 Johnson Drive, Suite B-4
Waukesha, WI, 53186

RE: Wetland Boundary Verification Summary – Ravenwoods Residential Development, Village of Menomonee Falls, Waukesha County, Wisconsin

Dear Mr. Williams:

Heartland Ecological Group, Inc. (“Heartland”) completed a determination and delineation of a wetland boundary segment at the Ravenwoods residential development site on August 31, 2018 at the request of TDI Associates, Inc. Fieldwork was completed by Eric C. Parker, P.W.S. of Heartland. The approximately one-acre site (the “Study Area”) is outlined in red on Attachment 1. The Study Area is southeast of the intersection of Silver Spring Drive and Westwind Drive, in the northeast ¼ of Section 34, T8N, R20E, Village of Menomonee Falls, Waukesha County, Wisconsin.

The wetland boundary segment in the Study Area was delineated by Graef, Anhalt, Schloemer & Associates, Inc. in 2000. After the 2000 delineation, fill materials were placed on the upland side of the boundary in preparation for development and the fill slope became vegetated and stabilized. This condition was recorded on an as-built survey dated July 15, 2005 completed by Pioneer Engineering & Surveying, LLC (Attachment 1). The purpose of Heartland’s wetland determination and delineation was to review the approximate location of the 2000 wetland boundary in relation to the long-established fill-slope and to determine the wetland boundary was at or near the toe of the fill-slope as expected.

Methods

Wetland determinations and delineations were based upon the criteria and methods described in the USACE Wetlands Delineation Manual, T.R. Y-87-1 (“1987 Corps Manual”) and the applicable Regional Supplement to the Corps of Engineers Wetland Delineation Manual.

Results

According to the WETS analysis using the previous three (3) months of precipitation data, conditions encountered at the time of the fieldwork were expected to be wet for the time of year (Attachment 2, WETS Analysis). Site conditions observed during the field investigation were confirmed to be wet given the time of year.

One (1) wetland boundary segment was identified and delineated within the Study Area at approximately the toe of slope of the old fill-slope (Attachment 1, Heartland’s Wetland Boundary Review Sketch on Pioneer’s 2005 As-Built Survey). Wetland determination data sheets (Attachment 3) were completed at two (2) sample points that were representative of



the upland and wetland conditions near the boundary. Attachment 4 provides photographs of the wetland boundary and sample point locations. The wetland boundary and sample point locations are shown on Attachment 1.

Wetland 1 (W-1), as determined at sample point P2 (Attachment 3), is a wet meadow and shallow marsh located in the northern portion of the Study Area. Dominant vegetation observed in W-1 included reed canary grass (*Phalaris arundinacea*, FACW), and hybrid cattail (*Typha x glauca*, OBL). These species are hydrophytic and met the wetland vegetation parameter.

The Depleted Matrix (F3) hydric soil indicator was noted at sample point P1 in W-1, which is consistent with the previously mapped wetland, and met the hydric soil wetland parameter. The primary wetland hydrology indicators of High Water Table (A2) and Saturation (A3), were noted within W-1, while secondary indicators included Geomorphic Position (D2) and a positive FAC-Neutral Test (D5). Therefore, the wetland hydrology parameter was met.

Uplands within the Study Area are represented by sample point P1 located on the fill materials and recorded on a data sheet (Attachment 3).

Heartland recommends that all applicable regulatory agency reviews and permits are obtained prior to beginning work within the Study Area. Heartland can assist with evaluating the need for additional environmental reviews, surveys, or regulatory agency coordination in consideration of the proposed activity and land use as requested but is outside of the scope of the wetland determination.

Experienced and qualified professionals completed the wetland determination using standard practices and professional judgment. Wetland determinations may be affected by conditions present within the Study Area at the time of the fieldwork. All final decisions on wetlands are made by the USACE, the WDNR, and/or sometimes a local unit of government. Wetland determination reviews by regulatory agencies may result in modifications to the findings presented to the Client. These modifications may result from varying conditions between the time the wetland determination was completed and the time of the review. Factors that may influence the findings may include but not limited to precipitation patterns, drainage modifications, changes or modification to vegetation, and the time of year.

Please feel free to contact me if you have any questions regarding this wetland determination.

Regards,

Eric C. Parker, Principal Scientist
Heartland Ecological Group, Inc.
eric@heartlandecological.com
414.380.0269

Attachments:

- 1 – Heartland's Wetland Boundary Review Sketch
- 2 – WETS Analysis
- 3 – Wetland Determination Data Sheets
- 4 – Site Photographs



TDI Associates, Inc.
Ravenwoods
Project #: 20180105
September 4, 2018

Attachment 1 | Wetland Boundary Review Sketch

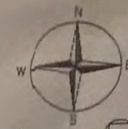
THE LOCATION OF UNDERGROUND STRUCTURES OR FACILITIES SHOWN ON THIS PLAN ARE BASED ON AVAILABLE RECORDS AT THE TIME OF CONSTRUCTION AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT. THE CONTRACTOR IS RESPONSIBLE FOR CONTAINING ALL UTILITIES TO INCLUDE REPAIR TO CONSTRUCTION TO OBTAIN THE EXACT LOCATION OF UTILITIES AND TO PROVIDE ADEQUATE PROTECTION DURING THE COURSE OF THE WORK.

30' X 100' #3 STONE TRACKING MAT TO BE INSTALLED PRIOR TO CONSTRUCTION

Wetland W-1

APPROX WETLANDS BOUNDARY

CONG. MON. WITH BRASS CAP FOUND NORTH QUARTER (N 1/4) CORNER SECTION 34-8-20



CONG. MON. WITH BRASS CAP FOUND NORTHEAST CORNER OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION

NO.	REVISIONS	BY	DATE

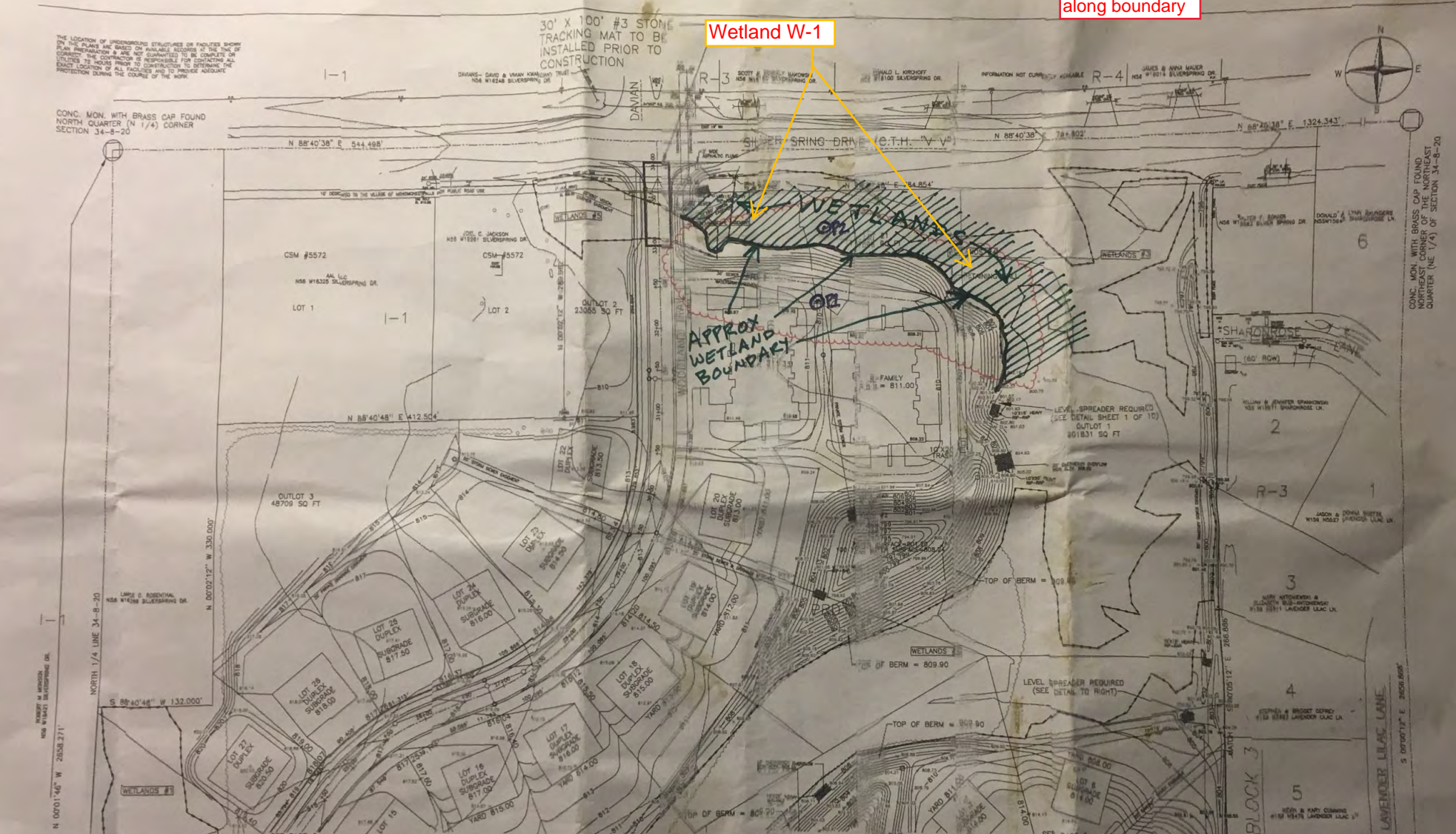
DESIGNED BY:
K. K. KLMECK
DRAWN BY:
K. K. KLMECK
CHECKED BY:
K. K. KLMECK

SCALE:
1" = 50' HORIZ.
DATE:
JULY 15, 2005

PIONEER ENGINEERING AND SURVEYING, L.L.C.
CONSULTANTS IN SURVEYING AND CONSTRUCTION DEVELOPMENTS
3902 O.T.H. "B"
JOHNSON CREEK, WI, 53038
(820) 699 - 3330 FAX: 699 - 3332

RAVENWOODS ASBUILT GRADING PLAN

MUNIC. PROJ. NO. 98-08	PIONEER PROJ. NO. 98-08
VILLAGE OF MEMPHOENEE FALLS APPROVED BY	PIONEER SMT. NO. PAGE 7 OF 10
VILLAGE ENGINEER: DAV	PIONEER FILE NO. 98-08





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Attachment 2 | WETS Analysis

WETS Table

WETS Station: GERMANTOWN,
WI

Requested years: 1988 - 2017

Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	27.5	11.5	19.5	1.56	0.93	1.89	4	14.0
Feb	30.6	13.4	22.0	1.29	0.75	1.57	3	12.5
Mar	41.9	23.7	32.8	1.93	1.20	2.34	5	6.9
Apr	54.7	34.4	44.5	3.84	2.62	4.59	7	1.4
May	66.3	44.4	55.4	3.85	2.43	4.64	7	0.3
Jun	76.5	54.0	65.3	4.32	2.59	5.24	7	0.0
Jul	80.6	58.9	69.8	3.86	2.62	4.61	6	0.0
Aug	79.0	57.7	68.3	3.73	2.58	4.44	7	0.0
Sep	72.2	49.3	60.7	3.15	1.86	3.83	6	0.0
Oct	59.4	38.3	48.9	2.49	1.61	2.99	6	0.1
Nov	45.4	28.0	36.7	2.10	1.19	2.56	5	2.2
Dec	32.2	16.9	24.6	1.74	1.01	2.12	4	12.1
Annual:					31.58	35.90		
Average	55.5	35.9	45.7	-	-	-	-	-
Total	-	-	-	33.86			67	49.6

GROWING SEASON DATES

Years with missing data:	24 deg = 0	28 deg = 0	32 deg = 0
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 30	28 deg = 30	32 deg = 30
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	4/9 to 11/3: 208 days	4/26 to 10/13: 170 days	5/8 to 10/5: 150 days
70 percent *	4/4 to 11/9: 219 days	4/20 to 10/19: 182 days	5/3 to 10/10: 160 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

STATS TABLE - total precipitation (inches)

Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1944						4.36	1.62	1.89	3.07	0.33	2.26	1.25	14.78
1945	0.48	1.38	1.20	2.87	4.29	3.29	1.21	7.49	5.76	0.86	3.37	1.10	33.30
1946	2.00	0.90	3.03	1.21	2.38	3.48	0.18	1.31	2.49	1.25	2.50	1.65	22.38
1947	1.51	M1.20	1.10	3.70	M4.54	2.90	2.67	2.50	5.54	1.73	2.85	1.21	31.45
1948	M0.84	1.80	3.15	2.93	3.07	3.15	1.34	1.05	1.49	0.62	3.32	2.10	24.86
1949	1.75	1.49	1.93	1.43	1.35	6.72	4.65	2.47	1.45	1.79	0.38	1.67	27.08
1950	2.24	0.82	2.27	3.23	2.34	4.27	6.10	M2.38	2.86	0.57	0.90	1.85	29.83
1951	1.87	1.73	3.74	5.39	1.58	1.82	3.62	2.78	3.35	6.03	3.01	M0.99	35.91
1952	1.88	0.58	2.02	1.88	3.33	M2.36	7.99	3.98	0.00	0.00	3.57	1.44	29.00

										43	42	01	42
1987	1.03	T	2.65	4.08	2.49	2.19	4.64	4.54	4.	1.	2.76	4.27	34.
									45	42			52
1988	2.51	0.60	1.12	3.44	0.53	1.19	1.03	2.21	4.	1.	4.28	1.52	25.
									99	95			37
1989	0.37	0.43	2.09	1.16	3.79	2.68	6.10	6.17	3.	1.	0.66	0.27	28.
									29	47			48
1990	1.81	1.10	2.34	2.03	6.32	4.27	2.14	5.65	4.	2.	2.62	2.74	37.
									27	64			93
1991	1.00	0.25	3.32	3.79	3.28	4.23	4.66	3.46	3.	5.	M3.	1.62	38.
									97	47	27		32
1992	M0.97	1.55	M2.76	M2.88	0.78	1.15	3.98	4.24	4.	1.	5.18	1.90	30.
									05	24			68
1993	M2.17	1.16	1.56	8.47	2.66	5.50	5.37	3.28	4.	0.	1.57	0.28	36.
									17	78			97
1994	M1.49	3.08	0.83	1.28	1.57	3.38	8.75	3.75	1.	0.	3.22	0.98	30.
									80	75			88
1995	1.56	0.13	2.11	4.04	3.40	0.97	2.28	9.03	1.	4.	3.00	0.69	32.
									20	17			58
1996	1.98	0.91	0.50	3.20	2.94	9.31	3.96	2.18	2.	4.	0.64	1.41	33.
									02	74			79
1997	1.80	2.73	1.37	1.23	4.12	9.61	5.41	4.39	1.	1.	M1.	1.41	36.
									86	41	15		49
1998	3.25	2.09	4.18	4.48	2.76	4.32	2.02	3.77	1.	3.	2.11	0.84	34.
									40	04			26
1999	4.62	1.02	1.46	6.75	4.97	4.55	8.39	2.06	3.	0.	1.02	M1.	40.
									39	69	53		45
2000	M0.93	1.47	1.71	2.96	8.28	4.60	5.05	3.79	5.	1.	M2.	M5.	43.
									29	33	88	01	30
2001	M1.45	M3.06	0.32	3.90	4.63	5.12	2.03	3.28	6.	3.	0.64	1.10	35.
									43	20			16
2002	1.25	M1.53	1.63	3.91	2.30	5.85	2.31	5.38	M3.	2.	M0.	0.63	32.
									67	90	75		11
2003	0.45	0.75	1.14	2.11	6.38	2.31	2.59	3.69	2.	M1.	5.67	1.92	30.
									11	78			90
2004	M0.89	0.98	4.27	2.91	12.83	5.41	1.88	2.46	0.	3.	2.25	1.57	38.
									09	13			67
2005	3.48	2.14	1.22	1.09	M3.15	1.91	3.27	3.56	4.	0.	4.22	1.23	30.
									59	78			64
2006	M2.50	0.75	3.14	4.24	6.11	2.38	2.82	3.61	3.	4.	1.65	1.69	37.
									71	55			15
2007	1.17	1.54	3.01	3.26	2.34	1.82	6.38	10.77	1.	2.	0.21	M1.	36.
									92	30	70		42
2008	1.82	M2.00	1.29	7.79	1.33	9.87	3.37	1.48	3.	2.	1.21	3.14	39.
									98	17			45
2009	0.73	1.19	3.20	4.55	2.90	2.77	1.13	3.04	1.	4.	1.16	3.52	30.
									89	35			43
2010	0.74	0.60	0.50	M5.01	3.28	6.50	8.61	1.71	2.	1.	0.91	1.41	33.
									26	80			33
2011	1.00	1.67	2.86	5.14	2.53	4.26	4.63	1.65	6.	1.	2.17	1.23	34.
									44	03			61
2012	1.04	0.84	2.88	2.46	3.65	0.38	2.85	3.51	1.	M4.	0.51	3.62	27.
									32	64			70
2013	2.70	2.49	1.12	6.70	5.62	4.88	2.58	0.82	2.	1.	2.55	0.89	34.
									46	77			58
2014	0.55	0.97	0.65	4.76	2.66	7.43	2.33	2.50	1.	2.	1.64	0.94	27.
									15	31			89
2015	0.35	0.26	0.64	5.79	3.23	2.39	3.12	3.89	5.	1.	3.24	5.36	34.
									40	26			93
2016	0.28	0.37	2.77	1.64	2.15	3.91	2.89	4.10	4.	4.	1.52	1.60	29.
									59	12			94
2017	1.86	1.16	2.00	4.36	4.97	6.63	3.76	2.50	0.	2.	1.11	0.45	32.
									80	80			40
2018	1.08	2.22	0.56	1.62	4.84	3.98	2.63	M9.44					26.
													37

Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.



TDI Associates, Inc.
Ravenwoods
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Attachment 3 | Wetland Determination Data Sheets

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ravenwoods City/County: V Menomonee Falls / Waukesha Sampling Date: 8/31/18
 Applicant/Owner: TDI Associates State: WI Sampling Point: P1
 Investigator(s): Eric C. Parker - Heartland Ecological Group Section, Township, Range: Section 34, T8N, R20E
 Landform (hillside, terrace, etc.): Old fillslope Local relief (concave, convex, none): Convex
 Slope (%): 5-8 Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Matherton silt loam (MmA) NWI classification: None depicted

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
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Remarks:
 WETS analysis indicates antecedent precipitation is in the wetter than normal range. Typically this time of year there are dry conditions. Wetland boundary found to be at toe of old stabilized fill slope, at approx. location of 2000 delineation, as expected. 19 pink wetland boundary flags placed.

VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>30ft</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. _____					Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50.0%</u> (A/B)																
2. _____																					
3. _____																					
4. _____																					
5. _____																					
=Total Cover																					
Sapling/Shrub Stratum	(Plot size: <u>15ft</u>)																				
1. _____					Prevalence Index worksheet: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Total % Cover of:</td> <td style="text-align: center;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>3</u></td> <td>x 2 = <u>6</u></td> </tr> <tr> <td>FAC species <u>60</u></td> <td>x 3 = <u>180</u></td> </tr> <tr> <td>FACU species <u>82</u></td> <td>x 4 = <u>328</u></td> </tr> <tr> <td>UPL species <u>10</u></td> <td>x 5 = <u>50</u></td> </tr> <tr> <td>Column Totals: <u>155</u> (A)</td> <td><u>564</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>3.64</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>3</u>	x 2 = <u>6</u>	FAC species <u>60</u>	x 3 = <u>180</u>	FACU species <u>82</u>	x 4 = <u>328</u>	UPL species <u>10</u>	x 5 = <u>50</u>	Column Totals: <u>155</u> (A)	<u>564</u> (B)	Prevalence Index = B/A = <u>3.64</u>	
Total % Cover of:	Multiply by:																				
OBL species <u>0</u>	x 1 = <u>0</u>																				
FACW species <u>3</u>	x 2 = <u>6</u>																				
FAC species <u>60</u>	x 3 = <u>180</u>																				
FACU species <u>82</u>	x 4 = <u>328</u>																				
UPL species <u>10</u>	x 5 = <u>50</u>																				
Column Totals: <u>155</u> (A)	<u>564</u> (B)																				
Prevalence Index = B/A = <u>3.64</u>																					
2. _____																					
3. _____																					
4. _____																					
5. _____																					
=Total Cover																					
Herb Stratum	(Plot size: <u>5ft</u>)																				
1. <u>Poa pratensis</u>		60	Yes	FAC	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2. <u>Solidago canadensis</u>		30	Yes	FACU																	
3. <u>Symphyotrichum pilosum</u>		25	No	FACU																	
4. <u>Erigeron annuus</u>		20	No	FACU																	
5. <u>Daucus carota</u>		10	No	UPL																	
6. <u>Oenothera biennis</u>		5	No	FACU																	
7. <u>Symphyotrichum novae-angliae</u>		3	No	FACW																	
8. <u>Sonchus arvensis</u>		2	No	FACU																	
9. _____																					
10. _____																					
155 =Total Cover																					
Woody Vine Stratum	(Plot size: <u>30ft</u>)																				
1. _____					Hydrophytic Vegetation Present? Yes _____ No <u>X</u>																
2. _____																					
=Total Cover																					

Remarks: (Include photo numbers here or on a separate sheet.)
 No trees, shrubs, or woody vines in the plots. Photo 5 of P1 looking toward the wetland boundary, with wetland sample point P2 in the background in wetland W-1. Other photos 1-4 show wetland boundary to the east and west.

SOIL

Sampling Point: P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 3/2	40					Loamy/Clayey	SiC w/15% gravel
	10YR 4/3	60						
7-24	10YR 5/3	50					Loamy/Clayey	SiC w/25% gravel
	10YR 4/2	30						
	10YR 3/1	20						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: 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)
- Dark Surface (S7)
- 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 Soils³:

- Coast Prairie Redox (A16)
- Iron-Manganese Masses (F12)
- Red Parent Material (F21)
- Very Shallow Dark Surface (F22)
- Other (Explain in Remarks)

³Indicators 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

Remarks:

No redox features observed. Soil profile comprised of old fill materials placed ca. 2000-2001.

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 Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled 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 Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? Yes No Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

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

Wetland delineation by GRAEF in 2000; wetland boundary depicted on Pioneer Engineering As-Built survey.

Remarks:

No wetland hydrology indicators observed.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ravenwoods City/County: V Menomonee Falls / Waukesha Sampling Date: 8/31/18
 Applicant/Owner: TDI Associates State: WI Sampling Point: P2
 Investigator(s): Eric C. Parker - Heartland Ecological Group Section, Township, Range: Section 34, T8N, R20E
 Landform (hillside, terrace, etc.): Toeslope Local relief (concave, convex, none): Concave
 Slope (%): 1-3 Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Ashkum silty clay loam (AsA) NWI classification: None depicted

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
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Remarks:
 WETS analysis indicates antecedent precipitation is in the wetter than normal range. Typically this time of year there are dry conditions. Wetland boundary found to be at toe of old stabilized fill slope, at approx. location of 2000 delineation, as expected. 19 pink wetland boundary flags placed.

VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>30ft</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1.	_____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)																
2.	_____	_____	_____	_____																	
3.	_____	_____	_____	_____																	
4.	_____	_____	_____	_____																	
5.	_____	_____	_____	_____																	
=Total Cover					Prevalence Index worksheet: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Total % Cover of:</td> <td style="text-align: center;">Multiply by:</td> </tr> <tr> <td>OBL species <u>10</u></td> <td>x 1 = <u>10</u></td> </tr> <tr> <td>FACW species <u>100</u></td> <td>x 2 = <u>200</u></td> </tr> <tr> <td>FAC species <u>0</u></td> <td>x 3 = <u>0</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>110</u> (A)</td> <td><u>210</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = <u>1.91</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>10</u>	x 1 = <u>10</u>	FACW species <u>100</u>	x 2 = <u>200</u>	FAC species <u>0</u>	x 3 = <u>0</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>110</u> (A)	<u>210</u> (B)	Prevalence Index = B/A = <u>1.91</u>	
Total % Cover of:	Multiply by:																				
OBL species <u>10</u>	x 1 = <u>10</u>																				
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UPL species <u>0</u>	x 5 = <u>0</u>																				
Column Totals: <u>110</u> (A)	<u>210</u> (B)																				
Prevalence Index = B/A = <u>1.91</u>																					
Sapling/Shrub Stratum (Plot size: <u>15ft</u>)																					
1.	_____	_____	_____	_____																	
2.	_____	_____	_____	_____																	
3.	_____	_____	_____	_____																	
4.	_____	_____	_____	_____																	
5.	_____	_____	_____	_____																	
=Total Cover																					
Herb Stratum (Plot size: <u>5ft</u>)																					
1.	<u>Phalaris arundinacea</u>	<u>100</u>	<u>Yes</u>	<u>FACW</u>																	
2.	<u>Typha X glauca</u>	<u>10</u>	<u>No</u>	<u>OBL</u>																	
3.	_____	_____	_____	_____																	
4.	_____	_____	_____	_____																	
5.	_____	_____	_____	_____																	
6.	_____	_____	_____	_____																	
7.	_____	_____	_____	_____																	
8.	_____	_____	_____	_____																	
9.	_____	_____	_____	_____																	
10.	_____	_____	_____	_____																	
=Total Cover																					
Woody Vine Stratum (Plot size: <u>30ft</u>)																					
1.	_____	_____	_____	_____																	
2.	_____	_____	_____	_____																	
=Total Cover																					

Hydrophytic Vegetation Indicators:
1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)
 No trees, shrubs, or woody vines in the plots. Photo 6 of P2 looking back toward the wetland boundary, with P1 in the background. Other photos 1-4 showing wetland boundary to the east and west.

SOIL

Sampling Point: P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 4/2	100					Loamy/Clayey	SiCL
6-13	10YR 4/2	95	10YR 4/4	5	C	M	Loamy/Clayey	SiCL
13-22	10YR 5/2	90	10YR 4/6	10	C	M	Loamy/Clayey	SiC

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: 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)
- Dark Surface (S7)
- 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 Soils³:

- ? Coast Prairie Redox (A16)
- Iron-Manganese Masses (F12)
- Red Parent Material (F21)
- Very Shallow Dark Surface (F22)
- Other (Explain in Remarks)

³Indicators 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

Remarks:

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 Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled 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 Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): 9
 Saturation Present? Yes No Depth (inches): 5
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

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

Remarks:



TDI Associates, Inc.
Ravenwoods
Project #: 20180105
September 4, 2018

Attachment 4 | Site Photographs



Photo #1 View Northwest of west end of wetland, which is mowed and goes up to culvert.



Photo #2 View North of wetland boundary along north edge of embankment, near tree.



Photo #3 View Northeast of wetland boundary at northeast corner of embankment.

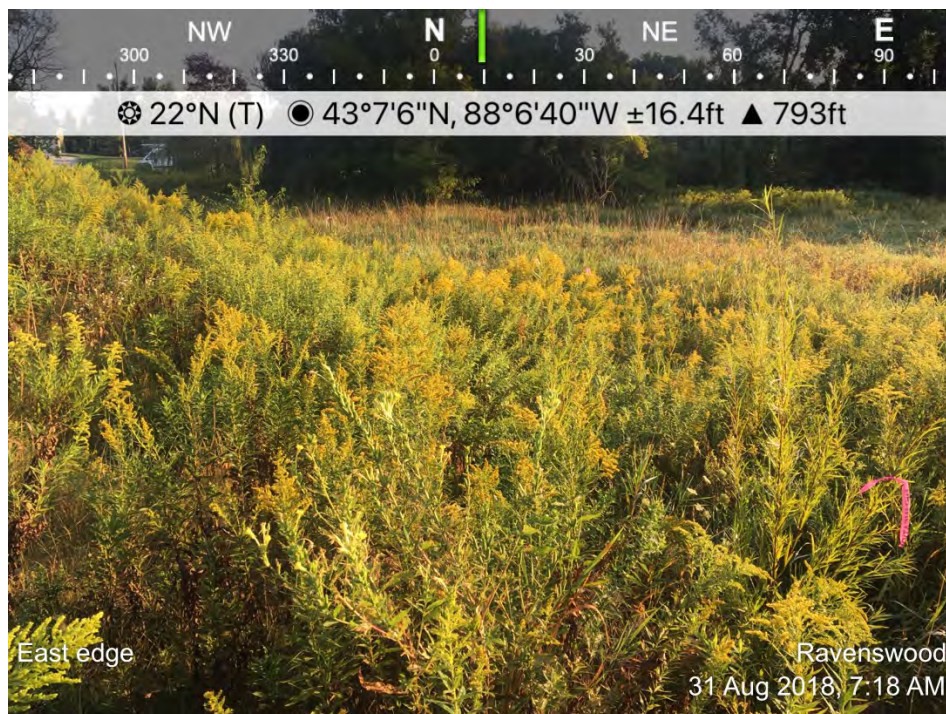


Photo #4 View North along wetland boundary at toe of east edge of embankment.



Photo #5 View North of upland sample point P1, wetland in background.



Photo #6 View South of wetland sample point P2, upland in background.