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WETLAND DELINEATION TECHNICAL MEMORANDUM

TO: Dan Ringstad, New Market Bank Sr. Vice President

FROM: Natalie White, SEH Biologist | Project Manager

DATE: May 31, 2016

RE: Wetland Delineation – Crystal Village Lot 4 Block 2
SEH No. NEWMB 134676 14.00

This Technical Memorandum details the results of a site investigation for wetlands performed by Short Elliott Hendrickson Inc. (SEH®) in the Crystal Village housing development in Duluth, Minnesota on April 29th, 2016. The parcel assessed was Lot 4, Block 2 of the Crystal Village housing development. The site is approximately 1.2 acres with property boundaries bordering Arrowhead Road to the north and Crystal Drive to the south with forested uplands and residential properties to the east and west (**Figure 1**). The site was investigated for areas meeting the technical criteria of a wetland following the 1987 U.S. Army Corps of Engineers *Wetlands Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Northcentral and Northeast Region* (USACE 2012). The field investigation was completed by Kyle Hanson, CWD, SEH Biologist.

Topographic maps, the Natural Resources Conservation Service (NRCS) Web Soil Survey (**Figure 2**), the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (**Figure 3**), and the Minnesota Department of Natural Resources (MNDNR) Public Waters Inventory (PWI) (**Figure 4**) were reviewed prior to visiting the site to locate potential wetland habitats. One wetland was identified, mapped, and flagged in the field using pin flags and pink flagging tape within the area of investigation. **Table 1** summarizes the wetland characteristics and detailed field observations are also summarized below.

Table 1
Wetland Characteristics

Wetland ID	Size ¹	Eggers & Reed Classification	Circular 39 Classification	Cowardin Classification
1	0.76	Hardwood Swamp	Type 7	PFO1B
1	0.06	Shrub-Carr	Type 6	PSS1B
Total	0.82			
<small>¹Size includes areas of wetland within the area of investigation only. Wetlands may extend beyond the limits of the area investigated and actual wetland size may be larger than indicated.</small>				

The landscape of the site is relatively flat with wetland characteristics found at the toe of slope to the adjacent upland areas on and outside of the property boundary. The property is approximately 68% wetland according to this assessment.

The NWI map indicates one wetland within the area of interest (**Figure 3**). The nearest PWI identified by the MNDNR is Chester Creek, located approximately 0.5 mile north of the area of interest. No PWI basins or watercourses are located on the site (**Figure 4**).

One wetland was identified on the site as a Hardwood Swamp/Shrub-Carr mix and is described below. The wetland borders Arrowhead Road to the north and extends east outside of the property boundary and nears the south and western property boundaries (**Figure 5**). The wetland extends out of the parcel to the east and west; only portions within the area of interest were delineated.

Hardwood Swamp/Shrub-Carr

Dominant vegetation observed in the Hardwood Swamp portion of the wetland consisted of black ash (*Fraxinus nigra* – FACW) in the tree stratum, speckled alder (*Alnus incana* – FACW) and pussy willow (*Salix discolor* – FACW) in the shrub/sapling layer, and Canada bluejoint grass (*Calamagrostis canadensis* – OBL) in the herbaceous stratum. At the southwest corner of the property boundary, a small portion of the total wetland area is Shrub-Carr type and is dominated by balsam fir (*Abies balsamea* – FAC) in the tree stratum, speckled alder (*Alnus incana* – FACW) and pussy willow (*Salix discolor* – FACW) in the sapling/shrub stratum, and Canada bluejoint (*Calamagrostis canadensis* – OBL) and common red raspberry (*Rubus idaeus* – FAC) in the herbaceous stratum.

Soils in the Hardwood Swamp portion of the wetland were comprised of 10 YR 2/1 mucky silty clay from 0-6 inches below ground surface. From 6-12 inches below ground surface, soils consisted of 10 YR 4/2 silty clay with 20% redoximorphic concentrations (10 YR 3/6) in the soil matrix. This soil description meets the criteria for hydric soil indicator A10 – 2 cm Muck and F3 – Depleted Matrix. Soils were saturated at the surface and a water table was observed at 2 inches below the surface. Two primary indicators of wetland hydrology were observed: A2 – High Water Table and A3 – Saturation.

At the southwest corner of the property boundary, a small portion of the wetland area was classified as Shrub-Carr habitat and was dominated by speckled alder (*Alnus incana* – FACW) and pussy willow (*Salix discolor* – FACW) in the sapling/shrub stratum, and Canada bluejoint (*Calamagrostis canadensis* – OBL) and common red raspberry (*Rubus idaeus* – FAC) in the herbaceous stratum. Balsam fir (*Abies balsamea* – FAC) was dominant in the tree stratum. In total, the tree stratum comprised less than 30% total canopy cover. Soils consisted of 10 YR 2/1 fibric peat from 0-12 inches and 10 YR 2/1 muck from 12-48 inches. A water table was observed at three (3) inches below the surface and the primary indicators of wetland hydrology A2 – High Water Table and A3 – Saturation were present.

Surrounding Upland Observations

Upland surrounding the Hardwood Swamp portion of the wetland was dominated by quaking aspen (*Populus tremuloides* – FAC) in the tree stratum, American hazelnut (*Corylus americana* – FACU) in the shrub/sapling stratum and northern bracken fern (*Pteridium aquilinum* – FACU) in the herbaceous stratum. Upland soils are composed of 7.5 YR 2.5/2 fine sandy loam from 0-3 inches below ground surface, 7.5 YR 3/3 sandy loam from 3-6 inches, and 7.5 YR 3/4 from 6-12+ inches below ground surface. This soil profile does not meet any of the technical indicators for hydric soils. The hydrology indicator A3 – Saturation at three (3) inches below the ground surface was observed. Despite the presence of soil saturation, this area did not meet hydrophytic vegetation or hydric soil indicators and is therefore classified as upland habitat.

At the southwest portion of the site near the Shrub-Carr wetland type, upland areas were dominated by paper birch (*Betula papyrifera* – FACU) and quaking aspen (*Populus tremuloides* – FAC) in the shrub/sapling stratum and soils consisted of 7.5 YR 3/3 sandy clay loam from 0-18 inches below the surface. This soil profile does not meet any of the technical indicators for hydric soils. No indicators of wetland hydrology were observed in this area.

Supporting Maps, Data Sheets, and Representative Photographs

Attached are maps (**Figures 1-5**) showing the delineated wetlands and resources reviewed prior to conducting the field delineation. Wetland Determination Data Forms, representative site photos of the area, and climate data are also attached.

This summary Technical Memorandum is provided to New Market Bank for your review and coordination with local, state, and federal wetland regulatory agencies as applicable for wetland boundary and type concurrence as needed.

If you have any questions regarding this wetland delineation please contact me directly at 218.279.3003 or nwhite@sehinc.com.

EJ/NW

Attachments

c: Kyle Hanson, CWD – SEH

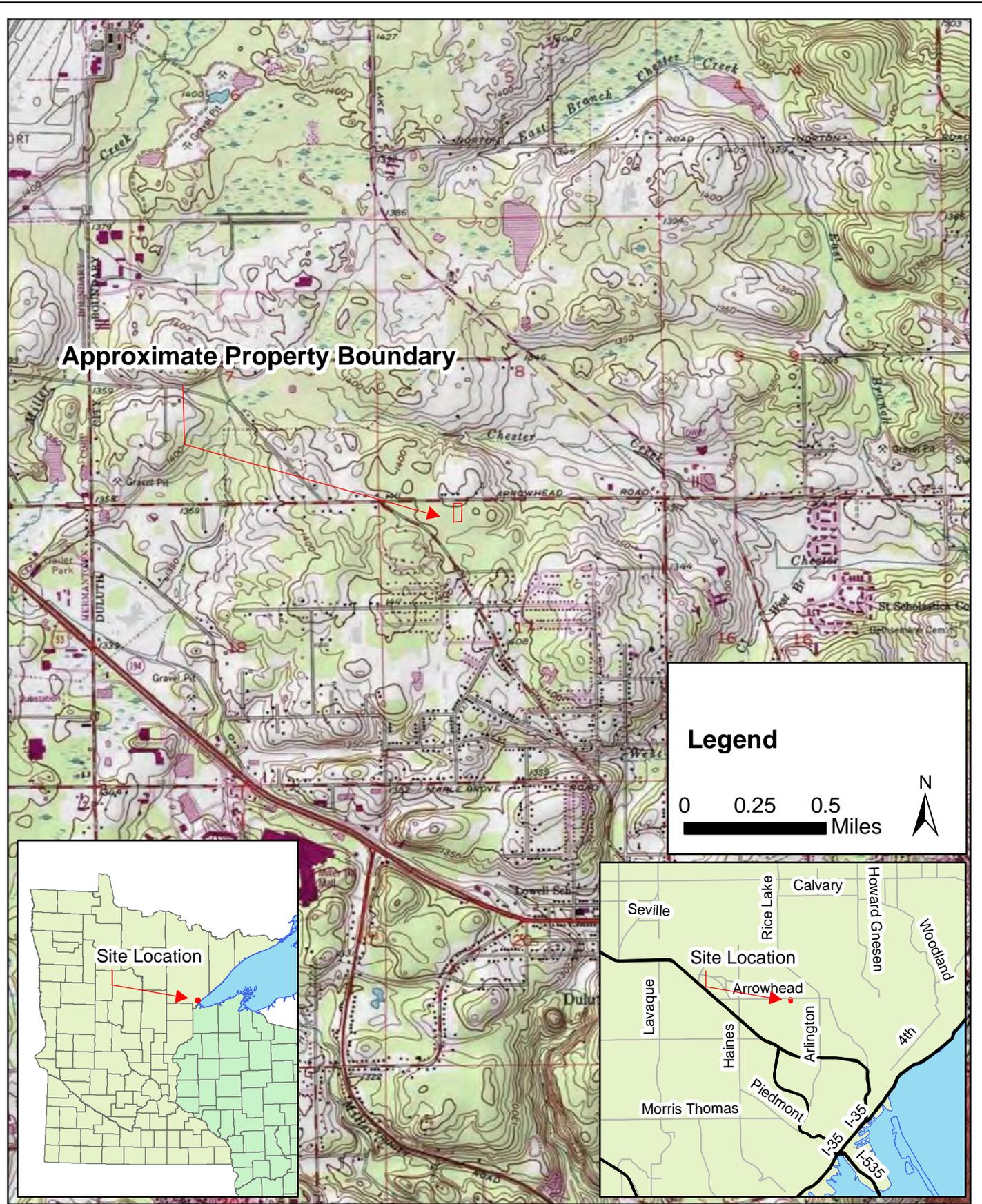
s:\ko\newmb\134676\3-env-stdy-regs\31-env-rpt\lot 4 block 2 north\final crystal village north_delineation memo.docx

Citations:

U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Waterways Experiment Station, Vicksburg, Mississippi.

U.S. Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers: Wetlands Delineation Manual: Northcentral and Northeast Region. 152 pp. plus appendices.

Path: S:\KON\NEWMB1346763-env-study-regs\31-env\rf\Welfare\Delimitation\GIS\Figure 1 Site Location N.mxd



Approximate Property Boundary

Legend

0 0.25 0.5 Miles



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www.sehinc.com

Project: NEWMB 134676
Print Date: 5/16/2016

Map by: nwhite
Projection: NAD 83 UTM 15N
Source: SEH, USGS, MNDOT,
MNDNR, ESRI

SITE LOCATION MAP

Crystal Village Lot 4 Block 2
Duluth, St. Louis County, Minnesota

Figure
1

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



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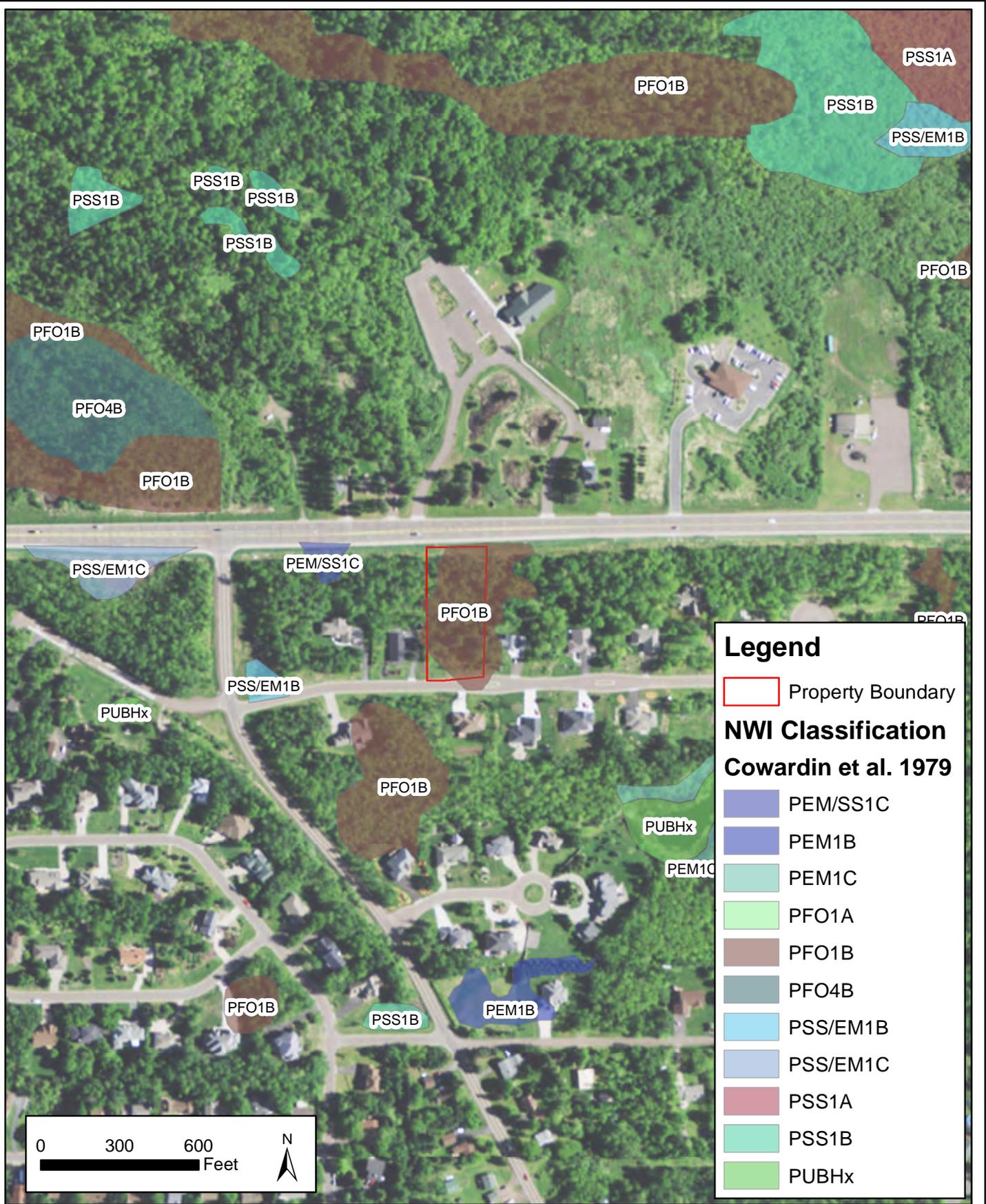
Project: NEWMB 134676
 Print Date: 5/20/2016

Map by: nwhite
 Projection: NAD 83 UTM 15N
 Source: SEH, NRCS, ESRI

NRCS SOILS MAP
 Crystal Village Lot 4 Block 2
 Duluth, St. Louis County, Minnesota

Figure
 2

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Legend

Property Boundary

NWI Classification
Cowardin et al. 1979

- PEM/SS1C
- PEM1B
- PEM1C
- PFO1A
- PFO1B
- PFO4B
- PSS/EM1B
- PSS/EM1C
- PSS1A
- PSS1B
- PUBHx



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NATIONAL WETLANDS INVENTORY

Crystal Village Lot 4 Block 2
Duluth, St. Louis County, Minnesota

Figure
3

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Legend

- PWI Watercourses
- PWI Basins



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 Map by: nwhite
 Projection: NAD 83 UTM 15N
 Source: SEH, MNDNR, ESRI

PUBLIC WATERS INVENTORY
 Crystal Village Lot 4 Block 2
 Duluth, St. Louis County, Minnesota

Figure 4

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Path: S:\KOWIN\NEWMB\1346768-env-stdy-regs\01-env-tp\Wetland Delineation\CIS\Figure 5 Wetland Boundary N.mxd



Legend

- Sample Point Locations

Wetland Boundary

Wetland Type

- Hardwood Swamp
- Shrub-Carr

0 20 40 80 Feet



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Map by: nwhite
Projection: NAD 83 UTM 15N
Source: MNGeo, SEH, MNDOT

Wetland Location Map
Crystal Village Lot 4 Block 2
Duluth, St. Louis County, Minnesota

Figure
5

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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Crystal Village North City/County: Duluth/St. Louis Sampling Date: 4-28-2016
 Applicant/Owner: New Market Bank State: MN Sampling Point: 1-1U
 Investigator(s): Kyle Hanson Section, Township, Range: S17, T50N, R14W
 Landform (hillslope, terrace, etc.): footslope Local relief (concave, convex, none): none
 Slope (%): 1 Lat.: 46.82171 Long.: -92.14739 Datum: NAD 83, UTM 15N
 Soil Map Unit Name: Hermantown-Canosia-Giese, depressional, complex, 0-3% slopes NWI Classification: PFO1B
 Are climatic/hydrologic conditions of the site typical for this time of the year? yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? circumstances" present? Yes
 (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u> N </u> Hydric soil present? <u> N </u> Indicators of wetland hydrology present? <u> Y </u>	Is the sampled area within a wetland? <u> N </u> If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.) 	

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Living Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)	Field Observations: Surface water present? Yes <u> </u> No <u> X </u> Depth (inches): _____ Water table present? Yes <u> </u> No <u> X </u> Depth (inches): _____ Saturation present? Yes <u> X </u> No <u> </u> Depth (inches): <u> 3 </u> (includes capillary fringe)
Indicators of wetland hydrology present? <u> Y </u>		Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Remarks:		

VEGETATION - Use scientific names of plants

Sampling Point: 1-1U

Tree Stratum						50/20 Thresholds		
Plot Size (	30-ft	Absolute % Cover	Dominant Species	Indicator Status		20%	50%	
1	<i>Populus tremuloides</i> -- Quaking Aspen	80	Y	FAC	Tree Stratum	18	45	
2	<i>Acer rubrum</i> -- Red Maple	10	N	FAC	Sapling/Shrub Stratum	1	3	
3	--				Herb Stratum	18	45	
4	--				Woody Vine Stratum	0	0	
5	--				Dominance Test Worksheet			
6	--				Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A)			
7	--				Total Number of Dominant Species Across all Strata: <u>3</u> (B)			
8	--				Percent of Dominant Species that are OBL, FACW, or FAC: <u>33.33%</u> (A/B)			
9	--				Prevalence Index Worksheet			
10	--	90	= Total Cover		Total % Cover of:			
					OBL species	<u>0</u>	x 1 =	<u>0</u>
					FACW species	<u>0</u>	x 2 =	<u>0</u>
					FAC species	<u>90</u>	x 3 =	<u>270</u>
					FACU species	<u>95</u>	x 4 =	<u>380</u>
					UPL species	<u>0</u>	x 5 =	<u>0</u>
					Column totals	<u>185</u> (A)		<u>650</u> (B)
					Prevalence Index = B/A = <u>3.51</u>			
					Hydrophytic Vegetation Indicators:			
					<input type="checkbox"/> Rapid test for hydrophytic vegetation			
					<input type="checkbox"/> Dominance test is >50%			
					<input type="checkbox"/> Prevalence index is ≤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			
					Definitions of Vegetation Strata:			
					Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.			
					Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.			
					Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.			
					Woody vines - All woody vines greater than 3.28 ft in height.			
					Hydrophytic vegetation present? <u>N</u>			
Sapling/Shrub Stratum								
Plot Size (	15-ft	Absolute % Cover	Dominant Species	Indicator Status				
1	<i>Corylus americana</i> -- American Hazelnut	5	Y	FACU				
2	--							
3	--							
4	--							
5	--							
6	--							
7	--							
8	--							
9	--							
10	--	5	= Total Cover					
Herb Stratum								
Plot Size (	5-ft	Absolute % Cover	Dominant Species	Indicator Status				
1	<i>Pteridium aquilinum</i> -- Northern Bracken Fern	90	Y	FACU				
2	--							
3	--							
4	--							
5	--							
6	--							
7	--							
8	--							
9	--							
10	--							
11	--							
12	--							
13	--							
14	--							
15	--	90	= Total Cover					
Woody Vine Stratum								
Plot Size (	30-ft	Absolute % Cover	Dominant Species	Indicator Status				
1	--							
2	--							
3	--							
4	--							
5	--	0	= Total Cover					

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

Note: This data sheet has been adapted to use the 2016 National Wetland Plant List: Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 wetland ratings*. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X

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Project/Site: Crystal Village North City/County: Duluth/St. Louis Sampling Date: 4-28-2016
 Applicant/Owner: New Market Bank State: MN Sampling Point: 1-1W
 Investigator(s): Kyle Hanson Section, Township, Range: S17, T50N, R14W
 Landform (hillslope, terrace, etc.): toe slope Local relief (concave, convex, none): none
 Slope (%): 1 Lat.: 46.82166 Long.: -92.14747 Datum: NAD 83, UTM 15N
 Soil Map Unit Name: Hermantown-Canosia-Giese, depressional, complex, 0-3% slopes NWI Classification: PFO1B
 Are climatic/hydrologic conditions of the site typical for this time of the year? yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? circumstances" present? Yes
 (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>Y</u> Hydric soil present? <u>Y</u> Indicators of wetland hydrology present? <u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID: <u>Wetland 1</u>
Remarks: (Explain alternative procedures here or in a separate report.) 	

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u>X</u> No <u> </u> Depth (inches): <u>2</u> Saturation present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> (includes capillary fringe)		Indicators of wetland hydrology present? <u>Y</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 		
Remarks:		

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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Crystal Village North City/County: Duluth/St. Louis Sampling Date: 4-28-2016
 Applicant/Owner: New Market Bank State: MN Sampling Point: 1-2U
 Investigator(s): Kyle Hanson Section, Township, Range: S17, T50N, R14W
 Landform (hillslope, terrace, etc.): footslope Local relief (concave, convex, none): none
 Slope (%): 1 Lat.: 46.82106 Long.: -92.14763 Datum: NAD 83, UTM 15N
 Soil Map Unit Name: Normanna-Canosia-Hermantown complex, 0-8% slopes NWI Classification: none
 Are climatic/hydrologic conditions of the site typical for this time of the year? yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? circumstances" present? Yes
 (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u> N </u> Hydric soil present? <u> N </u> Indicators of wetland hydrology present? <u> N </u>	Is the sampled area within a wetland? <u> N </u> If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.) 	

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Living Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)	Field Observations: Surface water present? Yes _____ No <u> X </u> Depth (inches): _____ Water table present? Yes _____ No <u> X </u> Depth (inches): _____ Saturation present? Yes _____ No <u> X </u> Depth (inches): _____ (includes capillary fringe)	Indicators of wetland hydrology present? <u> N </u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 			
Remarks:			

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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Crystal Village North City/County: Duluth/St. Louis Sampling Date: 4-28-2016
 Applicant/Owner: New Market Bank State: MN Sampling Point: 1-2W
 Investigator(s): Kyle Hanson Section, Township, Range: S17, T50N, R14W
 Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): none
 Slope (%): 1 Lat.: 46.82111 Long.: -92.14764 Datum: NAD 83, UTM 15N
 Soil Map Unit Name: Normanna-Canosia-Hermantown complex, 0-8% slopes NWI Classification: PFO1B
 Are climatic/hydrologic conditions of the site typical for this time of the year? yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? circumstances" present? Yes
 (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>Y</u> Hydric soil present? <u>Y</u> Indicators of wetland hydrology present? <u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID: <u>Wetland 1</u>
Remarks: (Explain alternative procedures here or in a separate report.) 	

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water table present? Yes <u>X</u> No <u> </u> Depth (inches): <u>3</u> Saturation present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> (includes capillary fringe)		Indicators of wetland hydrology present? <u>Y</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 		
Remarks:		

VEGETATION - Use scientific names of plants

Sampling Point: 1-2W

Tree Stratum				Absolute % Cover	Dominant Species	Indicator Status	50/20 Thresholds		
1	<i>Abies balsamea</i>	--	<i>Balsam Fir</i>	15	Y	FAC	Tree Stratum	20%	50%
2	<i>Acer rubrum</i>	--	<i>Red Maple</i>	5	N	FAC	Sapling/Shrub Stratum	6	14
3	<i>Larix laricina</i>	--	<i>American Larch</i>	5	N	FACW	Herb Stratum	8	20
4	<i>Betula papyrifera</i>	--	<i>Paper Birch</i>	3	N	FACU	Woody Vine Stratum	20	50
5		--						0	0
6		--					Dominance Test Worksheet		
7		--					Number of Dominant Species that are OBL, FACW, or FAC: <u>5</u> (A)		
8		--					Total Number of Dominant Species Across all Strata: <u>5</u> (B)		
9		--					Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)		
10		--		<u>28</u>	= Total Cover		Prevalence Index Worksheet		
Sapling/Shrub Stratum				Absolute % Cover	Dominant Species	Indicator Status	Total % Cover of:		
1	<i>Alnus incana</i>	--	<i>Speckled Alder</i>	25	Y	FACW	OBL species	<u>80</u>	x 1 = <u>80</u>
2	<i>Salix discolor</i>	--	<i>Pussy Willow</i>	10	Y	FACW	FACW species	<u>45</u>	x 2 = <u>90</u>
3	<i>Cornus alba (sericea)</i>	--	<i>Red Osier</i>	5	N	FACW	FAC species	<u>40</u>	x 3 = <u>120</u>
4		--					FACU species	<u>3</u>	x 4 = <u>12</u>
5		--					UPL species	<u>0</u>	x 5 = <u>0</u>
6		--					Column totals	<u>168</u> (A)	<u>302</u> (B)
7		--					Prevalence Index = B/A =	<u>1.80</u>	
8		--					Hydrophytic Vegetation Indicators:		
9		--					<input type="checkbox"/> Rapid test for hydrophytic vegetation		
10		--					<input checked="" type="checkbox"/> Dominance test is >50%		
11		--					<input checked="" type="checkbox"/> Prevalence index is ≤3.0*		
12		--					Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)		
13		--					Problematic hydrophytic vegetation* (explain)		
14		--					*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic		
15		--		<u>40</u>	= Total Cover		Definitions of Vegetation Strata:		
Herb Stratum				Absolute % Cover	Dominant Species	Indicator Status	Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.		
1	<i>Calamagrostis canadensis</i>	--	<i>Bluejoint</i>	70	Y	OBL	Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.		
2	<i>Rubus idaeus</i>	--	<i>Common Red Raspberry</i>	20	Y	FAC	Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.		
3	<i>Rhododendron groenlandicum</i>	--	<i>Rusty Labrador-Tea</i>	10	N	OBL	Woody vines - All woody vines greater than 3.28 ft in height.		
4		--					Hydrophytic vegetation present? <u>Y</u>		
5		--							
6		--							
7		--							
8		--							
9		--							
10		--							
11		--							
12		--							
13		--							
14		--							
15		--		<u>100</u>	= Total Cover				
Woody Vine Stratum				Absolute % Cover	Dominant Species	Indicator Status			
1		--							
2		--							
3		--							
4		--							
5		--		<u>0</u>	= Total Cover				
Remarks: (Include photo numbers here or on a separate sheet)									
Note: This data sheet has been adapted to use the 2016 National Wetland Plant List: Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. <i>The National Wetland Plant List: 2016 wetland ratings</i> . <i>Phytoneuron</i> 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X									

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Photo 1 Hardwood Swamp portion of Wetland 1



Photo 2 Willow catkins in Shrub-Carr portion of Wetland 1

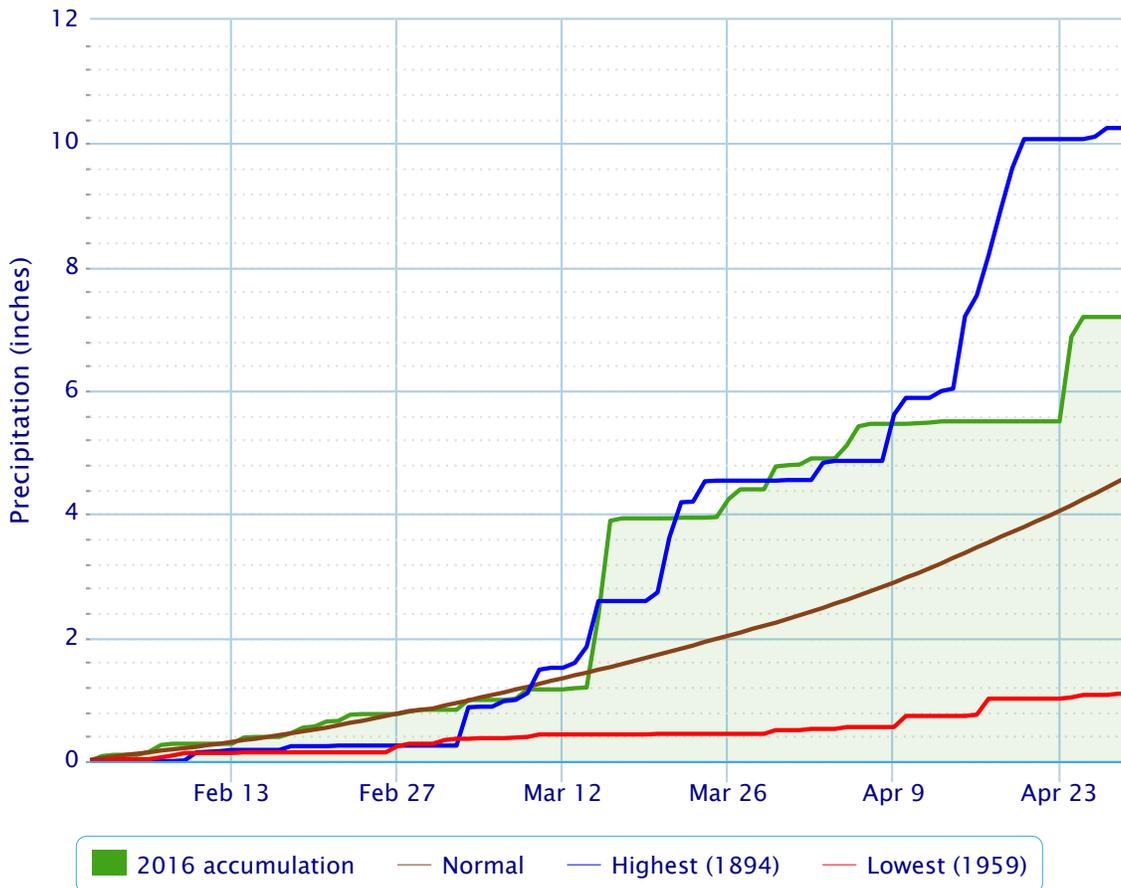


Photo 3 Upland adjacent to Wetland 1

Accumulated Precipitation – Duluth Area, MN (ThreadEx)



Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



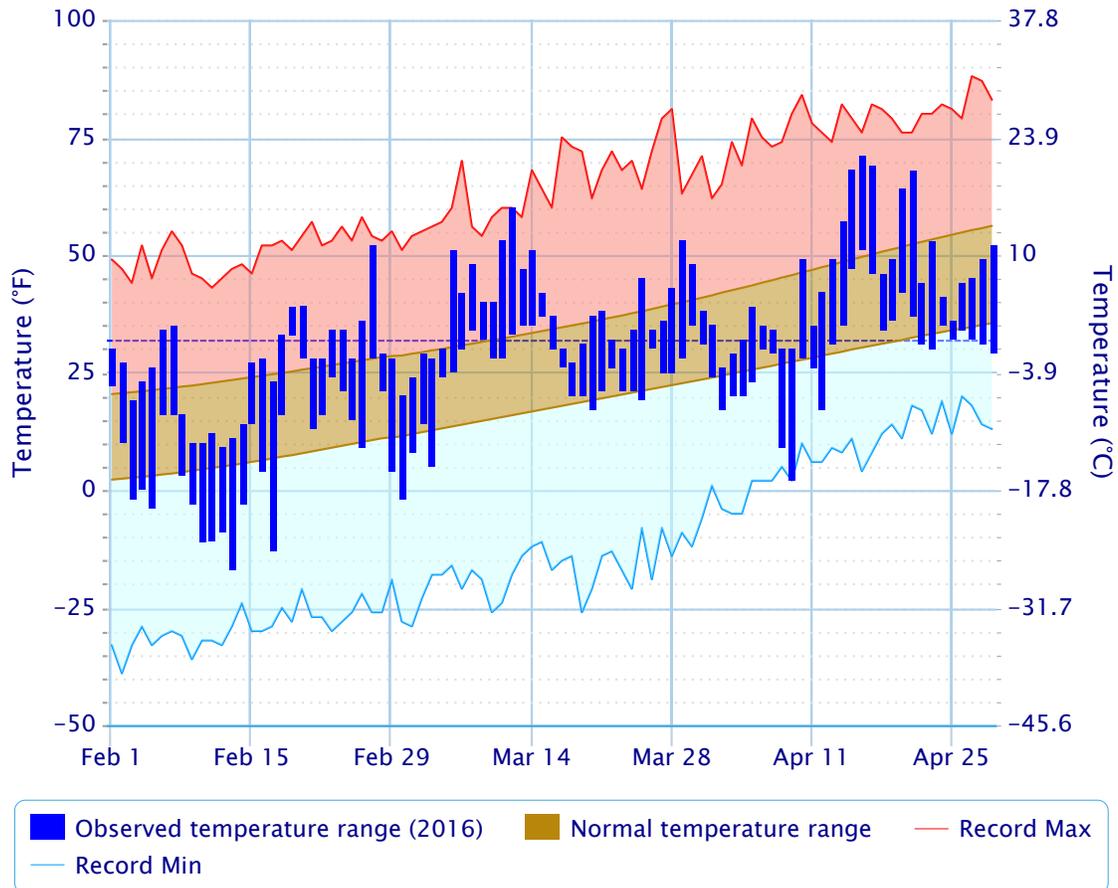
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Note regarding subsequent/missing values

Daily Temperature Data – Duluth Area, MN (ThreadEx)



Period of Record – 1874-05-13 to 2016-05-19. Normals period: 1981-2010. Click and drag to zoom chart.



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