

506 Springdale Street, Mount Horeb, WI 53572

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,

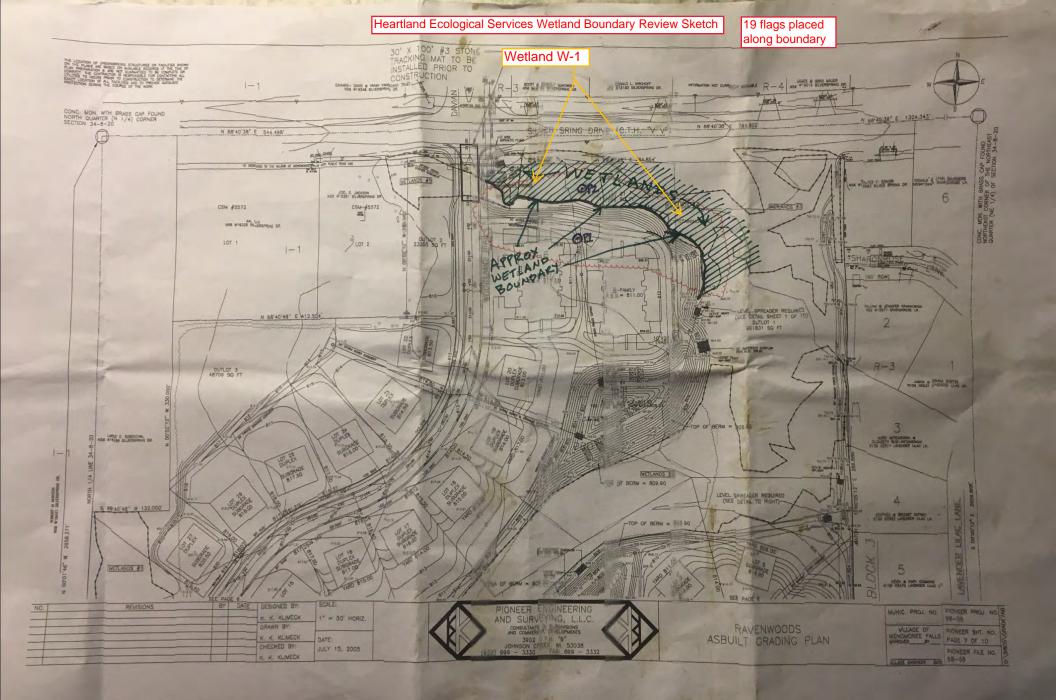
Eric C. Parker, Principal Scientist Heartland Ecological Group, Inc. eric@heartlandecological.com 414.380.0269

Attachments:

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



Attachment 1 | Wetland Boundary Review Sketch





Attachment 2 | WETS Analysis

### WETS Analysis Worksheet

Reference:

Ravenwoods
20180105
June - August 2018
Germantown, WI
Waukesha

#### Long-term rainfall records (from WETS table)

		3 years in 10		3 years in 10				
	Month	less than	Normal	greater than				
1st month prior:	August	2.58	3.73	4.44				
2nd month prior:	July	2.62	3.86	4.61				
3rd month prior:	June	2.59	4.32	5.24				
		Sum =	11.91					

\*Normal precipitation with 30% to 70% probability of occurrence

#### Site determination

		One u	cicinination		
	Site	Condition	Condition**	Month	
	Rainfall (in)	Dry/Normal*/Wet	Value	Weight	Product
	9.44	Wet	3	3	9
	2.63	Normal	2	2	4
	3.98	Normal	2	1	2
Sum =	16.05			Sum*** =	15

Determination: X Wet Dry Normal

**Condition va	alue:	***If sum is:	
Dry =	1	6 to 9	then period has been drier than normal
Normal =	2	10 to 14	then period has been normal
Wet =	3	15 to 18	then period has been wetter than normal

Precipitation data source: Midwest Regional Climate Center, cli-MATE: MRCC Application Tools Environment

Donald E. Woodward, ed. 1997. Hydrology Tools for Wetland Determination, Chapter 19. Engineering Field Handbook. U.S. Department of Agriculture, Natural Resources Conservation Service, Fort Worth, TX.

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

\* 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.	0.	3.57	1.44	29.

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

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



Attachment 3 | Wetland Determination Data Sheets

### WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ravenwoods		City/Cou	unty: V Menor	monee Falls / Waukesha	a Sampling Date:	8/31/18
Applicant/Owner: TDI Associates				State: WI	Sampling Point:	P1
Investigator(s): Eric C. Parker - Heartland Ecological G	roup	Section,	Township, Ra	nge: Section 34, T8	N, R20E	
Landform (hillside, terrace, etc.): Old fillslope			Local relief (c	concave, convex, none	): Convex	
Slope (%): 5-8 Lat:		Long:			Datum:	
Soil Map Unit Name: Matherton silt loam (MmA)					sification: None dep	licted
Are climatic / hydrologic conditions on the site typical fo	or this time of ye	ar?	Yes	No X (If no, e		
Are Vegetation, Soil, or Hydrologys	-			Circumstances" presen		0
Are Vegetation, Soil, or Hydrology n				plain any answers in F		
SUMMARY OF FINDINGS – Attach site ma					·	itures, etc.
Hydrophytic Vegetation Present? Yes No	» <u>X</u>	Is th	e Sampled Ar	rea		
Hydric Soil Present? Yes No	X	withi	in a Wetland?	? Yes	<u>No X</u>	
Wetland Hydrology Present? Yes No	<u>х</u>					
Remarks: WETS analysis indicates antecedent precipitation is in boundary found to be at toe of old stabilized fill slope,						
VEGETATION – Use scientific names of plan	nts.					
The Other (Distained 20ff )		ominant	Indicator	Deminance Toot w		
<u>Tree Stratum</u> (Plot size: <u>30ft</u> ) 1.	% Cover Sp	pecies?	Status	Dominance Test w		
2.				Number of Dominar Are OBL, FACW, or	•	1 (A)
3.				Total Number of Do		、
4.				Across All Strata:		2 (B)
5				Percent of Dominan		
	=Tot	tal Cover		Are OBL, FACW, or	FAC: 5	0.0% (A/B)
Sapling/Shrub Stratum (Plot size: 15ft )				Brovelence Index :	······	
1				Prevalence Index v Total % Cover		y hy:
3.				OBL species	$\frac{01}{0} \qquad x 1 =$	<u>y by.</u> 0
3 4.				FACW species	3 x 2 =	6
4 5				· · _		180
	=To	tal Cover	·	· · ·		328
Herb Stratum (Plot size: 5ft )				· · · ·	10 x 5 =	50
1. Poa pratensis	60	Yes	FAC			564 (B)
2. Solidago canadensis	30	Yes	FACU	Prevalence Index		( )
3. Symphyotrichum pilosum	25	No	FACU			
4. Erigeron annuus	20	No	FACU	Hydrophytic Veget	ation Indicators:	
5. Daucus carota	10	No	UPL		or Hydrophytic Vege	tation
6. Oenothera biennis	5	No	FACU	2 - Dominance	Test is >50%	
7. Symphyotrichum novae-angliae	3	No	FACW	3 - Prevalence	Index is ≤3.0 <sup>1</sup>	
8. Sonchus arvensis	2	No	FACU		al Adaptations <sup>1</sup> (Prov	
9.					arks or on a separate	
10				Problematic Hy	drophytic Vegetation	<sup>1</sup> (Explain)
M halfer Obstance (Distance 20# )	<u>155</u> =Tot	tal Cover			soil and wetland hyd	
<u>Woody Vine Stratum</u> (Plot size: <u>30ft</u> )			ŀ		disturbed or problema	atic.
2				Hydrophytic Vegetation		
Z	=To	tal Cover		Vegetation Present? Ye	s NoX	_

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
------

Depth	Matrix		Redo	x Featu				
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
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						0
	10YR 3/1	20						
	1011(3/1							
Type: C=C	oncentration, D=Dep	letion RM		MS=Mas	ked San	d Grains	<sup>2</sup> Location	PL=Pore Lining, M=Matrix.
71	Indicators:			NO Mac				for Problematic Hydric Soils <sup>3</sup>
Histosol			Sandy Gle	eved Mat	rix (S4)			Prairie Redox (A16)
	oipedon (A2)		Sandy Re	-				anganese Masses (F12)
	istic (A3)		Stripped N					rent Material (F21)
	en Sulfide (A4)		Dark Surfa	•	-			nallow Dark Surface (F22)
	d Layers (A5)		Loamy Mu	( )	eral (F1)			Explain in Remarks)
	uck (A10)		Loamy Gle	-				
	d Below Dark Surface	e (A11)	Depleted I	-				
	ark Surface (A12)	····/	Redox Da	`	'		<sup>3</sup> Indicators	of hydrophytic vegetation and
	/lucky Mineral (S1)		Depleted I		```	)		hydrology must be present,
	ucky Peat or Peat (S3	)	 Redox De		• • •	·		disturbed or problematic.
	· · · · · · · · · · · · · · · · · · ·						Hydric Soil Present?	Yes <u>No</u>
Remarks:	nches):	l profile co	omprised of old fill n	naterials	placed c	a. 2000-		Yes No
Remarks: No redox fea	atures observed. Soi	l profile co	omprised of old fill n	naterials	placed c	a. 2000-		Yes No
Remarks: No redox fea	atures observed. Soi DGY drology Indicators:				placed c	a. 2000-	2001.	
Remarks: No redox fea IYDROLC Wetland Hy Primary Indi	atures observed. Soi DGY rdrology Indicators: cators (minimum of o		uired; check all that	apply)			2001. <u>Secondary</u>	Indicators (minimum of two req
Remarks: No redox fea No redox fea Netland Hy Primary Indi Surface	atures observed. Soi DGY rdrology Indicators: cators (minimum of o Water (A1)		<u>uired; check all that</u> Water-Sta	apply) ined Lea	aves (B9)		2001 <u>Secondary</u> Surface	Indicators (minimum of two req Soil Cracks (B6)
Remarks: No redox fea <b>IYDROLC</b> <b>Netland Hy</b> Primary Indi Surface High Wa	atures observed. Soi OGY drology Indicators: cators (minimum of o Water (A1) ater Table (A2)		uired; check all that Water-Sta Aquatic Fa	apply) ined Lea auna (B1	aves (B9) 3)		2001. <u>Secondary</u> Surface Drainag	Indicators (minimum of two req e Soil Cracks (B6) ge Patterns (B10)
Remarks: No redox fea IYDROLC Netland Hy Primary Indi Surface High Wa Saturatio	Atures observed. Soi OGY Adrology Indicators: cators (minimum of o Water (A1) ater Table (A2) on (A3)		uired; check all that Water-Sta Aquatic Fa True Aqua	<u>apply)</u> ined Lea auna (B1	aves (B9) 3) ts (B14)		2001. <u>Secondary</u> Surface Drainag Dry-Se	Indicators (minimum of two req e Soil Cracks (B6) ge Patterns (B10) ason Water Table (C2)
Remarks: No redox fea IYDROLC Vetland Hy Primary Indi Surface High Wa Saturatio Water M	Atures observed. Soi OGY drology Indicators: cators (minimum of o Water (A1) ater Table (A2) on (A3) larks (B1)		uired; check all that Water-Sta Aquatic Fa True Aqua Hydrogen	apply) ined Lea auna (B1 sulfide f	aves (B9) 3) ts (B14) Odor (C1	)	2001. <u>Secondary</u> Surface Drainag Dry-Se Crayfis	Indicators (minimum of two req e Soil Cracks (B6) ge Patterns (B10) ason Water Table (C2) h Burrows (C8)
Remarks: No redox fea <b>YDROLC</b> Netland Hy Primary Indi Surface High Wa Saturatio Water M Sedimer	atures observed. Soi DGY drology Indicators: <u>cators (minimum of o</u> Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2)		uired; check all that Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F	<u>apply)</u> ined Lea auna (B1 sulfide Rhizosph	aves (B9) 3) ts (B14) Odor (C1 heres on	) Living Ro	2001. <u>Secondary</u> Surface Drainag Dry-Se Crayfis pots (C3) Saturat	Indicators (minimum of two req Soil Cracks (B6) ge Patterns (B10) ason Water Table (C2) h Burrows (C8) ion Visible on Aerial Imagery (C
Remarks: No redox fea IYDROLC Wetland Hy Primary Indi Surface High Wa Saturatic Water M Sedimer Drift Dep	atures observed. Soi DGY rdrology Indicators: <u>cators (minimum of o</u> Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3)		uired; check all that Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F Presence	apply) ined Lea auna (B1 atic Plan Sulfide Rhizosph of Redu	aves (B9) 3) ts (B14) Odor (C1 heres on l ced Iron (	) Living Ro	2001. Secondary Surface Drainag Dry-Se Crayfis pots (C3) Saturat Stunted	Indicators (minimum of two req Soil Cracks (B6) ge Patterns (B10) ason Water Table (C2) h Burrows (C8) ion Visible on Aerial Imagery (C d or Stressed Plants (D1)
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### 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.): <u>Toeslope</u>	Local relief (concave, convex, none): Concave
Slope (%): <u>1-3</u> 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 ye	ear? Yes <u>No X</u> (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrologysignificantly distu	urbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrologynaturally problem	natic? (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       X       No         Hydric Soil Present?       Yes       X       No         Wetland Hydrology Present?       Yes       X       No	Is the Sampled Area within a Wetland? Yes <u>X</u> No
boundary found to be at toe of old stabilized fill slope, at approx. locat	n normal range. Typically this time of year there are dry conditions. Wetland ion of 2000 delineation, as expected. 19 pink wetland boundary flags placed.
<b>VEGETATION</b> – Use scientific names of plants.	
	ominant Indicator pecies? Status <b>Dominance Test worksheet:</b>
1.	Number of Dominant Species That       Are OBL, FACW, or FAC:     1 (A)
3. 4.	Total Number of Dominant Species Across All Strata: 1 (B)
	tal Cover Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15ft</u> ) 1.	Prevalence Index worksheet:
1 2.	Total % Cover of: Multiply by:
3.	OBL species         10         x 1 =         10
4.	FACW species 100 x 2 = 200
5.	FAC species         0         x 3 =         0
	tal Cover     FACU species     0     x 4 =     0
Herb Stratum (Plot size: 5ft )	UPL species $0 \times 5 = 0$
1. Phalaris arundinacea     100       2. Typha X glauca     10	YesFACWColumn Totals:110(A)210(B)NoOBLPrevalence Index = B/A =1.91
2. Typna x giauca 10 10 10	
4.	Hydrophytic Vegetation Indicators:
5.	1 - Rapid Test for Hydrophytic Vegetation
6.	X 2 - Dominance Test is >50%
7.	X_3 - Prevalence Index is ≤3.0 <sup>1</sup>
8	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
10	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
<u>Woody Vine Stratum</u> (Plot size: <u>30ft</u> )	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1.       2.	Hydrophytic Vegetation
=To	tal Cover 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
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Depth	Matrix		Redo	x Featur	es				
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks	
0-6	10YR 4/2	100					Loamy/Clayey	SiCL	
6-13	10YR 4/2	95	10YR 4/4	5	С	М	Loamy/Clayey	SiCL	
13-22	10YR 5/2	90	10YR 4/6	10	C	M	Loamy/Clayey	SiC	
10-22	1011( 0/2		1011( 4/0	10			Loamy/olayey	010	
		·		·					
		·		·					
	·	·		·			·		
4		·		·					
	oncentration, D=Dep	letion, RN	I=Reduced Matrix,	MS=Mas	ked San	d Grains		PL=Pore Lining, M=Matrix.	
Hydric Soil			Candy Ol					for Problematic Hydric Soils <sup>3</sup> :	
Histosol			Sandy Gle	-			<u>?</u> Coast Prairie Redox (A16)		
	pipedon (A2) istic (A3)		Sandy Re Stripped M	• • •			Iron-Manganese Masses (F12) Red Parent Material (F21)		
	( )		Dark Surfa		5)				
	en Sulfide (A4) d Layers (A5)		Loamy Mu		aral (E1)		Very Shallow Dark Surface (F22) Other (Explain in Remarks)		
	uck (A10)		Loamy Gl	-					
	d Below Dark Surface	e (A11)		-					
	ark Surface (A12)	5 (, (11)		X Depleted Matrix (F3) Redox Dark Surface (F6)				<sup>3</sup> Indicators of hydrophytic vegetation and	
	/lucky Mineral (S1)			Depleted Dark Surface (F7)				wetland hydrology must be present,	
5 cm Mucky Peat or Peat (S3)				Redox Depressions (F8)				unless disturbed or problematic.	
Restrictive	Layer (if observed)	:							
Type:									
	nches):						Hydric Soil Present	? Yes <u>X</u> No	
Type: Depth (i							Hydric Soil Present?	? Yes <u>X</u> No	
Type: Depth (i							Hydric Soil Present	? Yes <u>X</u> No	
Type: Depth (i Remarks: HYDROLC Wetland Hy	DGY drology Indicators:								
Type: Depth (i Remarks: HYDROLC Wetland Hy Primary Indi	DGY drology Indicators: cators (minimum of c						<u>Secondary</u>	/ Indicators (minimum of two required	
Type: Depth (i Remarks: HYDROLC Wetland Hy Primary Indi Surface	DGY drology Indicators: cators (minimum of c Water (A1)		Water-Sta	ined Lea	``'		<u>Secondary</u> Surfac	<u>/ Indicators (minimum of two required</u> ee Soil Cracks (B6)	
Type: Depth (i Remarks: HYDROLO Wetland Hy Primary Indi Surface X High Wa	DGY drology Indicators: cators (minimum of c Water (A1) ater Table (A2)		Water-Sta Aquatic Fa	ined Lea auna (B1	3)		<u>Secondary</u> Surfac Draina	<u>/ Indicators (minimum of two required</u> se Soil Cracks (B6) age Patterns (B10)	
Type: Depth (i Remarks: HYDROLC Wetland Hy Primary Indi Surface X High Wa X Saturatio	DGY drology Indicators: cators (minimum of c Water (A1) ater Table (A2) on (A3)		Water-Sta Aquatic Fa	ined Lea auna (B1 atic Plant	3) s (B14)		Secondary Surfac Draina Dry-Su	<u>/ Indicators (minimum of two required</u> se Soil Cracks (B6) age Patterns (B10) eason Water Table (C2)	
Type: Depth (i Remarks: HYDROLC Wetland Hy Primary Indi Surface X High Wa X Saturatio Water M	DGY rdrology Indicators: cators (minimum of c Water (A1) ater Table (A2) on (A3) larks (B1)		Water-Sta Aquatic Fa True Aqua Hydrogen	ined Lea auna (B1 atic Plant Sulfide (	3) s (B14) Odor (C1	·	<u>Secondary</u> Surfac Draina Dry-Si Crayfi	<u>/ Indicators (minimum of two required</u> ce Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8)	
Type: Depth (i Remarks: HYDROLC Wetland Hy Primary Indi Surface X High Wa X Saturation Water W Sedimen	DGY drology Indicators: cators (minimum of c Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2)		Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F	ined Lea auna (B1 atic Plant Sulfide ( Rhizosph	3) s (B14) Odor (C1 ieres on l	_iving R	<u>Secondary</u> Surfac Draina Dry-Su Crayfi oots (C3) Satura	<u>/ Indicators (minimum of two required</u> e Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9)	
Type: Depth (ii Remarks: HYDROLC Wetland Hy Primary Indi Surface X High Wa X Saturatio Water M Sedimer Drift Dep	DGY drology Indicators: cators (minimum of c Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3)		Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F Presence	ined Lea auna (B1 atic Plant Sulfide ( Rhizosph of Reduc	3) s (B14) Odor (C1 ieres on l ced Iron (	_iving R [C4)	<u>Secondary</u> Surfac Draina Dry-Su Crayfi oots (C3) Sturfac	<u>r Indicators (minimum of two required</u> ce Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1)	
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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.





Ravenswood TDI Associates, Inc. Photos taken 8/31/2018



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.





Ravenswood TDI Associates, Inc. Photos taken 8/31/2018



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



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