Appendix J – Wetland Delineation, Functional Assessment, and Associated Correspondence

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit (LGU)	Address
Shingle Creek Watershed Management Commission	**3235 Fernbrook Lane Plymouth, MN 55447**

1. PROJECT INFORMATION

Applicant Name	Project Name	Date of Application	Application Number
Bridget Rief – Metropolitan Airports Commission	**Crystal Airport**	**November 2018 – submitted outside growing season**	

☒ Attach site locator map.

Type of Decision:

☒ Wetland Boundary or Type ☐ No-Loss ☐ Exemption ☐ Sequencing
☐ Replacement Plan ☐ Banking Plan

Technical Evaluation Panel Findings and Recommendation (if any):

☒ Approve ☐ Approve with conditions ☐ Deny

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: **5/21/2019**

☒ Approved ☐ Approved with conditions (include below) ☐ Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

On behalf of the Applicant (Metropolitan Airports Commission) Mead & Hunt submitted an application for Wetland Boundary & Type approval for the Crystal Airport project located at 5800 Crystal Airport Road in Sections 4 & 5, T118N, and Sections 32 & 33, T119N, R21W, within the Shingle Creek watershed (Figure 1).

A site investigation was completed by Evan Barrett of Mead & Hunt in October 2018. The boundaries of seven wetlands were delineated onsite.

The TEP met on May 13, 2019. Changes were made to the boundaries of Wetland 5 in the northeast corner of the project site. The boundary is now shown as open/continuing to the east towards the creek. Additionally, a change to connect a section of the boundary on the west was also made. Approved wetland boundaries are shown in the attached Approved Wetland Boundaries Maps (Figure 2). The Shingle Creek WMC approves the application for wetland boundary and type. This decision is valid for five years.

For Replacement Plans using credits from the State Wetland Bank:

Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

☐ **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).

☐ **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR "Declaration of Restrictions and Covenants" and "Consent to Replacement Wetland" forms have been filed with the county recorder's office in which the replacement wetland is located.

☐ **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.		
Name **Meaghan Watson, Wenck Associates Inc.**	Title **SC WMC WCA Agent**	
Signature 	Date **5/22/2019**	Phone Number and E-mail **763-252-6986** **mwatson@wenck.com**

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for three years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.

3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

☒ Appeal of an LGU staff decision. Send petition and $_____ fee (if applicable) to: **Meaghan Watson, Wenck Associates, Inc.** **7500 Olson Memorial Highway, Suite 300** **Golden Valley, MN 55427**	☐ Appeal of LGU governing body decision. Send petition and $500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155

4. LIST OF ADDRESSEES

☒ SWCD TEP member: **Stacey Lijewski – stacey.lijewski@hennepin.us**
☒ BWSR TEP member: **Ben Carlson – ben.carlson@state.mn.us**
☐ LGU TEP member (if different than LGU Contact):
☒ DNR TEP member: **Jason Spiegel – Jason.spiegel@state.mn.us**

☒ DNR Regional Office (if different than DNR TEP member): **Becky Horton-becky.horton@state.mn.us**
☒ WD or WMO (if applicable): **judie@jass.biz**
☒ Applicant (notice only) and Landowner (if different): **Metropolitan Airports Commission (Bridget Rief) – bridget.rief@mspmac.org**
☒ Members of the public who requested notice (notice only): **Consultant: Mead & Hunt (Evan Barrett) –evan.barrett@meadhunt.com**
☒ Corps of Engineers Project Manager (notice only): **mvp-reg-inquiry@usace.army.mil**
☐ BWSR Wetland Bank Coordinator (wetland bank plan applications only)

5. MAILING INFORMATION

- For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf
- For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf
- Department of Natural Resources Regional Offices:

NW Region:	NE Region:	Central Region:	Southern Region:
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

- For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687 or send to:

US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

- For Wetland Bank Plan applications, also send a copy of the application to:

Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:
☒ **Figure 1 – Project Location Map**
☒ **Figure 2 – Approved Wetland Boundaries**
☐
☐

Wetland Delineation Report

Crystal (MIC) Airport

Airfield Improvements

Report prepared for

Metropolitan Airports Commission

Minneapolis, Minnesota

Report prepared by

Mead & Hunt

www.meadhunt.com

May 2019

Table of Contents

Appendices

Tables **Page**

1. Introduction

Crystal Airport (MIC) (Airport) is a general aviation reliever airport owned and operated by the Metropolitan Airports Commission (MAC). The Airport is located approximately seven miles northwest of downtown Minneapolis. The Airport is bordered by 63rd Avenue North on the north, Bottineau Blvd (County Road 81) on the west, and 56th Avenue North/Bass Lake Road (County Road 10) to the south. Airport property covers approximately 430 acres over four contiguous parcels. The central parcel includes the main airfield and associated facilities, roads, and hangar areas. The Airport is bordered by single-family residences with some park/open spaces to the east and lies within the Shingle Creek subwatershed within the Mississippi River – Twin Cities Watershed. The MAC Wildlife Conservation Area sits to the east of the Airport's East Building area along Twin Creek. A project location map is presented in Appendix A.

The airfield at MIC consists of three paved runways, one turf grass runway, two supporting taxiways, and numerous privately-owned hangars. The primary runways 14L/32R and 14R/32L are 3,267 feet and 3,266 feet long, respectively. Both are 75 feet wide. The crosswind runway (Runway 6L/24R) is 2,499 feet long and 75 feet wide. The turf runway, 6R/24L is 2,123 feet long and approximately 137 feet wide. There are two non-precision instrument approaches to the Airport. Fueling, flight training, aircraft storage, and aircraft maintenance services are available from a full-service fixed-base operator. The primary role of the airport is to serve personal, recreational, and business aviation users. The Airport provides business services including flight training and aircraft maintenance.

MAC has prepared a number of Long-Term Comprehensive Plans (LTCP) for the Airport. The most recent approved planning document for Crystal Airport was adopted in October 2017 and covers a planning horizon year of 2035 (2035 LTCP). This plan recommended "right-sizing" the Airport to better align infrastructure and activity levels by decommissioning the south parallel runway (14R/32L), simplifying the airfield and opening up property for development of both aeronautical and non-aeronautical opportunities. The 2035 LTCP updated the findings of the previous 2025 LTCP and extended the planning horizon to 2035.

The purpose of the proposed action at MIC is to pursue the following three general infrastructure goals for the Airport:

1) Better align airfield infrastructure to match existing and forecasted activity levels;
2) Preserve and improve operational capabilities for design aircraft family; and
3) Enhance safety by simplifying the runway and taxiway layout.

The need of the proposed action is based on achieving the following six objectives that support the project purpose, as defined in the following subsections:

1) Simplify airfield geometry;
2) Provide the required runway length for critical design aircraft needs;
3) Enhance instrument approach capability and mitigate penetrations for both ends of the main primary runway;

4) Improve Airport ground vehicle circulation;
5) Increase aircraft parking apron capacity; and
6) Develop excess Airport property for non-aeronautical use.

In support of an alternatives analysis that explores meeting these goals, a wetland delineation was conducted by Mead & Hunt, Inc. (Mead & Hunt) within an Area of Interest (AOI) on June 4 – 5, 2018 and on September 24 – 26, 2018. The AOI comprises 50.1 acres spread over eight separate areas located in Section 4, Township 118N North, Range 21 West, and Section 33, Township 119N North, Range 21 West, Hennepin County, Minnesota. A total of seven wetlands were identified within the AOI.

This report summarizes the results of the wetland delineation. Delineator qualifications are provided in Appendix H. Mead & Hunt staff who performed the wetland delineation are:

- Brauna Hartzell, BS Biological Science, Florida State University, 1982; MS Environmental Monitoring, University of Wisconsin-Madison, 1994; 15 years wetland delineation practice.

- Kim Shannon, BS Biology, Oklahoma State University, 1994; MS Applied and Natural Science (Botany), Oklahoma State University, 1997; 10 years wetland delineation practice.

2. Methods

The wetland determination made use of available resources to provide context and background information and to assist in the field assessment including:

- U.S. Geological Survey (USGS) topographic maps and 2-foot elevation contours provided by Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, 2011.
- U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) soil survey, Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx
- U.S. Fish and Wildlife National Wetland Inventory (NWI) mapping with update for East-Central Minnesota at https://www.fws.gov/wetlands/data/mapper.html
- 2016 National Wetland Plant List (Lichvar, R.W., D. L. Banks, W. N. Kirchner, and N. C. Melvin, 2016)
- Minnesota Climatology Working group, Wetland Delineation Precipitation Data Retrieval from Gridded database http://climateapps.dnr.state.mn.us/gridded_data/precip/wetland/wetland.asp
- Aerial photography (MnGEO WMS Image Service, USDA-FSA National Agriculture Imagery Program (NAIP), Minnesota Historical Aerial Photographs Online, GoogleEarth)

The field methods used conform to the Routine Onsite Method of the *1987 U.S. Army Corps of Engineers' (USACE) Wetland Delineation Manual*, as enhanced by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (U.S. Army Corps of Engineers, 2011). Under wetland delineation guidance for the Minnesota Board of Water and Soil (BWSR), the project area falls within the Midwest Region based on township boundaries. However, the project area also falls within the Northcentral/Northeast Region as shown on USACE region maps; therefore, the Northcentral and Northeast regional supplement data sheets were used to be consistent with USACE guidance. Soil characteristics were examined by digging pits with a 16-inch tile spade and hydrologic indicators were visually assessed. Soil pits were left open for a minimum of 15 minutes to adequately assess the water table. Munsell Soil Color charts were used to determine the hue, value, and chroma for the matrix and any redoximorphic features in each soil layer.

Vegetation was documented on the North Central/Northeast Regional (NC/NE) data forms. Percent cover of each species in each stratum was estimated. The herbaceous stratum was sampled within a 5-foot radius plot; a 15-foot radius plot for the shrub/sapling stratum; and a 30-foot radius plot for the tree and woody vine stratum. The 2016 National Wetland Plant List (Lichvar, R.W., et al, 2016) was used to determine the wetland indicator status for each species and the 50/20 rule was applied to determine dominance.

Antecedent precipitation was assessed following procedures developed by the NRCS. Precipitation data three months prior to fieldwork were compared to 30-year precipitation averages (1981-2010) to determine if hydrologic conditions were normal, wetter, or drier than normal for the area.

All area within the AOI was examined. A total of 25 data points—17 in uplands and eight in wetlands—collected on two site visits were established to characterize the range of soil, vegetation, and hydrologic conditions. Wetland boundary points were indicated by wire pin flags placed approximately 25-50 feet apart. These sampling points and wetland boundary flags were surveyed with a Trimble Geo7X capable of sub-meter accuracy and mapped using Geographic Information System (GIS) software. The wire pin flags were removed after survey so that mowing operations would not be impacted.

The following appendices are included with this report:

- Appendix A – Project Location and Topography Map
- Appendix B – Detailed Topographic Map, NRCS Soils Map, and Aquatic Resources Map
- Appendix C – Historical Aerial Photography
- Appendix D – WETS Analysis and Climatic Data
- Appendix E – Wetland Boundary Maps
- Appendix F – Data Sheets
- Appendix G – Field Photographs
- Appendix H – Delineator Qualifications

3. Results and Discussion

A. Site Description

The AOI covers approximately 50.1 acres split across eight separate areas. The largest sections of the AOI cover areas at either end of the primary runways (Areas B and E/H) and a large area proposed for non-aeronautical development (Area G) at the northern entrance road (Zane Avenue North). Smaller sections of the AOI cover two taxiway connector areas, each of which is about 0.6 acres in size (Areas C and D). Proposed perimeter road additions at the north end of the primary runways and on the western side of the Airport connect hangar areas and facilitate aircraft movement within the airfield (Areas A and F). Areas A through G were examined during an early June site visit; lands within Area H were examined during a late September field visit. A project location map is presented in Appendix A.

Hangar storage areas surround the airfield, positioned at and named for the four cardinal directions – North, South, East and West. Nearly all infield areas consist of grasses and forbs and are mown on a regular basis. In the Northeast quadrant, Twin Creek flows to the southeast to Upper Twin Lake, just outside of Airport property. The airfield is relatively flat with little elevation change over the 430 acres of Airport property. The southwestern side is somewhat higher at approximately 870 feet (NAVD 1988), gently sloping to the north and east to about 858 feet along the Twin Creek stream channel. See Appendix B for a detailed Topographic Map.

Airfield drainage is managed through a system of swales and culverts. Closed infiltration areas are also utilized to infiltrate drainage at the southern and western sides of the Airport. The main runways (14L/32R and 14R/32L) divide the airfield along a northwest-to-southeast axis. Lands to the north and east of this axis are drained to Twin Creek, a Public Water Watercourse (Unnamed Stream M-058-002), and DNR Public Waters Wetland (27-639W). The remaining areas of the Airport drain internally to the west or south and runoff is infiltrated in closed basins in these areas.

Infield areas are actively managed by regular mowing. At the time of field work, many areas within the AOI had been mowed, with some regrowth observed, making vegetation identifiable in most cases. Reference areas, either unmown or with more regrowth, on other parts of the Airport were examined where identification was difficult. Most of the infield areas were dominated by a mix of grasses and forbs consisting of Kentucky blue grass, poverty grass, brome, tall rye grass, prairie cinquefoil, great and woolly plantain, common yarrow, yellow wood sorrel, and chickweed.

(1) Soils Mapping

About 50% of Airport property is covered by soils mapped as Udorthents (wet stratum, cut and fill land) and Urban Land. These areas generally underlay developed areas of the Airport – the hangar storage areas and portions of the main runways – where sandy or loamy soil material was placed to level land in preparation for construction. Because of the variability in these soil units, typical soil profile descriptions are not available.

Another 40% of Airport land is dominated by three soil units: poorly drained and very poorly drained Forada sandy loam (0 to 2 percent slopes), moderately well drained Duelm loamy sand (0 to 2

percent slopes), and excessively and well drained Hubbard loamy sand (1 to 6 percent slopes). Within the AOI, non-developed areas are covered primarily by Forada sandy loam (0 to 2 percent slopes) and Duelm loamy sand (0 to 2 percent slopes); developed areas mapped as Udorthents or Urban land account for approximately 50% of the AOI.

Typical soil profiles for Forada sandy loam (D10A) show a black (10YR 2/1) loam over a very dark gray (10YR 3/1) loam in the A horizon. The B horizon is marked by a dark grayish brown (2.5Y 4/2) sandy loam with dark gray (10YR 4/1) iron depletions and yellowish brown (10YR 5/6) iron concentrations. This soil is rated as predominantly hydric (85%).

The Duelm loamy sand (0 to 2 percent slopes) (D17A) soil profile is marked by a black (10YR 2/1) loamy sand in the A horizon underlain by a dark brown (10YR 3/3) loamy sand to 16 inches in depth. Underlying this is a dark yellowish brown (10YR 4/4) coarse sand to 20 inches in depth and the top of the B horizon. This soil is not rated as hydric.

Depressional areas, occurring along Twin Creek and an area at the southern end of the Airport within the AOI, generally are covered by hydric soils from the very poorly drained Seelyeville and Markey soils (depressional, 0 to 1 percent slopes) (D30A). The deep profile of the Seelyeville series shows a black (10YR 2/1) muck over a dark brown (7.5YR 3/2) muck to 19 inches in depth. The deep Markey series profile consists of very dark brown (10YR 2/2) muck material over very dark grayish brown (10YR 3/2) and very dark brown (10YR 2/2) muck layers to 32 inches in depth. This mapped soil unit is rated as hydric.

Soils present within the AOI are summarized in Table 1. Soils rated as hydric or predominantly hydric are highlighted in the table below. Soils mapping for the AOI is presented in Appendix B.

Table 1. Summary of Soils in Area of Interest

Map unit symbol	Map unit name	Percent of AOI	Primary Landform	Hydric Rating (Percent)
D10A	**Forada sandy loam, 0 to 2 percent slopes**	**30.2%**	**Flats, stream terraces**	**Yes (85)**
D17A	Duelm loamy sand, 0 to 2 percent slopes	9.3%	Flats	No (7)
D30A	**Seelyeville and Markey soils, depressional, 0 to 1 percent slopes**	**5.0%**	**Depressions on stream terraces**	**Yes (100)**
D31A	Urban land-Duelm complex, 0 to 2 percent slopes	3.3%	Stream terraces	No (5)
D64B	Urban land-Hubbard complex, Mississippi River Valley, 0 to 8 percent slopes	5.2%	Stream terraces	No (0)
D67B	Hubbard loamy sand, 1 to 6 percent slopes	5.9%	Stream terraces, hillslopes	No (3)
M-W	Water, miscellaneous	0.3%		No (0)

Table 1. Summary of Soils in Area of Interest

Map unit symbol	Map unit name	Percent of AOI	Primary Landform	Hydric Rating (Percent)
U1A	Urban land-Udorthents, wet substratum, complex, 0 to 2 percent slopes	1.1%	Outwash plains, moraines, stream terraces	No (0)
U2A	Udorthents, wet substratum, 0 to 2 percent slopes	15.2%	Outwash plains, moraines, stream terraces	No (0)
U3B	Udorthents (cut and fill land), 0 to 6 percent slopes	21.4%	Moraines	No (0)
U4A	Urban land-Udipsamments (cut and fill land) complex, 0 to 2 percent slopes	3.1%	Outwash plains, stream terraces	No (0)

(2) Aquatic Resources

The National Wetland Inventory (NWI) indicates several areas of mapped wetlands within Airport lands: a floodplain complex associated with Twin Creek, a large area just west of the East Building complex in the infield, and a large area at the southern end of the primary runways near Area E. The floodplain complex shows a mixture of forested and emergent wetland types while most other areas are mapped as emergent, temporary flooded wetlands (PEM1A).

The Twin Creek floodplain complex skirts the eastern edge of Area G and no wetlands are mapped in this area of the AOI. Within Area E, at the southern end of the primary runways, a large area is mapped as emergent, temporary flooded wetland (PEM1A).

MN Public Water (27-639W) lies just to the east of the airfield and is mapped as a combination of PEM1A, PEM1C, and PFO1A. Twin Creek (mapped as Public Watercourse) flows southeasterly through this complex to Upper Twin Lake (MN Public Water 27-42P).

Wetlands within the AOI are classified as Circular 39 Type 1. See Appendix B for aquatic resources mapping.

(3) Historic Aerial Photograph Review

Aerial photographs from 1945, 1956, 1962, 1967, 1971, 1991, 1997, 2000, 2006, 2010, 2013, 2015, 2016, 2017, and 2018 were reviewed to assess areas within the AOI for wet signatures. These photos are presented in Appendix C and focus on Areas E/H and G, areas with delineated wetlands. As discussed in later sections, wetlands were not delineated in other portions of the AOI and historic imagery for these areas is not presented.

Area G

The earliest photograph in this collection, taken in 1945, shows only about a third of the area under row crop production. By 1956, nearly all of the Area G is being cultivated except for the

Twin Creek floodplain. Two ditches flowing west-to-east towards the creek appear to be draining these fields.

The 1962 photograph shows Area G in agricultural use, prior to any construction in this area. By this time, Runways 14L/32R and 6L/24R had been constructed further to the south along with hangars at the West and South Building Areas. Two tree-lined ditches running eastward to the Twin Creek floodplain are visible as well as a fairly large but sparsely wooded area west of a farm access road (that later becomes Zane Avenue). The eastern edges of the two fields appear to be saturated along the creek.

Photographs taken in 1967 and 1971 show a continued pattern of agricultural use with the western wood lot experiencing growth and canopy closure. The two tree-lined ditches are also seeing ongoing growth.

The general vicinity of Area G in 1991, twenty years later, appears mostly as a managed landscape with the two wooded areas. The wood lot just west of Zane Avenue, seen as somewhat more open than it currently is, is generally in the same configuration as today. A second wooded area appears to follow "L-"shaped drainage ditches that run to the western edge of the Twin Creek floodplain. This wooded ditch is the northern drainage ditch as seen in the 1956 photo. The active floodplain appears to extend to the west into Area G. These wooded features remain today in basically the same configuration. Lands outside of these features appear to be managed by mowing.

By 1997, the Maintenance Building has been constructed north of the North Building Area, along Zane Avenue, just outside of the Area G boundary. Discussions with maintenance personnel indicated that at some time in the early 2000's (or perhaps earlier at the time of the Maintenance Building construction), the drainage was modified to carry flows through swales along the north hangar access road. This modification cut-off active drainage through the ditch to the east and with no inlets, these ditches now only carry surface run-off.

At some point around 2010, the fencing along Twin Creek (which forms the eastern boundary of Area G) appears to have been reconstructed and elevated on a berm which served to direct in-stream flows to a narrower channel and modified the extent of flooding in the broader floodplain. Images post-2010 show the broader floodplain inside the fence as being actively managed.

Areas E and H

The first photo in this series, taken in 1945, shows most of Area E/H to be undeveloped for agricultural purposes. There appears to be a shallow basin surrounded by scrub-shrub-type vegetation. Drainage to this area apparently flows from the northeast via a ditch cutting through agricultural lands to the east.

By 1956, some residential development is occurring on the fringes of Area E/H while the scrub-shrub area appears unaltered. Between 1962 and 1967, the area sees continued single-family residential development on either side while construction of runways and taxiways at this end of

the airport has been completed. The hangar access road on the east side of Area E/H has also been constructed. Grading at the Runway 31 end (now Runways 32L and 32R) has covered a large portion of the northern part of Area E/H. The scrub-shrub area remains mostly intact but sees some decrease in size perhaps due to filling by 1971. Twenty years later in 1991, the scrub-shrub area appears largely as it does today.

In 1997, Area E/H appears to be managed as it currently is although a darker area indicating different vegetation, and/or a different hydrologic regime is seen just south of the Area E/H boundary. The darker area varies slightly over time, perhaps reflecting different moisture levels but remains in the same general area with respect to the Area E boundary.

Two small saturated areas can be seen consistently in several photos starting in 2010 (Spring 2010: Hennepin County) on either side of the proposed perimeter road extension. Over the course of numerous photos (2015, 2016, 2017, and 2018), these areas consistently show saturated wet signatures. This location was investigated during field work and is documented as Wetlands 1 and 2 in the Findings section below.

(4) Antecedent Climatic Conditions

Precipitation worksheets using the gridded method from the Minnesota Climatology Working Group were calculated for the three months prior to field work for each site visit. This analysis indicated that climatic conditions were drier than normal for the June 2018 visit and site conditions were within normal range at the September field visit (see Appendix D).

Four days prior to the September site visit, approximately 4.5 inches of rain fell on site. During the Fall field work, another 0.3 inches of precipitation fell on September 25. Precipitation data for September is presented in Appendix D.

B. Findings

(1) Wetlands

A total of seven wetlands were delineated in the vicinity of the AOI during the two site visits. Wetland boundary maps with sampling point locations are presented in Appendix E followed by data sheets and field photographs in Appendices F and G. Table 2 summarizes the delineated wetlands within the AOI which are described in detail below.

Table 2. Summary of Delineated Wetlands within the Area of Interest

Wetland	Wetland Type	Circular 39 Type	Dominant Vegetation	Total Area (Acres)	Total Area (Sq. Ft)
Delineated June 2018					
1	Seasonally Flooded Basin	Type 1	Water smartweed, blunt spikerush	0.027	1,174.63
2	Seasonally Flooded Basin	Type 1	Water smartweed, dark green bulrush	0.031	1,343.44
3	Forested Floodplain	Type 1	Black ash, green ash, buckthorn, raspberry, reed canary grass	0.059	2,564.86
4	Seasonally Flooded Basin	Type 1	Water smartweed	0.060	2,619.77
5	Seasonally Flooded Basin	Type 1	Water smartweed	0.131	5,706.40
Delineated September 2018					
6	Seasonally Flooded Basin	Type 1	Crabgrass, barnyard grass	0.179	7,790.95
7	Seasonally Flooded Basin	Type 1	Lady's-thumb, meadow foxtail, barnyard grass	0.156	6,779.07
Total				0.642	27,979.11

(a) Wetlands 1 and 2 (PEM1A/Type 1)

Wetlands 1 and 2 (W1 and W2) are small shallow basins located within Area E straddling the proposed perimeter road corridor. NWI mapping shows a large shallow area mapped as emergent (PEM1A) located in the infield south of the Runway 32R blast pad.

Data points 1 through 3 were taken in a transect crossing each wetland and the upland area separating the two wetlands. The locations of these sampling points are found on the Wetland Boundary Maps in Appendix E. Data sheets and field photographs are presented in Appendices F and G.

Vegetation

At both wetland data points DP1 and DP3, water smartweed (*Persicaria hydropiper: OBL*) was a dominant in the herb layer. Blunt spike rush (*Eleocharis obtusa*: OBL) was a co-dominant at DP1 and dark green bulrush (*Scirpus atrovirens*: OBL) was a co-dominant at DP3. Another minor component of the herb stratum at both wetland sampling points was field meadow-foxtail (*Alopecurus pratensis*: FAC). The dominant species at wetland sampling points DP1 and DP3 are hydrophytic (OBL) and meet the wetland vegetation criterion.

The area experiences mowing as part of regular maintenance activities at the airport. At the time of field work, vegetation was approximately 6 inches in height. Plant identification of water smartweed and dark green bulrush was made by reference to other nearby areas with more mature growth visible.

Hydrology

While evidence of surface water, a high water table, or saturation was not observed at either DP1 or DP3 under drier than normal climatic conditions, wetland hydrology was indicated by field observation of secondary indicators Geomorphic Position (D2) and a positive FAC-Neutral Test (D5) at both these sampling points. Examination of several recent aerial photographs (Google Earth 2018, 2017, 2016 in Appendix C), show saturated signatures corresponding to these areas and thus fulfill the secondary indicator Saturation Visible on Aerial Imagery (C9) at both sampling points. Wet signatures (darker areas) can be seen in other photographs taken in previous years later in the growing season.

Soils

Seelyeville and Markey soils (depressional, 0 to 1 percent slopes) (D30A) cover a large area in this vicinity. These soils consist of deep muck profiles. However, soil profiles taken at wetland sampling points DP1 and DP3 indicated layers of very dark grayish brown (10YR 3/2) to very dark brown (10YR 2/2) sand over black (10YR 2/1) or very dark gray (10YR 3/1) sand layers with dark reddish brown (10YR 3/4) to yellowish red (5YR 4/6) redox features. These soils profiles satisfied the hydric soils criterion by meeting the Sandy Redox (S5) hydric soils indicator.

It is therefore likely that the sandy profiles are indicative of placement of fill materials over the original mucky soils.

The upland data point (DP2) did not satisfy any hydric soils indicator with a very dark brown (10YR 2/2) sand over a mixed very dark gray (10YR 3/1) and black (10YR 2/1) sand layer. Redox features were not found in the very dark gray (10YR 3/1) component, the largest percentage component (90%) of the mixture. Redox features were found in the black (10YR 2/1) sand matrix component, the much smaller component by percentage basis (8%) of the overall layer. This profile did not meet any hydric soils indicators. The soil pit was dug to refusal at 16 inches where a very hard compacted layer was encountered.

Wetland Boundary

The wetland boundary was based on distinct differences in vegetation, hydrology, soils and topography. The upland sampling point (DP2) was taken on a transect between the two wetland sampling points on slightly higher ground. In transition to uplands, vegetation shifted to include Kentucky blue grass (*Poa pratensis*: FACU) and tall rye grass (*Schedonorus arundinaceus*: FACU) as dominants, and indicators of hydric soils were lacking in the mixed soils. Wetland hydrology was absent at the upland data point.

Topography changes seen as a slightly higher rise between the two wetlands in the otherwise nearly flat infield determined the boundary in this area.

(b) Wetland 3 (PFO1A/Type 1)

Wetland 3 (W3) is a small area of open canopy within a forested area located west of Zane Avenue within Area G. The more open central area is dominated by herbaceous vegetation and woody saplings and is ringed by black ash and box elder.

This wood lot is visible in many historical images as it experiences canopy closure over time. In 1962, the area is fairly sparse but over the following 50 years, the canopy has nearly closed (see 2010 image). In many of the images, a slightly open area can be seen in the middle of the wood lot that appears to correspond to W3.

This small basin appears to collect surface runoff from the south and was relatively undisturbed at the time of field work. W3 does not appear on NWI mapping.

Sampling points DP4 (wetland) and DP5 (upland) were taken in this area. The locations of these sampling points are found on the Wetland Boundary Maps in Appendix E. Data sheets and field photographs are presented in Appendices F and G.

Vegetation

The mix of vegetation within W3 was dominated by common red raspberry (*Rubus idaeus*: FAC) and reed canary grass (*Phalaris arundinacea*: FACW) in the herb stratum, green ash (*Fraxinus pennsylvanica*: FACW) and buckthorn (*Rhamnus cathartica*: FAC) in the sapling layer, black ash (*Fraxinus nigra*: FACW) and box elder (*Acer negundo*: FAC) in the tree layer, and Virginia-creeper (*Pathenocissus quinquefolia*: FACU) in the vine stratum. Other species including American elm (*Ulmus americana*: FACW) and black cherry (*Prunus serotina*: FACU) completed the assemblage. Also observed in the wetland area were sedge (*Carex* sp.) and river-bank grape (*Vitus riparia*: FAC). The dominant species within W3 are hydrophytic (FAC and FACW) and meet the hydrophytic vegetation criterion.

Hydrology

Wetland hydrology was indicated. At data point DP5 (wetland), secondary indicators Geomorphic Position (D2) and a positive FAC-Neutral Test (D5) were met. Runoff from the south appears to drain into this wooded area and collect in this shallow basin with no apparent outlet before infiltrating into the subsoil.

Soils

Forada sandy loam (0 to 2 percent slopes) is mapped underlying Wetland 3. The primary component of this series and another minor component are rated as hydric (see Appendix B for component list), making this a predominantly hydric soil. At wetland sampling point DP5, a layer of black (7.5YR 2.5/1) sandy loam over a black (7.5YR 2.5/1) sandy loam with brown (7.5YR 4/4) redoximorphic features was documented. This profile meets hydric soils indicator Redox Dark Surface (F6); therefore, hydric soils are present.

Wetland Boundary

The wetland boundary was determined by a transition to a plant community dominated by upland or facultative species with minor wetland components, an absence of hydric soils indicators, and a lack of wetland hydrology indicators.

In uplands, the vegetation shifted to one dominated by Siberian elm (*Ulmus pumila*: FACU), box elder, and buckthorn in both the tree and sapling strata at upland sampling point DP4. Other species observed as minor components included honeysuckle (*Lonicera x bella*: FACU) and garlic mustard (*Alliaria petiolata*: FACU) as American elm and green ash (both FACW) crossed the boundary. Hydrophytic vegetation was not present as the Prevalence Index was not satisfied at 3.09.

Hydric soils and wetland hydrology indicators were absent at DP4. The soil profile noted here was marked by a thick layer of very dark grayish brown (10YR 3/2) sandy loam over a pale brown (10YR 6/3) sand layer, both of which lacked redoximorphic features. Wetland hydrology was neither present nor indicated at this upland sampling point.

(c) Wetlands 4 and 5 (PEM1A/Type 1)

Wetlands 4 and 5 (W4 and W5) are emergent wetland communities located at the eastern boundary of Area G in a flat area situated within the Twin Creek floodplain. Slopes on the western side of this area rise three to four feet. The eastern boundary of Area G is formed by a fence which parallels the creek's stream bank. At the northern corner of Area G, the fence appears to be constructed on a berm, near the culvert exit under 63rd Avenue.

W4 and W5 do not appear on NWI mapping. The Twin Creek floodplain complex to the east is mapped as a mixture of forested and emergent wetland types.

This area is currently managed by regular mowing. However, historically, this area was part of the Twin Creek floodplain and often shows vegetative signatures consistent with the rest of the floodplain in aerial photos (1962, 1991, 1997, 2000, and 2006). Starting in 2010, the area exhibits signs of vegetative management (see Appendix C).

Two tree-lined ditches, one running eastward to the Twin Creek floodplain, and the other intersecting the western end of the first ditch, form an "L"-shape, just north of the Maintenance Building. These vacated ditches are lined with 40 - 50-feet tall mature cottonwood (*Populus deltoides*: FAC), box elder, and American elm as dominants. Other species present included black willow (*Salix nigra*: OBL), green ash, black cherry, grape (*Vitis* sp.), stinging nettle (*Urtica dioica*: FAC), and Virginia creeper. The eastern end of the ditch system forms the northern boundary of W5 and is mowed regularly.

These two ditches, as noted previously, were cut off from active drainage. No inlets were observed so surface runoff appears to be the primary source of hydrology. Test pits dug into each of the two ditches revealed that wetland hydrology was not present and that hydric soils were not present in the sandy soils.

Given these conditions – an alteration of hydrology due to the berm inhibiting normal flooding, regular vegetation management, and road construction and other soil disturbance – normal circumstances were not considered to be present in both wetlands.

Four sampling points on a transect were taken within Wetland 4 (DP6 – 9) and two paired sampling points within Wetland 5 (DP10 and 11). The locations of these points are shown on the Wetland Boundary Maps provided in Appendix E; data sheets along with field photographs are presented in Appendices F and G. The complex topography is shown on the detailed topography map in Appendix B.

Vegetation

The area had been recently mown at the time of field work. The plant community at DP7 (wetland) was dominated by water smartweed (*Persicaria hydropiper*: OBL) which was present at nearly every data point on the transect through W4. Water smartweed also dominated at wetland sampling point DP10 within W5 along with minor components blunt spike rush and reed canary grass.

One large cottonwood sits on the 63rd Avenue road embankment and several isolated box elder trees stand further south near W5.

Hydrology

Topographic rises along both sides of this part of the floodplain form a shallow basin within which both wetlands sit. Wetland hydrology is indicated at DP7 (wetland) within W4. Secondary indicators Geomorphic Position (D2) and a positive FAC-Neutral Test (D5) were observed and satisfied the hydrology criterion. The same secondary indicators were met at DP10 within W5.

Soils

Soils mapped in this portion of Area G are Seelyeville and Markey soils (depressional, 0 to 1 percent slopes), a soil unit rated as hydric. Upland and wetland sampling points in this area describe a deep soil profile of black (2.5/N) loam that met hydric soils indicator Thick Dark Surface (A12). No redox features were observed in any of the profiles. Soils were dry and crumbly to 20 inches in depth. The hydric soils criterion was satisfied at all the sampling points.

Wetland Boundary

The wetland boundary was determined by a transition to a plant community dominated by upland species, a lack of wetland hydrology indicators, and changes in elevation. In uplands, the plant community shifted to one dominated by Kentucky blue grass and smooth brome (*Bromus inermis*: UPL). Chickweed (*Stellaria meadia*: FACU), white clover (*Trifolium repens*: FACU), dandelion (*Taraxacum officinale*: FACU), and plantain (*Plantago major*: FACU) entered the upland plant community as minor components.

Topography played a key role in determining the boundary. A topographic rise of about two to four feet along the east and west sides of Wetland 4 aided in boundary determination. Along the east side at DP6 near the fence, elevation changes associated with the berm formed the boundary. Along the northern side of W4, the boundary was formed by the road embankment and the western boundary was formed by a gentle rise to the terrace to the west. The southern boundary of W4 was determined by changes in the plant community in transition to uplands. Topographic changes were not as evident in the mostly level terrain here.

Wetland 5 included a portion of the eastern end of the vacated drainage ditch. Topography also played an important role in the boundary determination as the western slope of the floodplain rose two to three feet and a transition to upland vegetation determined the boundary. Upland vegetation at DP11 was dominated by Kentucky blue grass. Wetland hydrology indicators were absent at DP11.

(d) Wetlands 6 and 7 (PEM1A/Type 1)

During the June field work, lands within Area E were examined. Area E consists of land at the southern end of the primary runways and a narrow ribbon designated for a perimeter road from Taxiway E1 to the hangar access road on the east side of the Airport. During the September visit, additional areas were examined (Area H) beyond the original AOI to include options for perimeter road alignments through this area as well as to assess more fully the status of a previously mapped wetland. This previously mapped wetland, shown as a large area of PEM1A/Type 1 wetland on wetland mapping (see Aquatic Resources Map in Appendix B), is situated just south of the Runway 32R blastpad between the hangar access road on the east and the Airport fence on the west.

At the June field visit, the proposed perimeter road connection (and all area within Area E) was examined and Wetlands 1 and 2 were delineated. A concave area with wetland vegetation including spike rush, smartweed, and dark green bulrush was observed near the western fence line but was not delineated at that time. This area likely is associated with Wetland 6.

Delineation of Wetlands 6 and 7 occurred during the September field visit while examining lands within Area H. To assess the status of the previously mapped Type 1 wetland, an east-to-west sampling transect consisting of four data points was taken through the area. This second site visit also enabled the examination of Wetlands 1 and 2 under late season conditions.

General Site Observations

This area is currently managed with regular mowing and consists mostly of grasses and upland forbs. Historically, this area often shows vegetative signatures consistent with a scrub-shrub plant community in aerial photos (1945, 1956, 1962, 1967, and 1971). Starting in 1991, the area exhibits signs of vegetative management and an absence of the scrub-shrub community (see Appendix C).

No mower ruts or other evidence of poor drainage that could inhibit tractor operation was observed. Maintenance personnel indicated that mowing equipment did not experience issues with getting bogged down or stuck at any time during management activities. The area had been mown about one week prior to field work.

In several sampling points, soils exhibited signs of disturbance, either as fill layers over native soils or as a mixture of debris including glass, pottery, and nails or other iron materials.

Given these conditions – a likely alteration of hydrology due to grading and filling, regular vegetation management, and other potential soil disturbance – normal circumstances were not considered to be present in both wetlands.

A heavy rainfall event occurred four days prior to the start of the September field work when approximately 4.5 inches of rain fell. At the time of the site visit, standing water and saturation at the surface was observed in both Wetlands 6 and 7. Generally, the larger area south of the Runway 32L and 32R ends is a closed flat area with no external outlets; thus, this area serves a groundwater infiltration function.

Five sampling points on two transects were taken within Wetland 6 (DP12 – 16) and three sampling points on a transect within Wetland 7 (DP17 – 19). The locations of these points are shown on the Wetland Boundary Maps provided in Appendix E; data sheets along with field photographs are presented in Appendices F and G. The complex topography is shown on the detailed topography map in Appendix B.

Vegetation

Wetlands 6 and 7 (W6 and W7) are emergent wetland communities located at the southern end of the Airport between the hangar access road (Scott Avenue North) and the western fence line. Wetland 6 is shallow basin adjacent to and west of Wetland 2 with a slight topographic rise separating them; Wetland 7 is a shallow basin/swale situated along the toe of the grading slope of the Runway 32R blast pad.

Due to mowing and late season vegetation changes leading to the introduction of annuals, hydrophytic vegetation was difficult to assess and was considered obscured. A mix of annual grasses and forbs were identifiable at DP13 (Wetland 6) including crabgrass (*Digitaria ischaemum*: FACU), barnyard grass (*Echinocloa muricata*: OBL), and lady's-thumb (*Persicaria maculosa*: FAC) complementing perennial quackgrass (*Elymus repens*: FACU) and Kentucky blue grass. This assemblage passed the Prevalence Index at 2.9.

At the other wetland sampling point within Wetland 6 (DP15), the vegetation was again obscured not only by mowing but by cut grass material that effectively acted as a mulch to suppress growth. Vegetation was dominated by crabgrass at this point along with other facultative and upland species such as creeping charlie (*Glechoma hederacea*: FACU), quackgrass, lady's-thumb, and meadow foxtail (*Alopecurus pratensis*: FAC). Barnyard grass (OBL) was also present.

As well, a concave area with wetland vegetation including spike rush, smartweed, and dark green bulrush was observed near the western fence line but was not delineated at the June field visit. This likely is associated with Wetland 6 in the general vicinity of DP15.

Given the satisfaction of both the hydric soils and wetland hydrology criteria at this sampling point, potential late season vegetation shifts, the lack of nearby or suitable reference sites, and the converging landform as evidenced by the shallow basin, hydrophytic vegetation was considered to be present at DP15.

Vegetation at Wetland 7 exhibited a similar situation at sampling point DP18: annuals such as barnyard grass and lady's-thumb dominated. Quackgrass and meadow foxtail joined as dominants. This complement of plants passed the Prevalence Index at 2.9.

Hydrology

Both wetlands exhibited multiple primary and secondary wetland hydrology indicators including Surface Water (A1), High Water Table (A2), Saturation (A3), and Geomorphic Position (D2). See sampling points DP13, 15, and 18. Pockets of standing water and saturation at the surface were present throughout both wetlands.

Soils

Soils mapped in this portion of Area E are Seelyeville and Markey soils (depressional, 0 to 1 percent slopes), a soil unit rated as hydric, Duelm loamy sand (0 to 2 percent slopes), and Udorthents (wet substratum, 0 to 2 percent slopes), both rated as not hydric. Delineated wetlands fall primarily on Seelyeville and Markey soils. This thick black mucky soil layer was evident throughout numerous sampling points, sometimes occurring at the surface or at times covered by up to 16 inches of sandy or loamy fill soil.

Within Wetland 6, sampling points DP13 and 15 show a black (10YR 2/1) muck layer. The deep black muck layer at DP15 is found at the surface and meets the Thick Dark Surface (A12) indicator while at DP13 the layer has been covered by a very dark grayish brown (10YR 3/2) sand layer to 16 inches in depth. The sandy top layer exhibited yellowish red (5YR 5/6) redoximorphic features and satisfied the Sandy Redox (S5) indicator.

Similarly, at wetland sampling point DP18 within Wetland 7, the deep 22-inch thick black (10YR 2/1) muck layer, found at the surface, satisfied the Thick Dark Surface (A12) indicator.

Wetland Boundary

The wetland boundary was determined by a transition to a plant community dominated by upland species, a lack of wetland hydrology indicators, and changes in elevation. In uplands, the plant community shifted to one dominated by Kentucky blue grass, quackgrass (*Elymus repens*: FACU), and crabgrass (*Digitaria ischaemum*: FACU). White clover (*Trifolium repens*: FACU), dandelion (*Taraxacum officinale*: FACU), and plantain (*Plantago major*: FACU) entered the upland plant community as minor components.

Indicators of wetland hydrology were generally lacking at upland sampling points associated with Wetlands 6 and 7 except for DP14 where a High Water Table (A2) and Saturation (A3) were present. The hydric soils criterion was satisfied at several upland sampling points (DPs 14, 16, and 19), often being the only wetland parameter satisfied.

Soils in uplands showed evidence of mixing, deposition of debris, trash, and other sandy fill materials over the native Seelyeville and Markey soils. This can be seen at upland sampling points DP12 and DP14, associated with Wetland 6, where the native soil is found at 20 and 22 inches in depth, respectively. At DP16, also associated with W6, the original muck layer was found at 11 inches in depth.

Located on the north side of Wetland 7, DP17 (upland) shows mixed soils to a depth of 20 inches, likely related to the grading for the Runway 32R blastpad. While at DP19 (upland) on the south side of the wetland, the hydric soils criterion satisfied the Redox Dark Surface (F6) hydric soils indicator. The native muck layer was found at 10 inches in depth here.

Topography played a key role in determining the boundary. A topographic rise of about two feet along the west and south sides of Wetland 6 aided in boundary determination. Along the east side of Wetland 6 topographic changes were more gradual. Along the northern side of W7, the boundary was formed at the toe of the grade slope and the southern boundary was formed by an absence of hydrophytic vegetation and a lack of hydrology. Both wetlands were found in low spots within the generally flat terrain enabling the collection of surface runoff.

(e) Re-examination of Wetlands 1 and 2

Re-examination of Wetlands 1 and 2 occurred during the September field visit. These wetlands consistently show wetness signatures in historic aerial photography as previously mentioned. At the September field visit, standing water was present within the two areas, both of which showed brown senescent vegetation corresponding to the delineated wetlands. Photo 34 (Appendix G) illustrates the vegetative conditions at Wetland 2 in the foreground and Wetland 1 in the background.

(f) Examination of Previously Mapped Wetland

During the September field visit, the large previously mapped area of PEM1A/Type 1 wetland was examined. Four sampling points (DP22 – 25), taken on an east-to-west transect, documented conditions within the area.

The terrain is generally flat in this area with elevation varying by one to two feet over this large expanse (see Detailed Topographic mapping in Appendix B).

Duelm loamy sand underlies the easternmost sampling point (DP22) where the hydric soils criterion was satisfied with a very dark gray (10YR 3/1) sandy loam layer over a very dark gray (10YR 3/1) sandy loam layer with reddish brown (5YR 4/4) redoximorphic features. This was the only wetland parameter satisfied here; both the hydrophytic vegetation and wetland hydrology criteria were not met at DP22.

Sampling points DP23 – 25 all were taken within the Seelyeville/Markey soils unit. Evidence of this layer, though, was not uncovered. At DP23 and 24, a hard pan restrictive layer encountered at 6 and 16 inches in depth, respectively, precluded digging below 16 inches at these locations. A very dark gray (10YR 3/1) sandy loam or sands with strong brown (7.5YR 4/6) or dark reddish brown (5YR 3/4) redox features satisfied the hydric soils criterion at these points. Saturation (A3) was present at 12 inches in depth at DP24. At neither point was the hydrophytic vegetation criterion satisfied.

The last point on this transect (DP25) did not meet the hydrophytic vegetation criterion but did satisfy both the wetland hydrology and hydric soils criteria with Saturation (A3) at 12 inches and Sandy Redox (S5) and Redox Dark Surface (F6). The soil profile showed both a depleted dark gray (10YR 4/1) sandy matrix with strong brown (7.5YR 4/6) redox features and very dark gray (10YR 3/1) sandy loam layer with dark reddish brown (5YR 3/4) redox features.

In all four data points, the hydrophytic vegetation criterion was not satisfied as Kentucky blue grass, white clover, crabgrass, and quackgrass dominated. Historic aerial imagery indicates that this area was at one time likely a scrub-shrub wetland. However, these four sampling points provide evidence that most of this area does not meet all three wetland criteria currently.

C. Uplands

Uplands within the AOI consisted primarily of managed landscapes with a mixture of grasses and forbs. Dominant upland vegetation included Kentucky blue grass and tall rye grass. Other species seen in infield Areas A, B, C, D, and F included poverty grass (*Dichanthelium* sp.), smooth brome (*Bromus inermis*: FACU), silverleaf cinquefoil (*Potentilla argentea*: FACU), great and woolly plantain (*Plantago major*: FACU and *Plantago patagonica*: UPL), common yarrow (*Achillea millifolium*: FACU), yellow wood sorrel (*Oxalis stricta*: FACU), and chickweed (*Stellaria meadia*: FACU). Transition to upland was marked by a lack of wetland hydrology and absence of hydric soils in many cases.

D. Summary

In summary, the AOI is primarily covered by Urban land, loamy sand, and sandy loam soils, with most areas in managed landscapes. Seven wetlands were identified within or near the AOI under primarily atypical conditions. Twenty-five (25) sampling points document conditions within the AOI. The wetland boundary was determined by the observation of multiple secondary indicators of wetland hydrology associated with wetland vegetation on soils exhibiting Sandy Redox (S5), Thick Dark Surface (A12), and

Redox Dark Surface (F6) in isolated depressional basins. Wetland hydrology during the June field visit was indicated by multiple secondary indicators observed as Geomorphic Position (D2), positive FAC-Neutral Test (D5), and Saturation Visible on Aerial Imagery (C9). At the late fall field visit in September, hydrology was present as primary indicators of Surface Water (A1), High Water Table (A2), and Saturation (A3). The boundary determinations primarily relied on the absence of one or more wetland criteria: lack of hydrophytic vegetation, wetland hydrology indicators, and hydric soils.

A transect of four sampling points within a previously mapped area of PEM1A/Type 1 wetland south of the primary runways documented upland conditions that do not meet all three wetland criteria currently.

(1) Other waters

This AOI does not include any intermittent or perennial streams or navigable waters. No other water bodies were identified during the delineation.

4. Conclusion

A total of seven separate wetland boundaries enclosing 0.642 acres were delineated within or near the AOI at Crystal Airport. A jurisdictional determination for these wetlands will be needed from the U.S. Corps of Engineers (USACE) as they may be considered isolated water bodies. A Section 404 wetland fill permit from the USACE will be needed for any construction activities within the jurisdictional wetland boundaries. A Section 401 water quality certification of the 404 permit will also be required by the Minnesota Pollution Control Agency, and additional permits may be required from the Local Government Unit (LGU) under the Minnesota Wetland Conservation Act. Independent review by local land use authorities may also be required. Final authority over the project rests with the above federal, state, and local agencies.

5. Certification and Limitations

The undersigned does hereby certify and state that she is an employee of Mead & Hunt, Inc., that she has been designated as being in responsible charge of the delineation of wetlands described herein; and that this delineation was performed in accordance with the USACE 1987 *Wetland Delineation Manual* as enhanced by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (U.S. Army Corps of Engineers, 2011).

This wetland delineation report documents vegetation, soils, and hydrology conditions on the above-referenced parcel according to these standard accepted practices, and the wetland boundary so established is valid only for the designated area. No uses or interpretations of wetland conditions or boundaries outside of the work area are supported by this work.

The mapped wetland boundaries are valid under the environmental conditions existing at the time of delineation. The user of this information is hereby notified that changing environmental conditions may affect the future validity of the wetland boundary.

MEAD & HUNT, Inc.

Brauna Hartzell
Wetland Ecologist & GIS Analyst

Date: May 2019

6. References

The following data sources were examined prior to fieldwork:

- Google Earth. Historical Aerial Images, Google Inc.

- Lichvar, R.W., D. L. Banks, W. N. Kirchner, and N. C. Melvin, 2016. *State of Wisconsin 2016 Wetland Plant List.* The National Wetland Plant List: 2016 wetland ratings, version 3.3. Phytoneuron 2016-30:1-17. Published 28 April 2016. http://wetland_plants.usace.army.mil/.

- MnGEO Geospatial Image Service. Minnesota Geospatial Information Office, Saint Paul, Minnesota. Accessed at http://geoint.lmic.state.mn.us/cgi-bin/wms.

- National Wetlands Inventory (with Minnesota Update) from the U.S. Fish and Wildlife Service at https://www.fws.gov/wetlands/data/mapper.html.

- Soils Survey of Hennepin County, MN, 2004. U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, Web Soil Survey available online at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

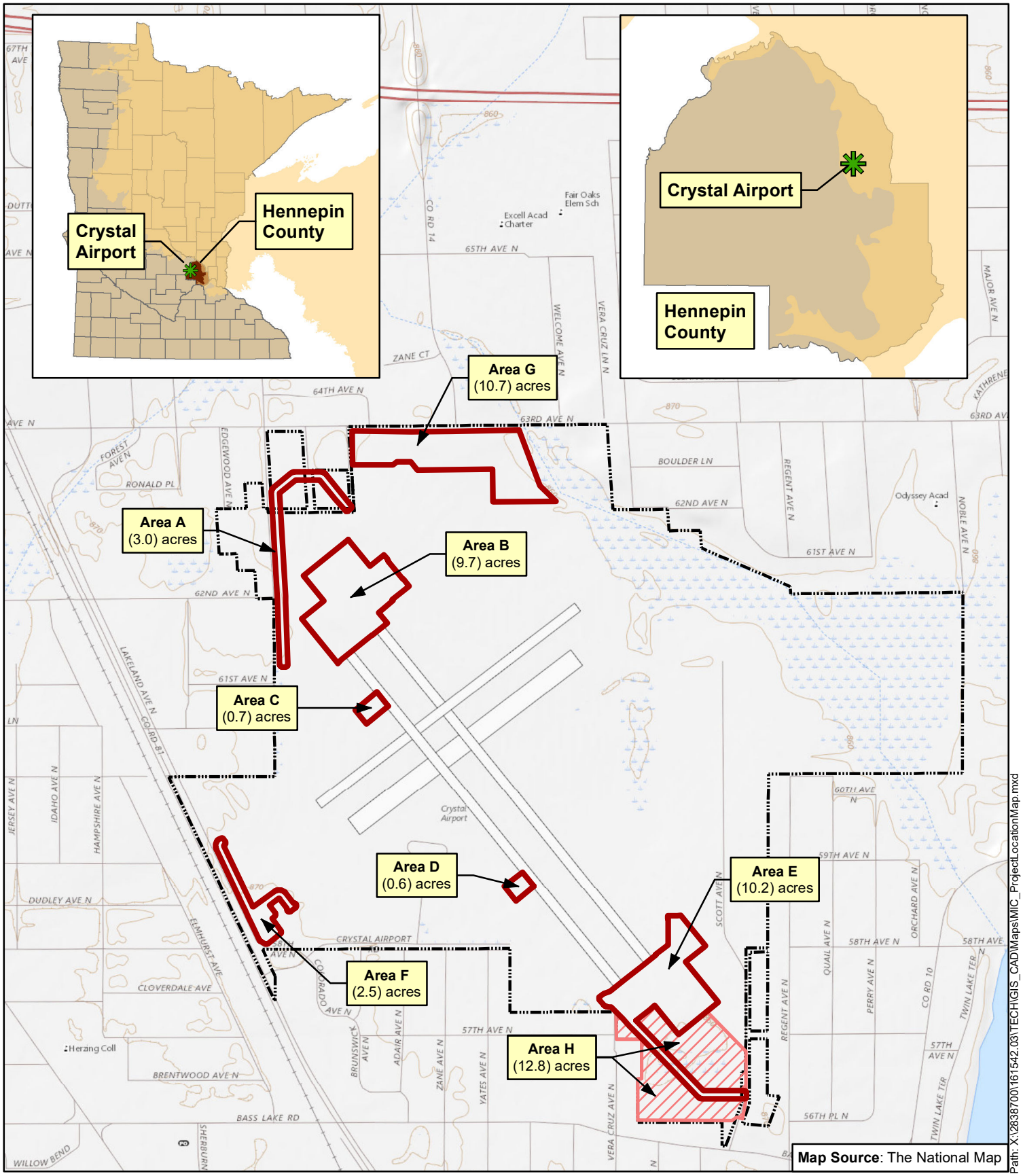
- U.S. Army Corps of Engineers, 2011. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0),* ed. J.S. Wakely, R.W. Lichvar, C.V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

- U.S. Army Corps of Engineers, 2016. *Guidance for Offsite Hydrology/Wetland Determinations*. USACE, St. Paul District and Minnesota Board of Water and Soil Resources. Minneapolis, MN.

- U.S. Department of Agriculture, Natural Resource Conservation Service (USDA, NRCS), 2016. *Field Indicators of Hydric Soils in the United States*, Version 8.0, ed. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz. USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils.

- University of Minnesota Libraries, Minnesota Historical Aerial Photographs Online available online at https://www.lib.umn.edu/apps/mhapo/.

Appendix A. Project Location and Topography Map



Project Location and Topography

CRYSTAL AIRPORT

Proposed Airfield Improvements

Legend

Area of Interest

- June 2018
- September 2018

- LRR Subregion: K
- Airport Boundary

0 1,000 2,000 Feet

N

Project Information

T118N, R21W, Section 4 and
T119N, R21W, Section 33
Cities of Brooklyn Park, Brooklyn Center, and Crystal
Hennepin County, MN
LRR subregion: K
USACE Regional Supplement: NC/NE
Area of Interest = 50.1 acres
Field work: June 4 -5 and Sept. 24 - 26, 2018

Appendix B. Detailed Topographic Map, NRCS Soils Map, Aquatic Resources Map, and Minnesota Public Waters Map

Detailed Topography Map

CRYSTAL AIRPORT

Proposed Airfield Improvements

Legend

- Airport Boundary
- Project Area of Interest

Contour Elevation

- Index
- Intermediate

N

0 300 600 1,200 Feet

Note: Contour interval is 2 feet.

Project Information

T118N, R21W, Section 4 and
T119N, R21W, Section 33
Cities of Brooklyn Park, Brooklyn Center, and Crystal
Hennepin County, MN
LRR subregion: K
USACE Regional Supplement: NC/NE
Area of Interest = 50.1 acres
Field work conducted:
June 4 -5 and Sept. 24 - 26, 2018

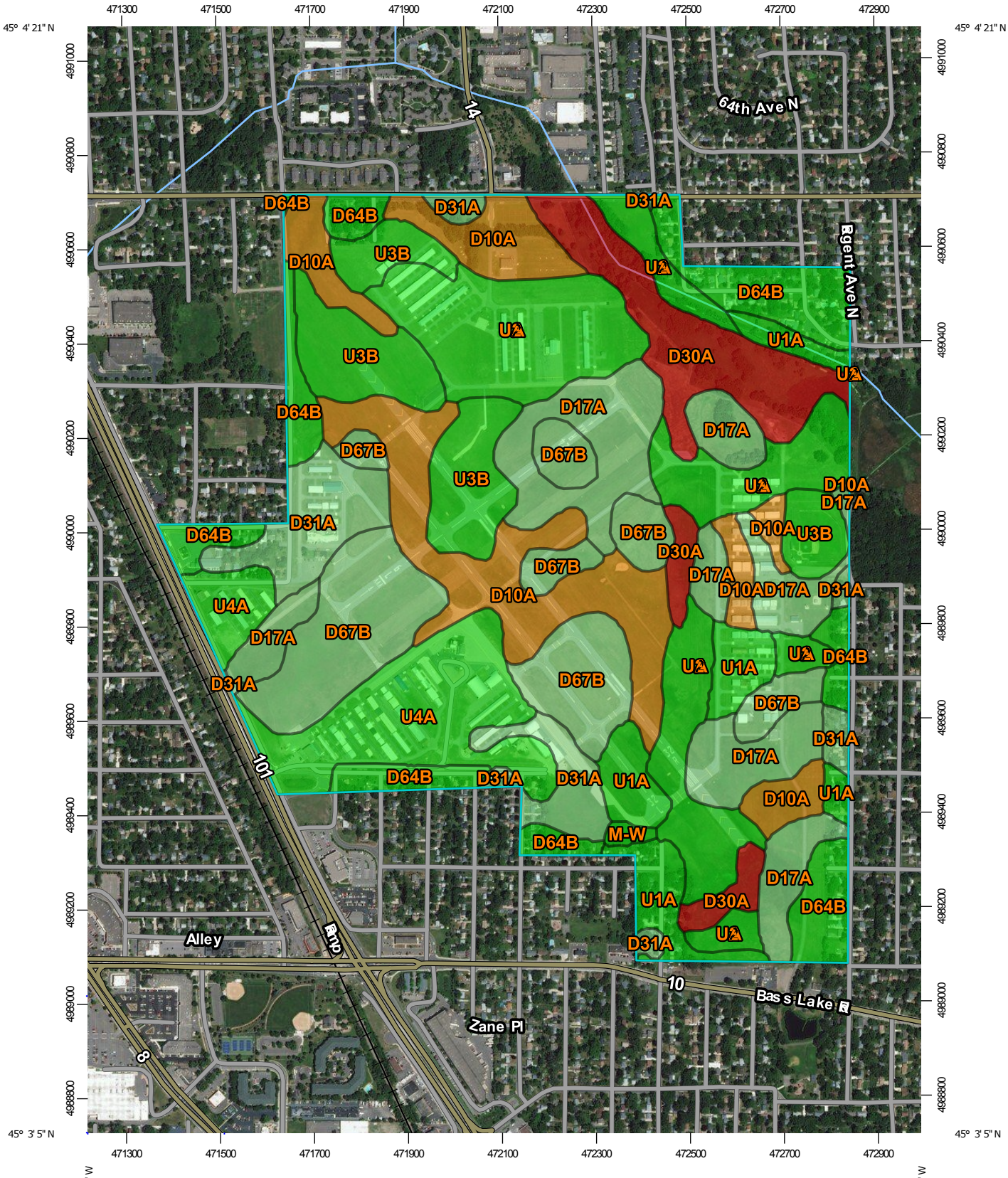
Mead & Hunt

Contour Source:
Hennepin County GIS Office,
Data derrived from Minnesota Department of Natural Resources LiDAR, 2012

Image Source: MnGEO WMS Image Service, Hennepin County (2016 color 7-county)

Path: X:\28387001\61542.03\TECH\GIS_CADMaps\MIC_DetailedTopographyMap.mxd

Hydric Rating by Map Unit—Hennepin County, Minnesota
(Crystal Airport, Crystal, MN)



Map Scale: 1:11,400 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 150 300 600 900

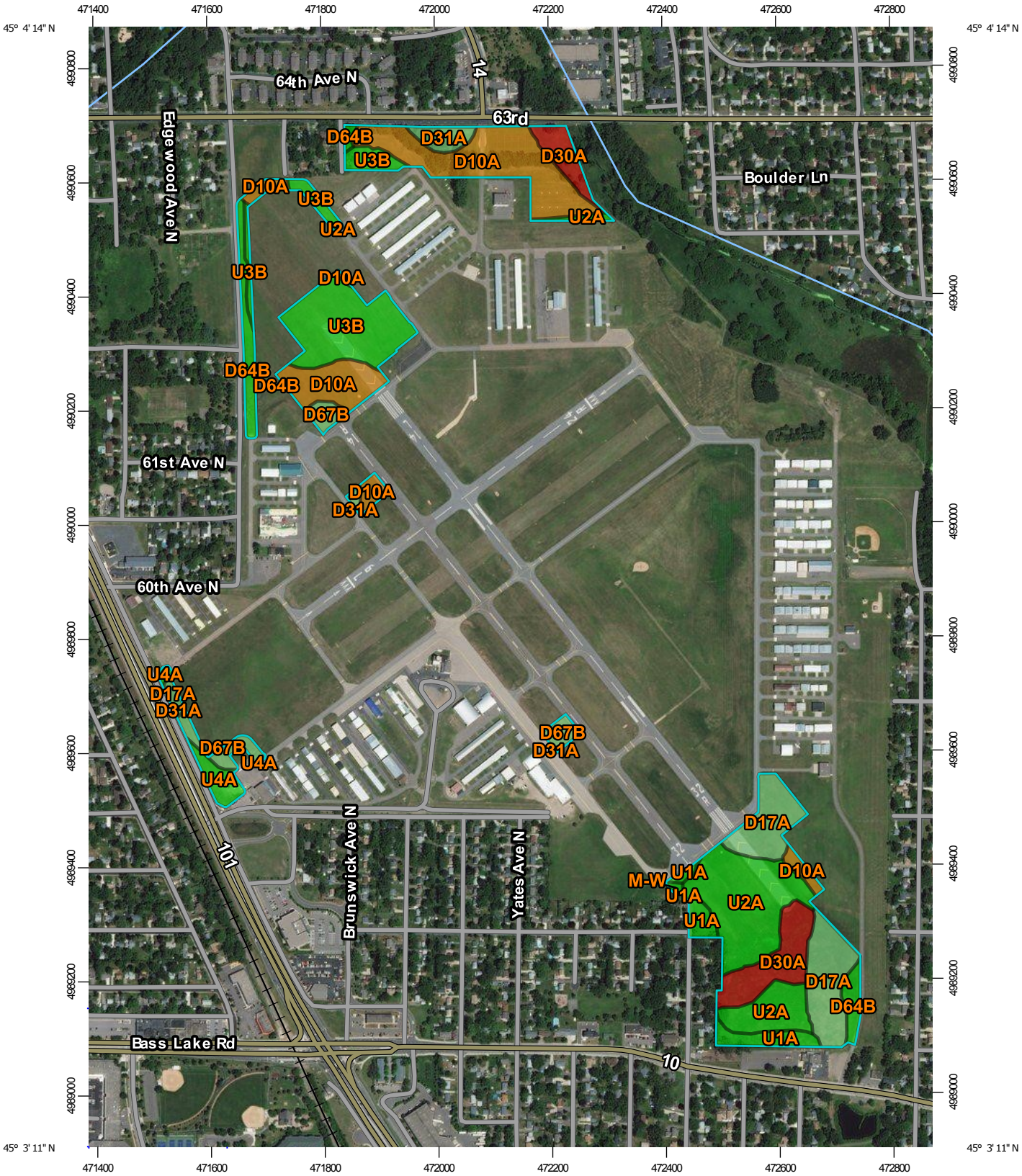
Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
D10A	Forada sandy loam, 0 to 2 percent slopes	85	59.8	13.9%
D17A	Duelm loamy sand, 0 to 2 percent slopes	7	55.2	12.8%
D30A	Seelyeville and Markey soils, depressional, 0 to 1 percent slopes	100	31.6	7.3%
D31A	Urban land-Duelm complex, 0 to 2 percent slopes	5	27.8	6.4%
D64B	Urban land-Hubbard complex, Mississippi River Valley, 0 to 8 percent slopes	0	38.6	8.9%
D67B	Hubbard loamy sand, 1 to 6 percent slopes	3	52.0	12.0%
M-W	Water, miscellaneous	0	1.1	0.2%
U1A	Urban land-Udorthents, wet substratum, complex, 0 to 2 percent slopes	0	22.2	5.1%
U2A	Udorthents, wet substratum, 0 to 2 percent slopes	0	69.5	16.1%
U3B	Udorthents (cut and fill land), 0 to 6 percent slopes	0	36.5	8.4%
U4A	Urban land-Udipsamments (cut and fill land) complex, 0 to 2 percent slopes	0	37.8	8.7%
Totals for Area of Interest			**432.1**	**100.0%**

Hydric Rating by Map Unit—Hennepin County, Minnesota
(Crystal Airport (MIC), Crystal, MN)



Map Scale: 1:9,560 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hennepin County, Minnesota
Survey Area Data: Version 14, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 1, 2013—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
D10A	Forada sandy loam, 0 to 2 percent slopes	85	11.3	22.5%
D17A	Duelm loamy sand, 0 to 2 percent slopes	7	6.7	13.4%
D30A	Seelyeville and Markey soils, depressional, 0 to 1 percent slopes	100	4.8	9.5%
D31A	Urban land-Duelm complex, 0 to 2 percent slopes	5	1.2	2.4%
D64B	Urban land-Hubbard complex, Mississippi River Valley, 0 to 8 percent slopes	0	2.6	5.3%
D67B	Hubbard loamy sand, 1 to 6 percent slopes	3	2.2	4.4%
M-W	Water, miscellaneous	0	0.1	0.2%
U1A	Urban land-Udorthents, wet substratum, complex, 0 to 2 percent slopes	0	2.1	4.1%
U2A	Udorthents, wet substratum, 0 to 2 percent slopes	0	9.9	19.7%
U3B	Udorthents (cut and fill land), 0 to 6 percent slopes	0	8.0	16.0%
U4A	Urban land-Udipsamments (cut and fill land) complex, 0 to 2 percent slopes	0	1.2	2.4%
Totals for Area of Interest			**50.1**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. Doc. 2012-4733 Filed 2-28-12. February, 28, 2012. Hydric soils of the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Vasilas, L.M., G.W. Hurt, and C.V. Noble, editors. Version 7.0, 2010. Field indicators of hydric soils in the United States.

Report—Hydric Soil List - All Components

Hydric Soil List - All Components–MN053-Hennepin County, Minnesota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
D10A: Forada sandy loam, 0 to 2 percent slopes	Forada	60-90	Flats,stream terraces	Yes	2
	Oylen	5-15	Flats,stream terraces	No	—
	Leafriver-Frequently ponded	3-10	Depressions,stream terraces	Yes	2,3
	Arvilla	1-8	Flats,stream terraces	No	—
	Marysland	1-7	Flats,stream terraces	Yes	2
D17A: Duelm loamy sand, 0 to 2 percent slopes	Duelm	70-90	Flats	No	—
	Glendorado	5-15	Flats	No	—
	Isan	2-7	Swales	Yes	2
	Hubbard	2-5	Hillslopes	No	—
	Isan-Frequently ponded	1-3	Depressions	Yes	2,3
D30A: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes	Markey-Surface drained	0-100	Depressions on stream terraces	Yes	1,3
	Seelyeville-Surface drained	0-100	Depressions on stream terraces	Yes	1,3
	Mineral soil-Surface drained	0-20	Depressions on stream terraces	Yes	2,3
D31A: Urban land-Duelm complex, 0 to 2 percent slopes	Urban land	35-80	Stream terraces	—	—
	Duelm	0-20	Stream terraces	No	—
	Isan	0-5	Swales on stream terraces	Yes	2
	Hubbard	0-5	Stream terraces	No	—
D64B: Urban land-Hubbard complex, Mississippi River Valley, 0 to 8 percent slopes	Urban land	65-85	Stream terraces	—	—
	Hubbard-Terrace	15-30	Stream terraces	No	—
	Mosford	0-5	Stream terraces	No	—
D67B: Hubbard loamy sand, 1 to 6 percent slopes	Hubbard	70-95	Stream terraces,hillslopes	No	—
	Mosford	2-10	Stream terraces,hillslopes	No	—
	Duelm	3-10	Flats,stream terraces	No	—
	Isan	0-5	Swales,stream terraces	Yes	2
	Nymore	0-5	Stream terraces,hillslopes	No	—

Hydric Soil List - All Components–MN053-Hennepin County, Minnesota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
M-W: Water, miscellaneous	Water-Miscellaneous	100	—	—	—
U1A: Urban land-Udorthents, wet substratum, complex, 0 to 2 percent slopes	Urban land	65-90	Outwash plains,moraines,stream terraces	—	—
	Udorthents-Wet substratum	10-35	Outwash plains,moraines,stream terraces	—	—
U2A: Udorthents, wet substratum, 0 to 2 percent slopes	Udorthents-Wet substratum	100	Outwash plains,moraines,stream terraces	—	—
U3B: Udorthents (cut and fill land), 0 to 6 percent slopes	Udorthents-Loamy (cut and fill land)	100	Moraines	—	—
U4A: Urban land-Udipsamments (cut and fill land) complex, 0 to 2 percent slopes	Urban land	65-85	Outwash plains,stream terraces	—	—
	Udipsamments-Cut and fill land	15-50	Outwash plains,stream terraces	—	—

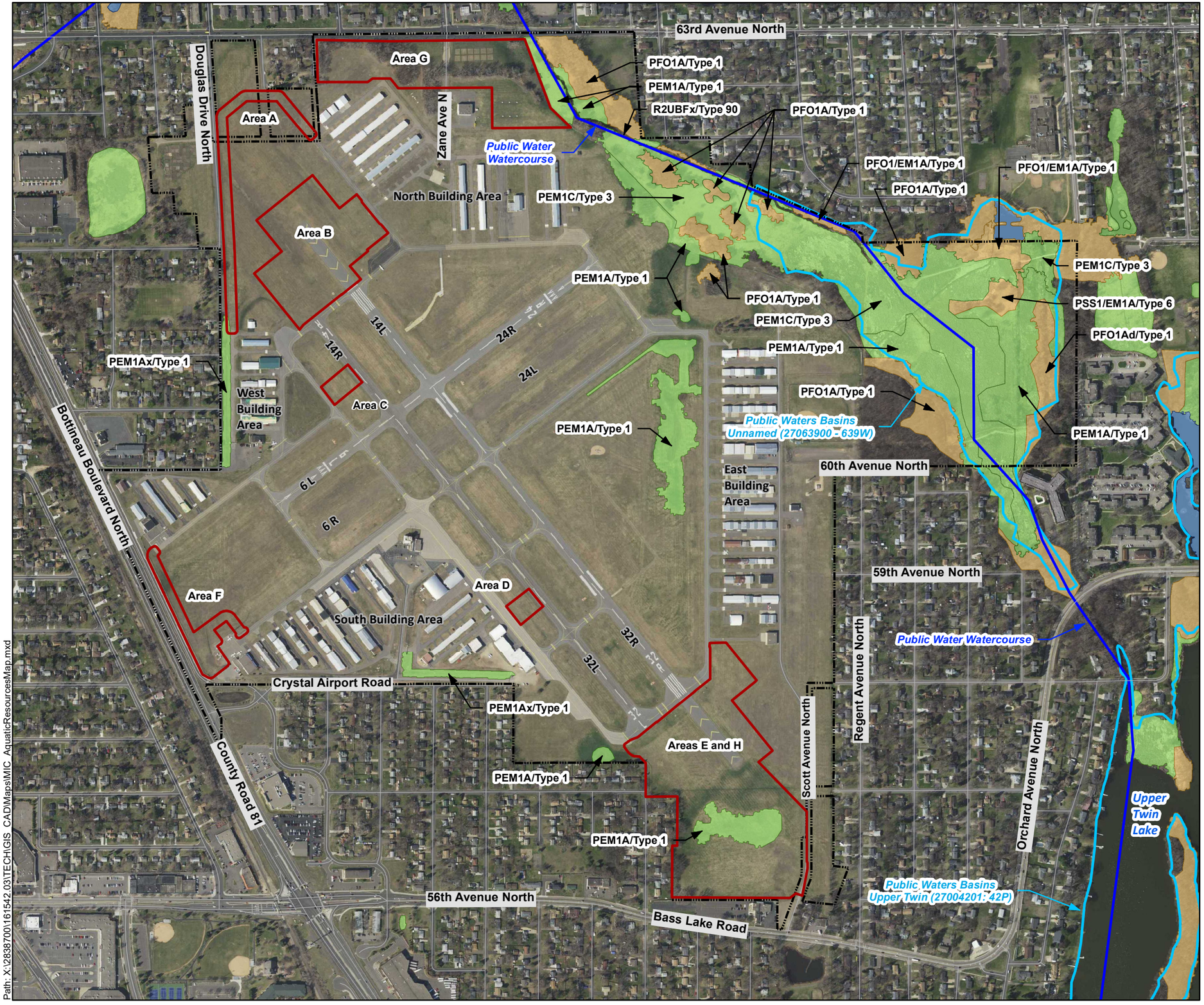
Data Source Information

Soil Survey Area: Hennepin County, Minnesota
Survey Area Data: Version 13, Oct 4, 2017

Aquatic Resources Map

National Wetlands Inventory (NWI)
and Minnesota Public Waters

CRYSTAL AIRPORT
Proposed Airfield Improvements



Path: X:\2838700\161542.03\TECH\GIS_CAD\Maps\MIC_AquaticResourcesMap.mxd

Legend

- Project Area of Interest
- Airport Boundary

PUBLIC WATERCOURSES**

- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse
- MNPublic Waters Basins

WETLAND TYPE*

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

* Labeled with NWI classificaiton and Circular 39 Type

N

0 300 600 1,200 Feet

Project Information

T118N, R21W, Section 4 and
T119N, R21W, Section 33
Cities of Brooklyn Park, Brooklyn Center, and Crystal
Hennepin County, MN
LRR subregion: K
USACE Regional Supplement: NC/NE
Area of Interest = 50.1 acres
Field work conducted:
June 4 -5 and Sept. 24 - 26, 2018

Mead & Hunt

*** National Wetland Inventory Update for Minnesota, 2010-2011**
MN Geospatial Commons

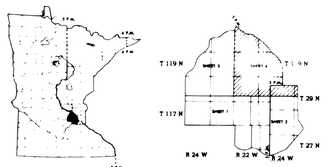
**** Mn Public Waters Data:** Public Waters (PW) Basin and Watercourse Delineations, Hennepin County, MN Geospatial Commons

Image Source: MnGEO WMS Image Service, Hennepin County (2016 color 7-county)

PROTECTED WATERS AND WETLANDS

HENNEPIN COUNTY MINNESOTA

SHEET 4 of 4



LEGEND

Protected Waters:
- Basins are identified with a number and the letter "P".
- Watercourses are identified with a heavy, dark line.
- Public ditches are identified with a dashed line.

Protected Wetlands:
- Identified with a number and the letter "W".

This map is intended for use with a separate descriptive list. The boundaries of the protected water bodies shown on this map are plotted as accurately as possible, consistent with the map scale, but are still approximate. A protected water body boundary coincides with the ordinary high water mark of the water body as defined in Minnesota Statutes, Section 105.37 and is determined through DNR field inspection or survey.

Protected waters and wetlands are subject to Minnesota Statutes, Section 105.42, which requires that a permit be obtained before making any alteration in the course, current or cross-section of these waters. Contact the DNR office in your area for further information.

Trespass

The designation and mapping of protected waters or wetlands **does not** entitle anyone to cross private land in order to gain access to the water. Please respect the property of others.

Water Bank

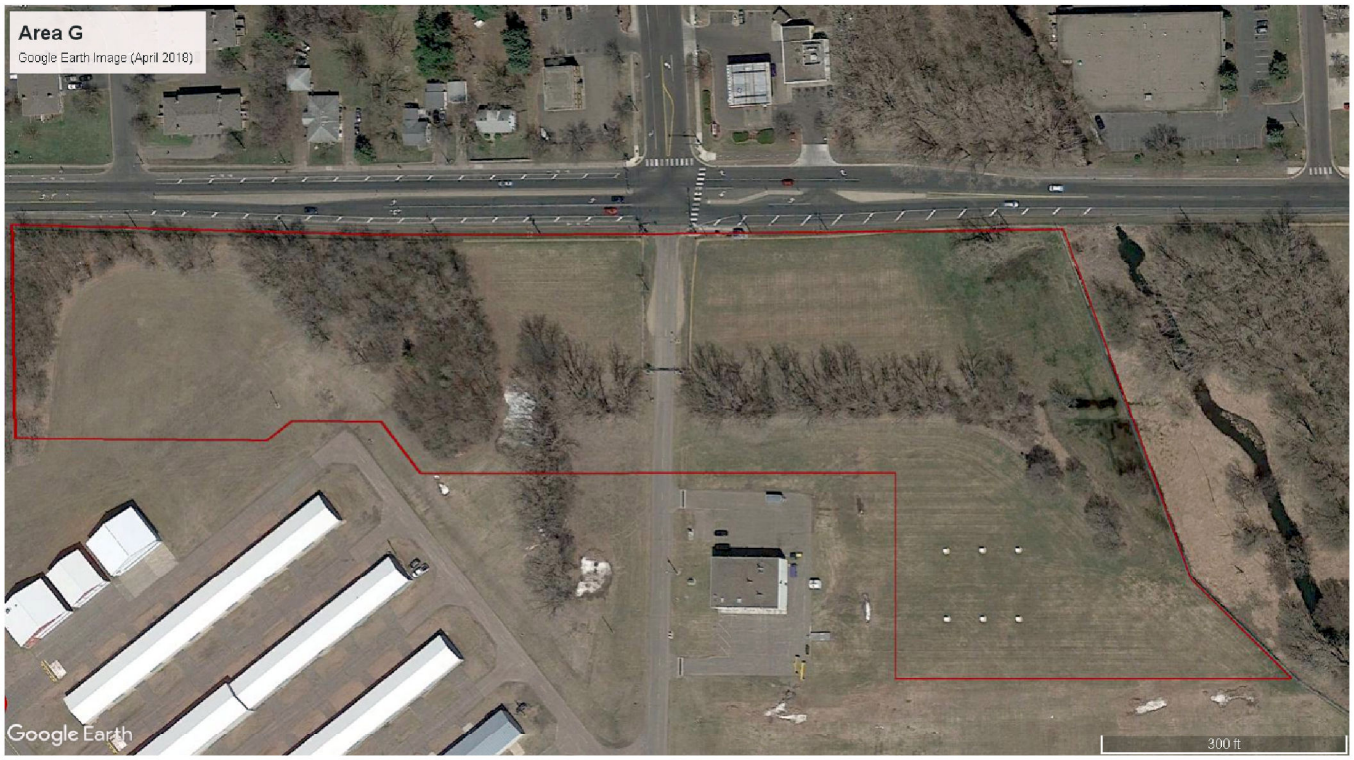
Wetland owners may be eligible for compensation for preservation of protected wetlands. Contact the DNR office in your area for further information.

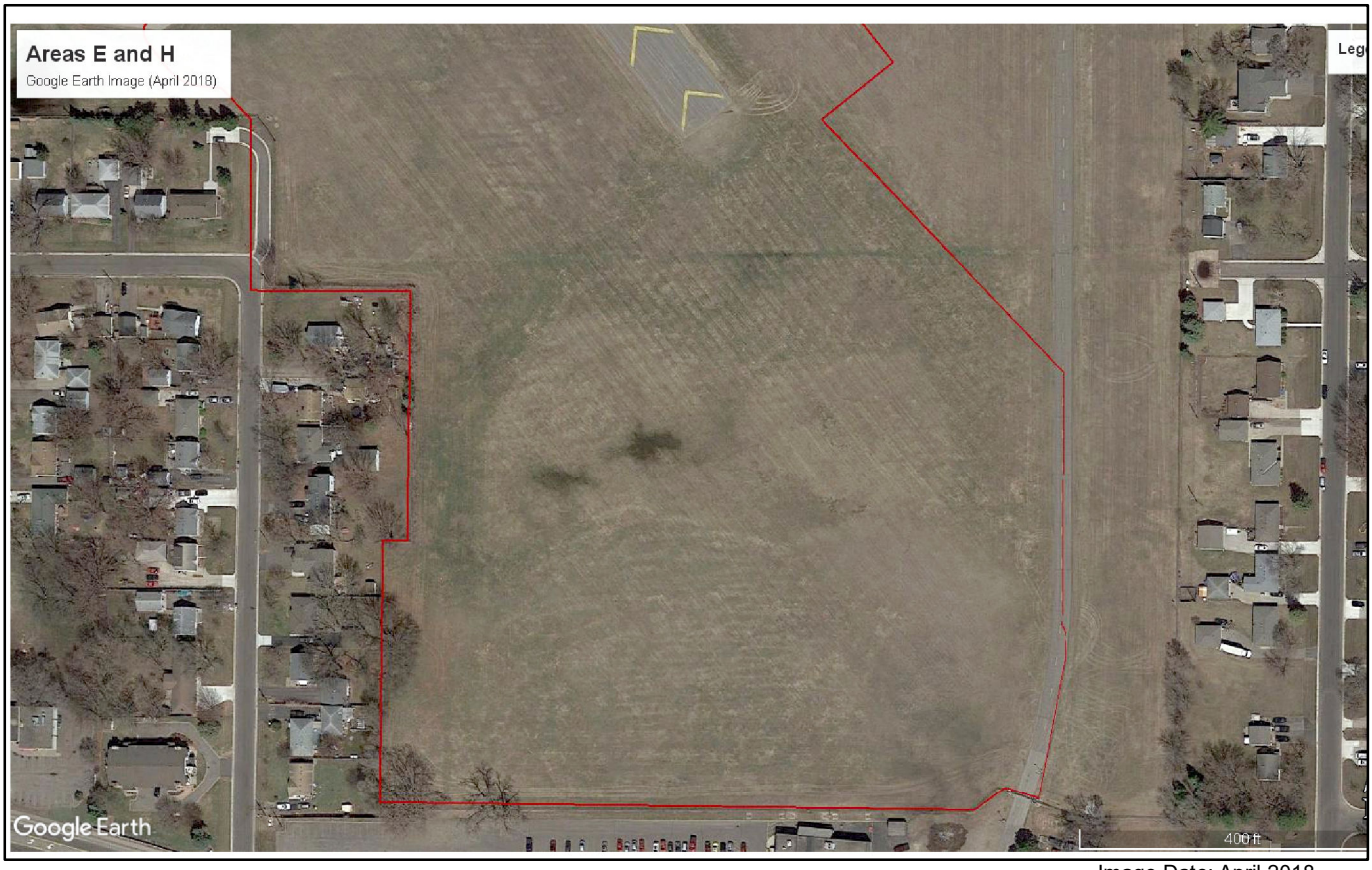
SCALE: 1" = 1 MILE

Department of Natural Resources
Division of Waters

1983

Appendix C. Historic Aerial Photography





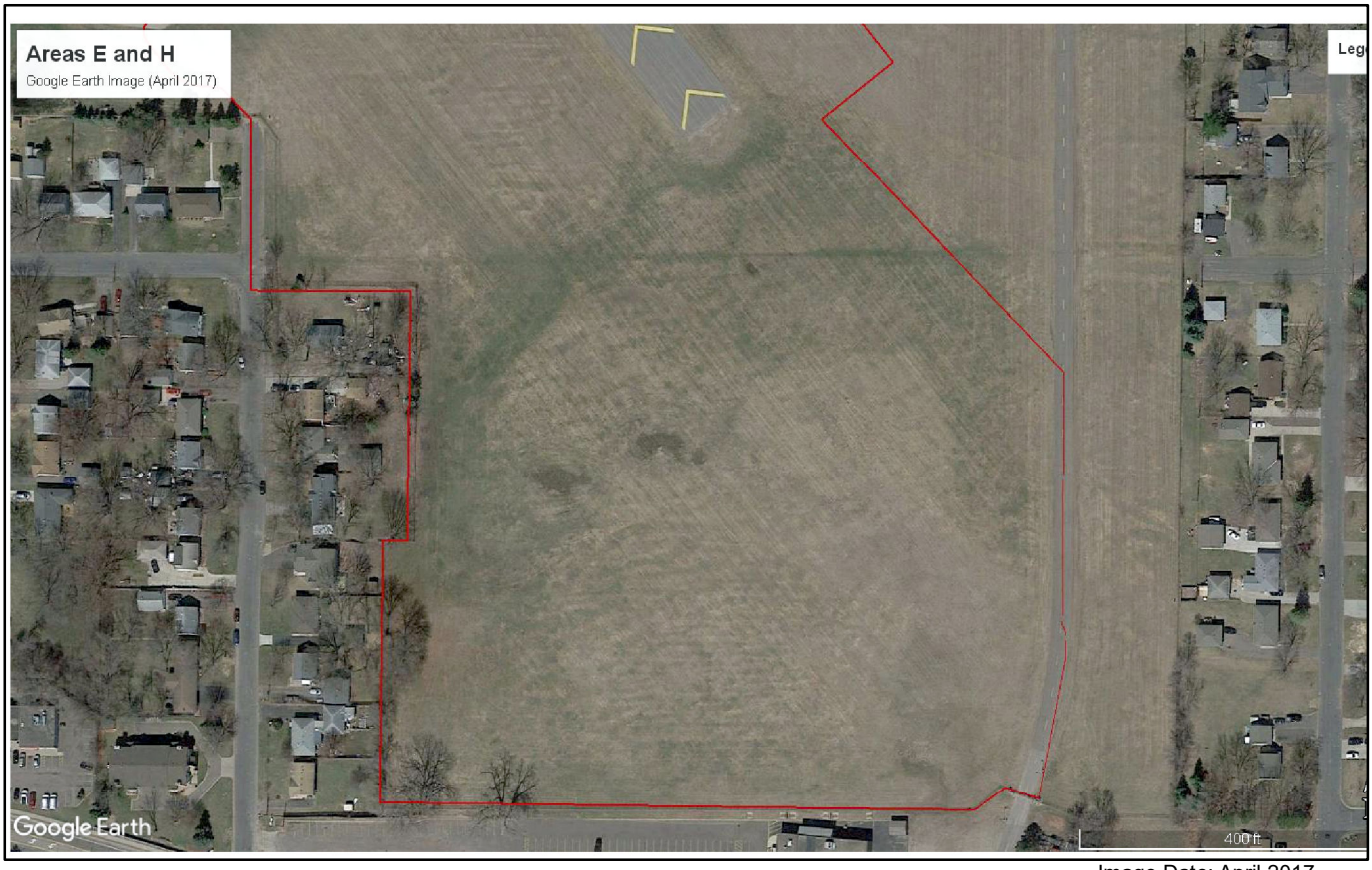
Historic Aerial Imagery

Image Date: April 2018
Image Source: Google Earth

CRYSTAL AIRPORT
Proposed Airfield Improvements

Images not to scale

N



Historic Aerial Imagery

Image Date: April 2017
Image Source: Google Earth

CRYSTAL AIRPORT
Proposed Airfield Improvements

Images not to scale

N

Historic Aerial Imagery

Image Date: 8/31/2017
Image Source: NAIP (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-50 **2017**

Historic Aerial Imagery

Image Date: April 2016
Image Source: Google Earth

CRYSTAL AIRPORT
Proposed Airfield Improvements

Images not to scale

N

Historic Aerial Imagery

Image Date: 9/27/2015
Image Source: NAIP (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

Historic Aerial Imagery

Image Date: 7/12/2013
Image Source: NAIP (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

Historic Aerial Imagery

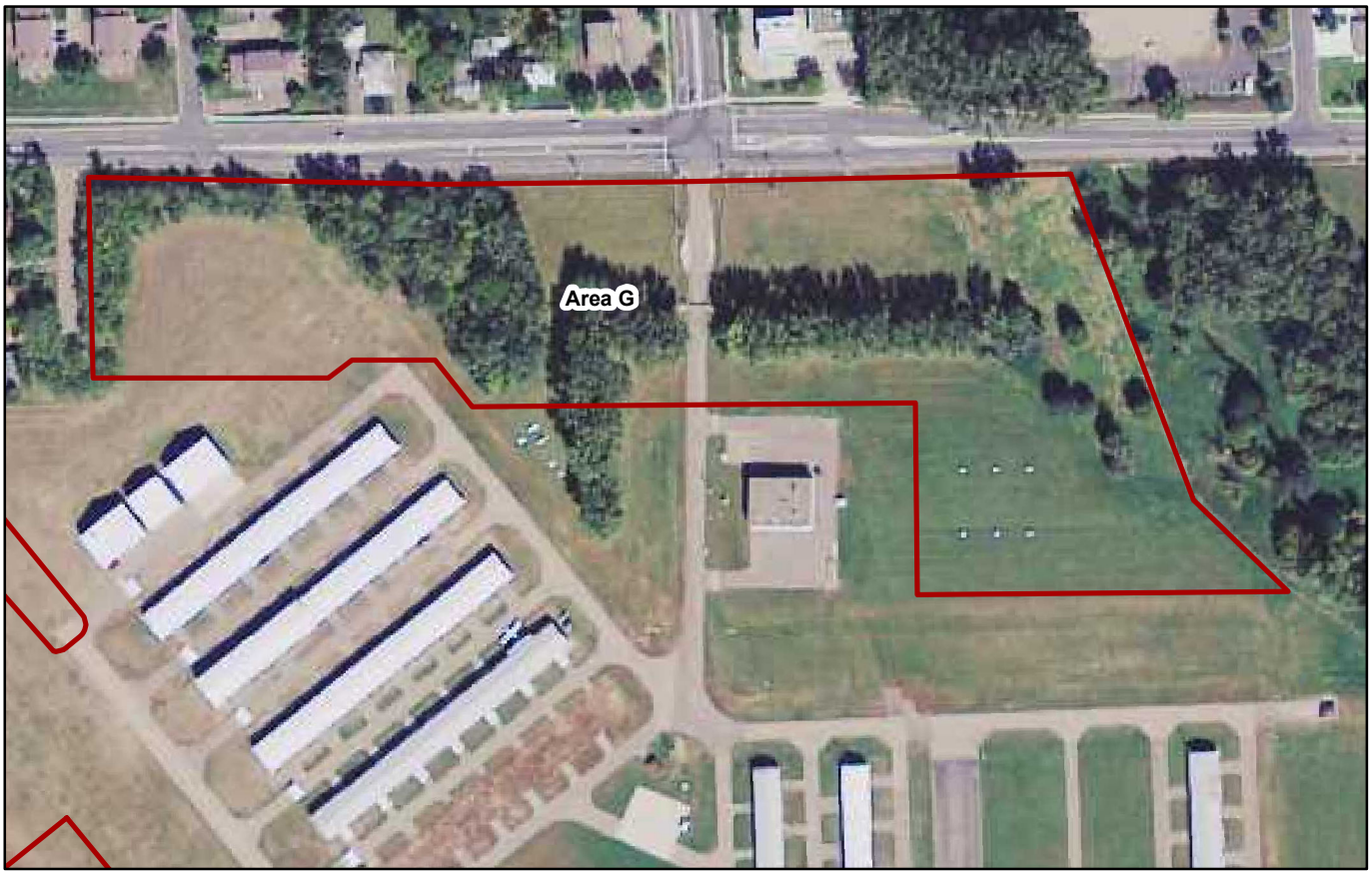
Image Date: Spring 2010
Image Source: Hennepin County, color 7-county (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-54 **2010**



Historic Aerial Imagery

Image Date: 9/12/2010
Image Source: NAIP (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

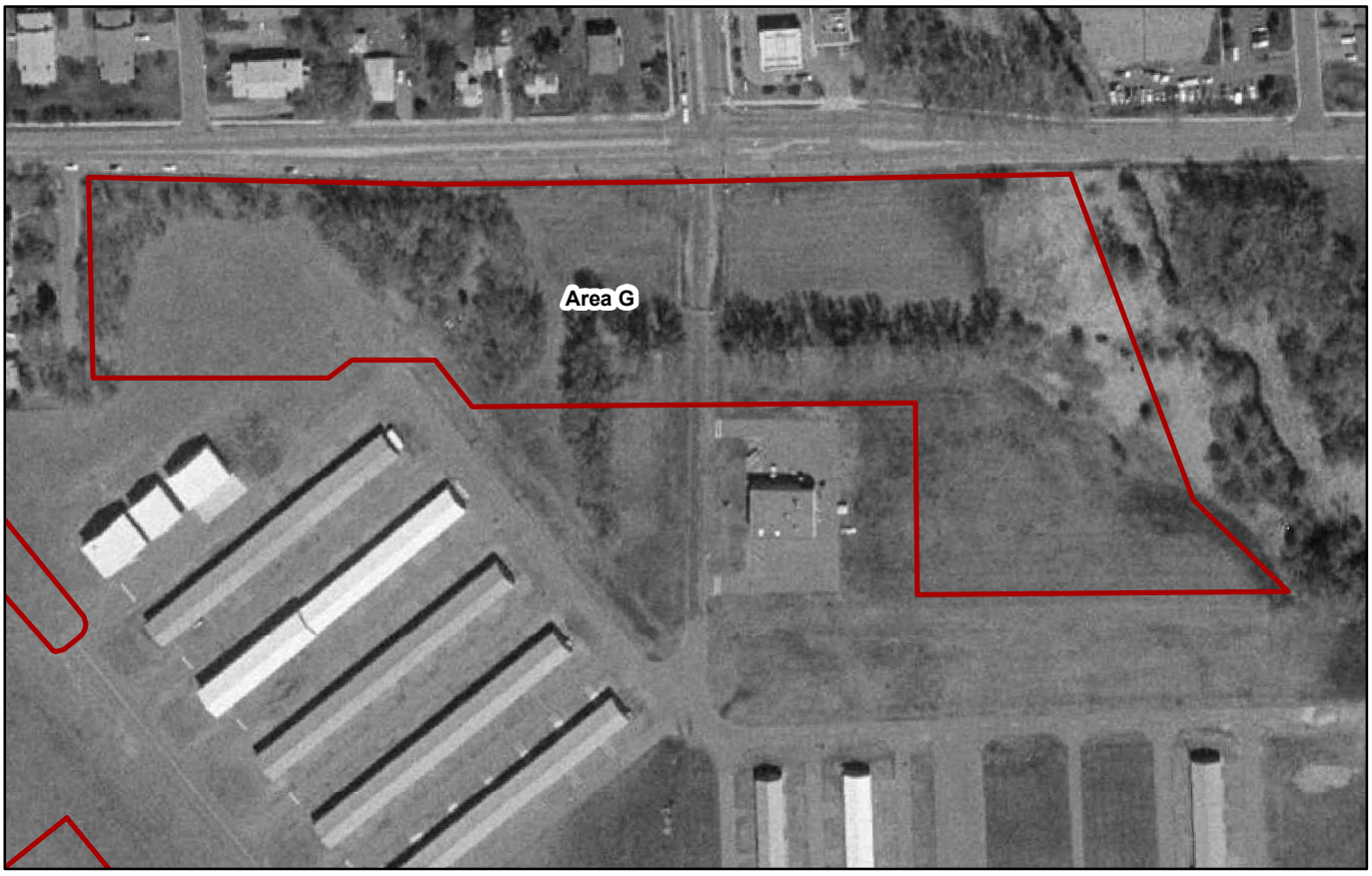
Historic Aerial Imagery

Image Date: Spring 2006
Image Source: Hennepin County, color 7-county (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N



Historic Aerial Imagery

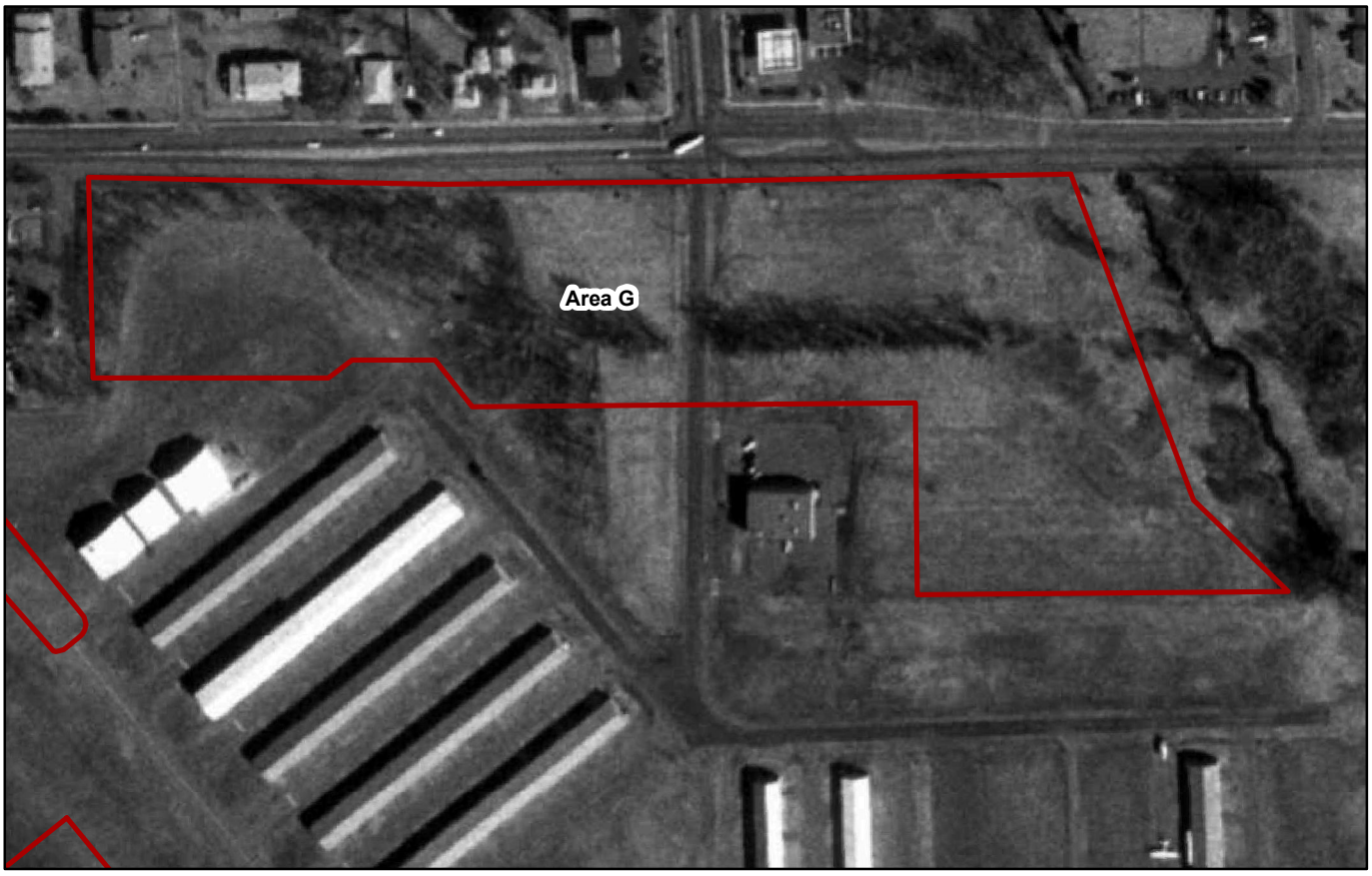
Image Date: Spring 2000
Image Source: Hennepin County, bw 7-county (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-57 **2000**



Historic Aerial Imagery

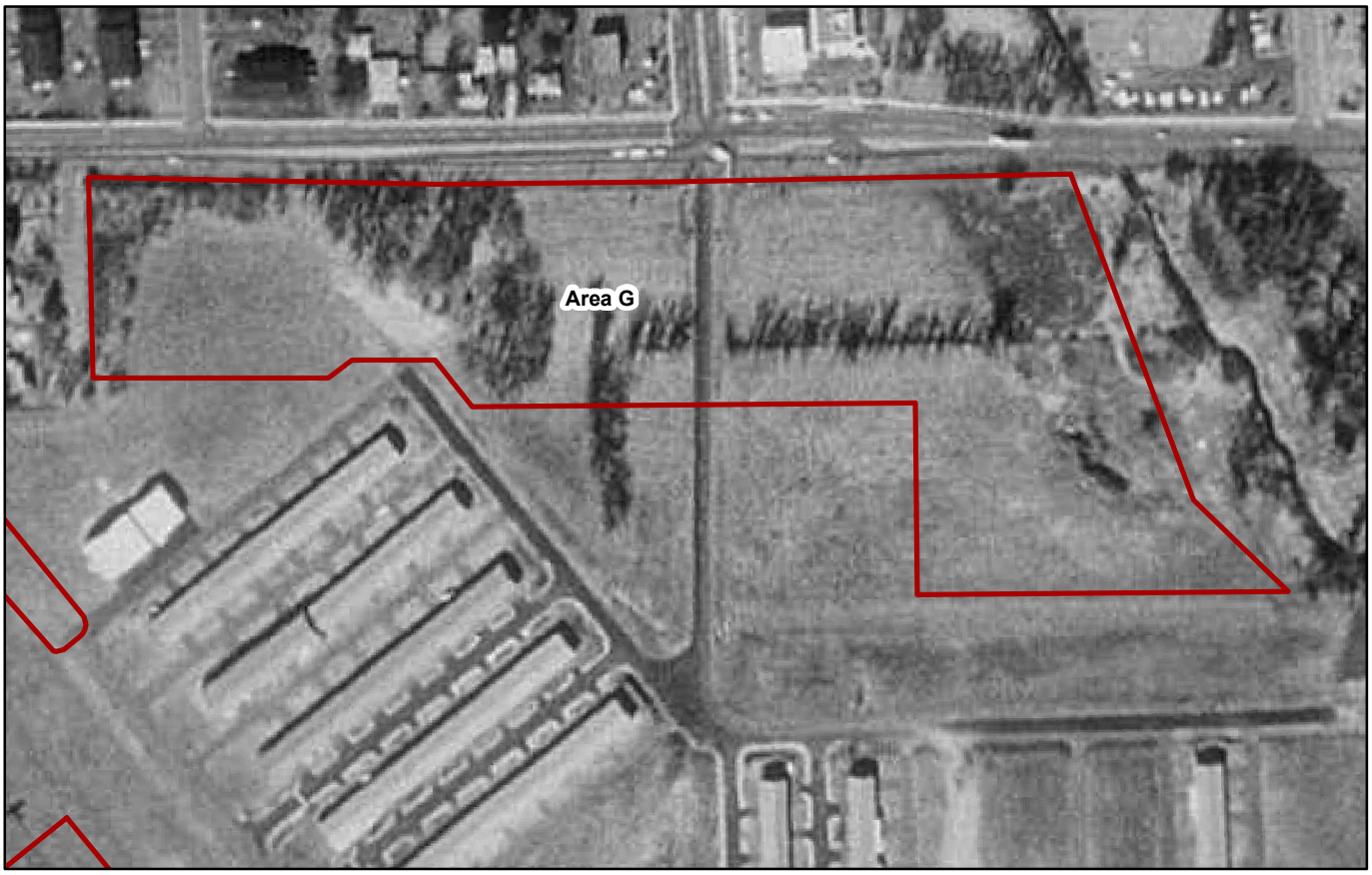
Image Date: Spring 1997
Image Source: Hennepin County, bw 7-county (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-58 **1997**



Historic Aerial Imagery

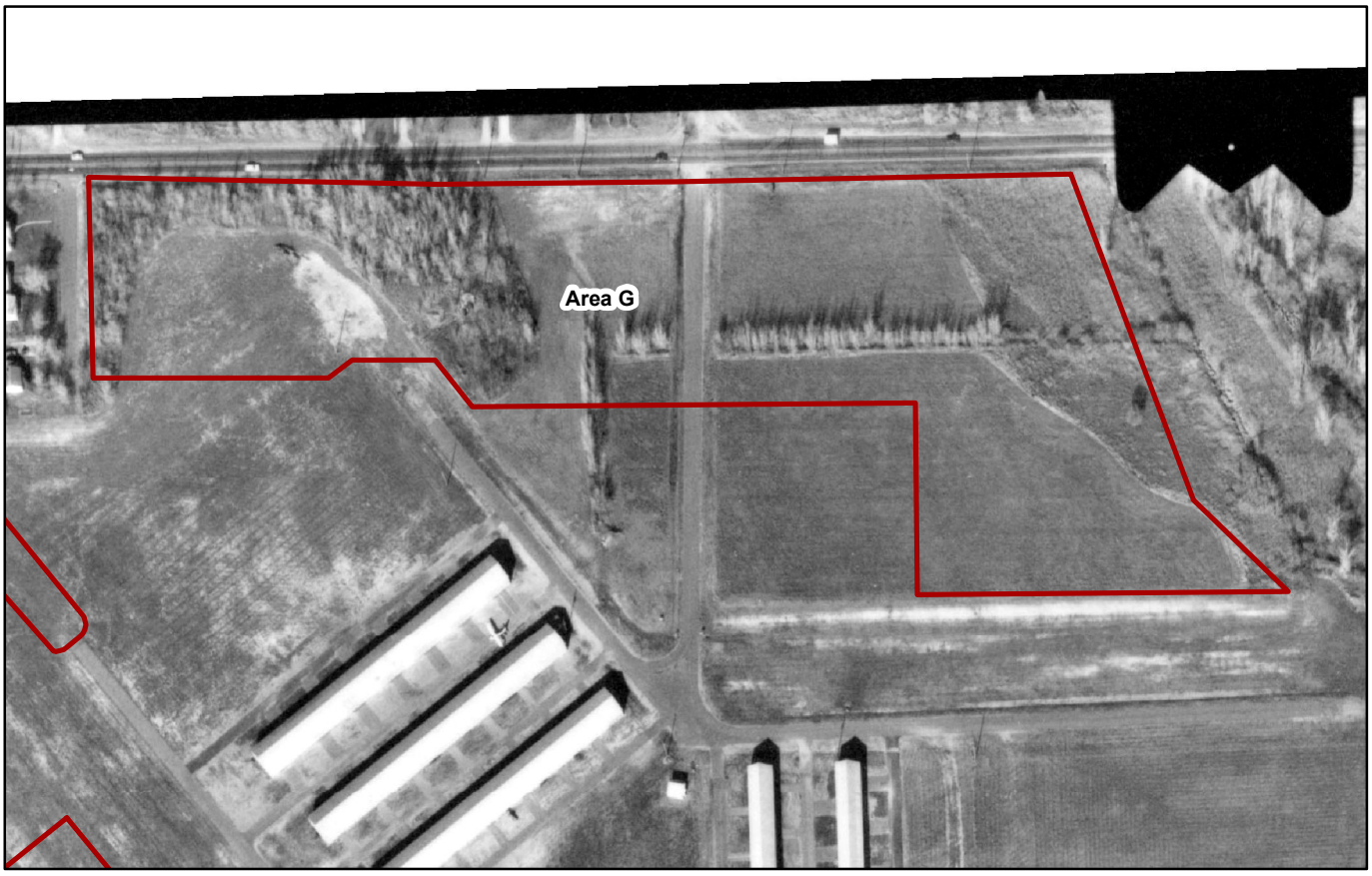
Image Date: Spring 1991
Image Source: Hennepin County, bw USGS (MNGeo WMS service)

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-59 **1991**



Historic Aerial Imagery

Image Date: November 1971
Image Source: University of Minnesota, Online Historic Aerial Photos

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-60 **1971**

Historic Aerial Imagery

Image Date: November 1967
Image Source: University of Minnesota, Online Historic Aerial Photos

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-61 **1967**

Historic Aerial Imagery

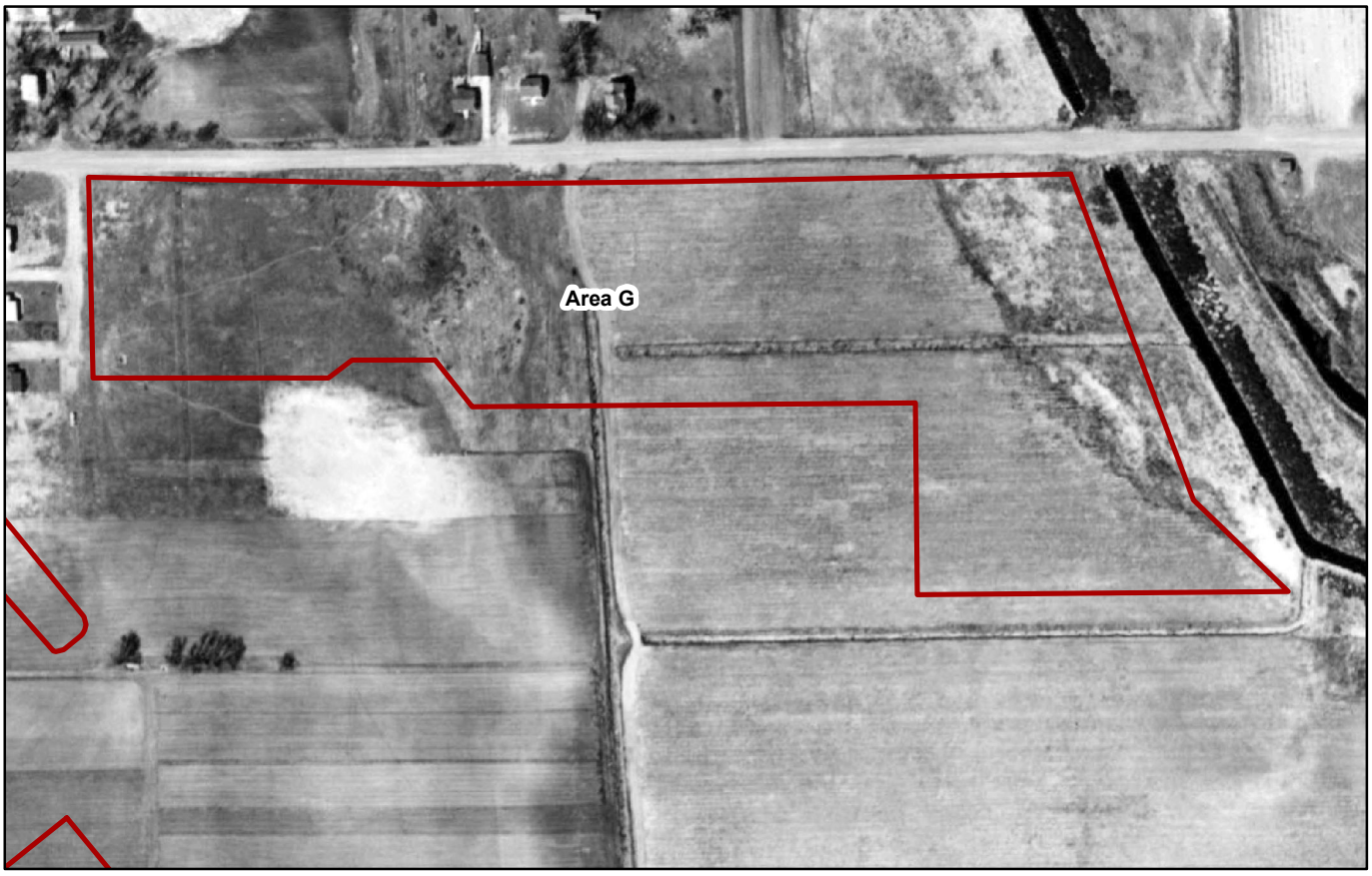
Image Date: April 1962
Image Source: University of Minnesota, Online Historic Aerial Photos

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-62 **1962**



Historic Aerial Imagery

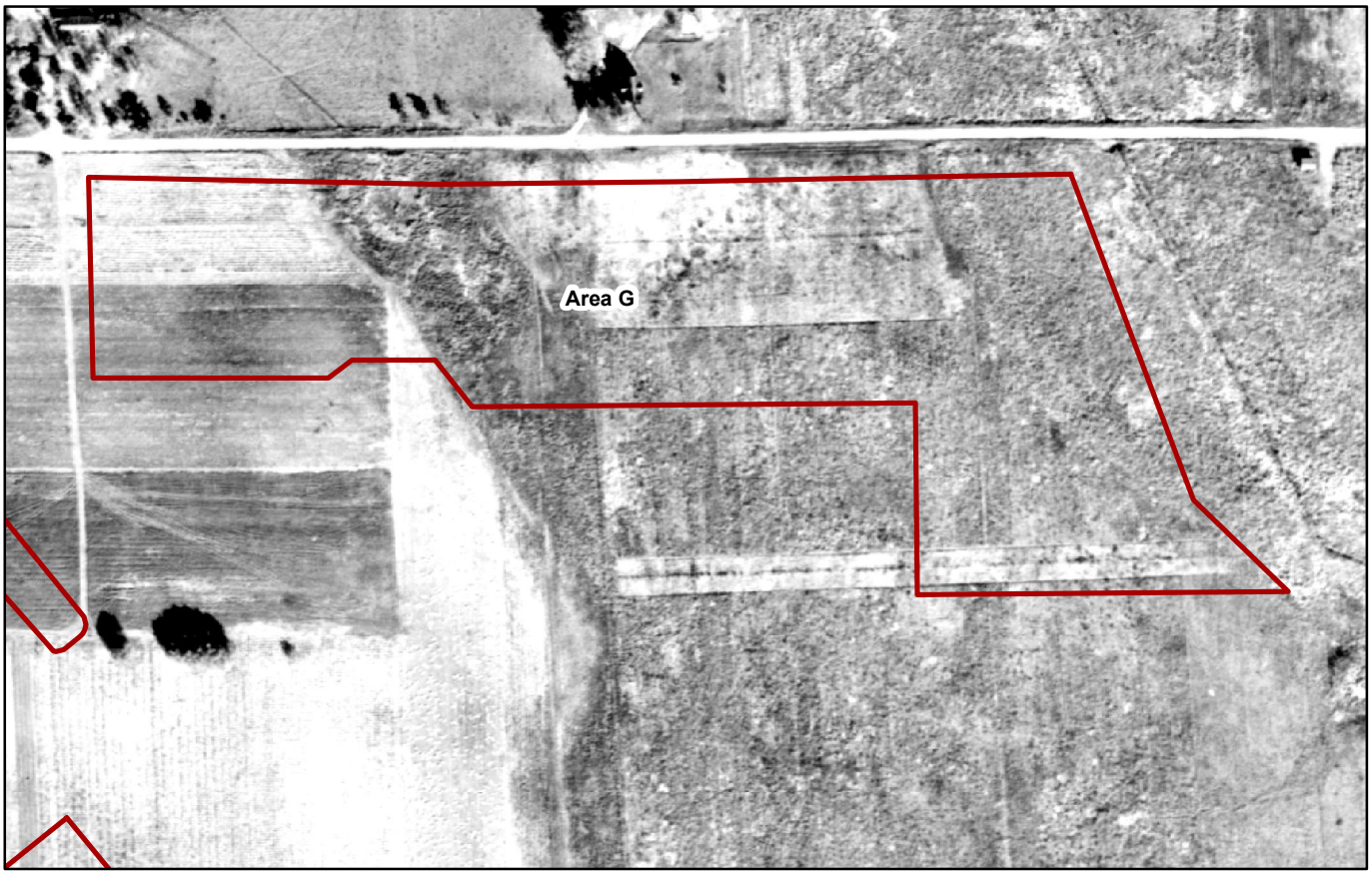
Image Date: May 1956
Image Source: University of Minnesota, Online Historic Aerial Photos

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-63 **1956**



Historic Aerial Imagery

Image Date: 1945 (Photo Date Unknown)
Image Source: University of Minnesota,
Online Historic Aerial Photos

CRYSTAL AIRPORT
Proposed Airfield Improvements

0 55 110 220 330 440 Feet

N

J-64 **1945**

Appendix D. WETS Analysis and Climatic Data

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Hennepin**
township name: **Brooklyn Center**
nearest community: **Brooklyn Center**
township number: **118N**
range number: **21W**
section number: **4**

Aerial photograph or site visit date:
Tuesday, September 25, 2018

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **August 2018**	second prior month: **July 2018**	third prior month: **June 2018**
estimated precipitation total for this location:	**3.64R**	**3.44R**	**4.23**
there is a 30% chance this location will have less than:	3.44	2.84	3.54
there is a 30% chance this location will have more than:	5.17	4.82	5.78
type of month: dry normal wet	**normal**	**normal**	**normal**
monthly score	**3 * 2 = 6**	**2 * 2 = 4**	**1 * 2 = 2**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**12 (Normal)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Minnesota State Climatology Office

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Hennepin** township number: **118N**
township name: **Brooklyn Center** range number: **21W**
nearest community: **Brooklyn Center** section number: **4**

Aerial photograph or site visit date:
Monday, June 4, 2018

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **May 2018**	second prior month: **April 2018**	third prior month: **March 2018**
estimated precipitation total for this location:	**2.49R**	**2.90R**	**1.31**
there is a 30% chance this location will have less than:	2.89	2.21	1.38
there is a 30% chance this location will have more than:	4.88	3.29	2.04
type of month: dry normal wet	**dry**	**normal**	**dry**
monthly score	**3 * 1 = 3**	**2 * 2 = 4**	**1 * 1 = 1**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**8 (Dry)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Climatological Data for BROOKLYN CENTER 1.1 E, MN (CoCoRaHS) - September 2018

Date	Max Temperature	Min Temperature	Avg Temperature	GDD Base 40	GDD Base 50	Precipitation	Snowfall	Snow Depth
2018-09-01	M	M	M	M	M	0.00	0.0	M
2018-09-02	M	M	M	M	M	0.00	M	M
2018-09-03	M	M	M	M	M	0.12	M	M
2018-09-04	M	M	M	M	M	0.02	M	M
2018-09-05	M	M	M	M	M	0.84	M	M
2018-09-06	M	M	M	M	M	0.00	0.0	M
2018-09-07	M	M	M	M	M	0.00	0.0	M
2018-09-08	M	M	M	M	M	0.00	0.0	M
2018-09-09	M	M	M	M	M	0.00	0.0	M
2018-09-10	M	M	M	M	M	0.00	0.0	M
2018-09-11	M	M	M	M	M	0.00	0.0	M
2018-09-12	M	M	M	M	M	0.00	0.0	M
2018-09-13	M	M	M	M	M	0.00	0.0	M
2018-09-14	M	M	M	M	M	0.00	0.0	M
2018-09-15	M	M	M	M	M	0.00	0.0	M
2018-09-16	M	M	M	M	M	0.00	0.0	M
2018-09-17	M	M	M	M	M	0.00	0.0	M
2018-09-18	M	M	M	M	M	0.47	M	M
2018-09-19	M	M	M	M	M	0.02	M	M
2018-09-20	M	M	M	M	M	0.15	M	M
2018-09-21	M	M	M	M	M	4.47	M	M
2018-09-22	M	M	M	M	M	0.00	M	M
2018-09-23	M	M	M	M	M	0.00	0.0	M
2018-09-24	M	M	M	M	M	0.00	0.0	M
2018-09-25	M	M	M	M	M	0.29	M	M
2018-09-26	M	M	M	M	M	0.07	M	M
2018-09-27	M	M	M	M	M	0.00	0.0	M
2018-09-28	M	M	M	M	M	0.00	0.0	M
2018-09-29	M	M	M	M	M	0.00	0.0	M
2018-09-30	M	M	M	M	M	0.00	0.0	M
Average|Sum	M	M	M	M	M	6.45	0.0	M

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

Wetland Delineation Precipitation Data Retrieval from a Gridded Database

Obtaining a long-term precipitation data time-series for wetland delineation efforts can be a difficult and time-consuming process. Locating the nearest precipitation monitoring station to the wetland often proves challenging. Once a nearby monitoring location is identified, retrieving the data, accounting for gaps in the record, and generating the summary statistics can provide further challenges.

By offering access to "synthetic" data, this application assists users in overcoming some the challenges inherent in assembling a precipitation data set. The synthetic data are made up of regularly-spaced grid nodes whose values were calculated using data interpolated from Minnesota's outstanding, but spatially and temporally irregular, precipitation data base.

Click to learn more about **Precipitation Grids**.

select a wetland location

Precipitation data for target wetland location:

county: **Hennepin**

township name: **Brooklyn Center**

nearest community: **Brooklyn Center**

township number: **118N**

range number: **21W**

section number: **4**

To create a **precipitation documentation worksheet** using the three-prior-month (NRCS) method, select the date of the site visit or aerial photograph and click on "create worksheet".

2018 September 25 **create worksheet**

precipitation totals are in inches

color key:
total is in lowest 30th percentile of the period-of-record distribution
total is => 30th and <= 70th percentile
total is in highest 30th percentile of the period-of-record distribution

multi-month totals:
WARM = warm season (May thru September)
ANN = calendar year (January thru December)
WAT = water year (Oct. previous year thru Sep. present year)

A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.

J-69

Period-of-Record Summary Statistics															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
30%	0.52	0.50	1.07	1.66	2.57	3.22	2.45	2.83	1.92	1.23	0.73	0.60	16.26	26.24	26.15
70%	1.08	1.21	2.03	2.78	4.61	5.49	4.39	4.39	3.87	2.77	1.91	1.32	21.46	32.91	31.91
mean	0.89	0.90	1.63	2.46	3.74	4.48	3.87	3.71	3.11	2.25	1.52	1.03	18.93	29.60	29.64
1981-2010 Summary Statistics															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
30%	0.53	0.42	1.38	2.20	2.89	3.54	2.84	3.44	2.32	1.42	1.00	0.66	18.71	30.80	29.55
70%	1.18	0.97	2.04	3.28	4.89	5.78	4.82	5.17	3.88	3.49	2.17	1.38	22.71	34.66	35.94
mean	0.86	0.79	1.88	2.95	3.92	4.73	4.32	4.27	3.54	2.59	1.76	1.20	20.78	32.81	32.62
Year-to-Year Data															
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
2018	1.07	1.40	1.32	2.43	2.49	4.23	3.44R	3.64R							
2017	0.74	0.70	0.60	3.28	6.20	3.70	2.94	7.07	1.88	4.91	0.49	0.70	21.79	33.21	34.32
2016	0.31	0.74	1.57	3.57	2.57	2.64	7.24	8.62	7.46	3.07	2.48	1.66	28.53	41.93	43.39
2015	0.32	0.25	0.61	2.01	4.63	3.42	6.65	3.59	3.95	2.90	4.07	1.70	22.24	34.10	29.00
2014	1.11	1.32	0.82	7.26	4.30	9.76	3.42	3.17	1.48	1.20	1.30	1.07	22.13	36.21	39.23
2013	0.67	1.21	2.13	4.55	4.68	7.75	3.68	1.02	1.29	4.36	0.61	1.62	18.42	33.57	31.03
2012	0.53	1.93	1.27	2.83	9.97	4.29	4.32	1.15	0.56	1.49	0.88	1.68	20.29	30.90	28.67
2011	0.89	0.82	2.19	3.18	6.51	3.80	9.11	4.71	0.50	0.85	0.15	0.82	24.63	33.53	38.96
2010	0.56	0.80	0.88	1.94	2.96	6.17	3.30	5.67	5.41	1.84	2.30	3.11	23.51	34.94	36.41
2009	0.46	0.96	1.76	1.58	0.49	4.01	1.26	6.24	0.64	5.92	0.53	2.27	12.64	26.12	21.69
2008	0.13	0.50	2.03	3.81	2.64	4.73	2.27	2.35	2.26	1.72	1.11	1.46	14.25	25.01	28.12
2007	0.59	1.38	3.45	2.47	3.49	2.04	1.89	5.17	5.28	5.52	0.03	1.85	17.87	33.16	30.01
2006	0.52	0.44	1.93	4.14	5.62	4.38	1.19	4.36	3.86	0.68	1.04	2.53	19.41	30.69	33.99
2005	1.24	1.06	1.34	2.41	3.76	6.17	2.24	4.15	8.53	4.28	1.90	1.37	24.85	38.45	35.79
2004	0.55	1.51	2.01	2.60	6.02	5.21	3.48	1.87	5.20	3.38	1.01	0.50	21.78	33.34	31.55
2003	0.24	0.98	1.63	3.12	5.83	8.33	1.80	0.44	2.59	1.04	1.08	0.98	18.99	28.06	29.26
2002	0.56	0.55	1.98	4.32	5.28	9.17	8.83	6.05	3.94	3.99	0.08	0.23	33.27	44.98	45.51
2001	1.28	1.61	0.97	7.72	5.04	4.47	2.71	4.19	3.76	0.97	3.26	0.60	20.17	36.58	37.94
2000	0.97	1.21	1.00	1.61	3.18	3.81	6.44	4.00	2.43	0.99	3.93	1.27	19.86	30.84	26.46
1999	1.32	0.37	1.72	3.41	5.99	5.62	5.21	4.35	2.10	0.68	0.75	0.38	23.27	31.90	35.70
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1998	1.28	0.89	4.00	2.27	4.24	4.35	2.90	5.18	1.50	3.00	1.90	0.71	18.17	32.22	29.72
1997	1.82	0.25	1.29	1.10	1.90	2.49	10.01	4.12	2.63	2.08	0.78	0.25	21.15	28.72	36.28
1996	2.18	0.34	1.71	0.84	4.62	4.02	1.81	1.43	1.82	4.11	4.84	1.72	13.70	29.44	26.18

1995	0.60	0.34	2.19	2.59	4.02	7.08	4.10	8.22	2.34	5.08	1.09	1.24	25.76	38.89	37.93
1994	1.26	0.82	0.46	7.59	2.09	2.87	4.12	3.31	3.13	4.26	1.59	0.60	15.52	32.10	29.67
1993	1.42	0.39	1.32	2.85	5.70	7.14	5.89	7.42	2.91	1.47	1.88	0.67	29.06	39.06	41.30
1992	0.96	0.44	1.45	2.42	1.36	3.63	6.10	3.42	5.22	2.54	2.46	1.26	19.73	31.26	31.76
1991	0.54	1.25	2.59	4.32	9.26	3.09	6.58	5.40	8.33	1.46	4.39	0.91	32.66	48.12	45.05
1990	0.10	0.74	4.25	3.23	4.14	8.29	7.22	3.27	1.92	2.08	0.67	0.94	24.84	36.85	34.93
1989	0.45	0.71	1.82	2.41	4.11	3.18	3.78	2.75	1.33	0.47	0.98	0.32	15.15	22.31	24.74
1988	1.16	0.18	1.48	1.11	2.15	0.26	1.42	5.51	2.91	0.83	2.73	0.64	12.25	20.38	20.03
1987	0.46	0.02	0.52	0.16	2.55	1.85	12.66	3.22	1.44	0.86	2.12	0.87	21.72	26.73	25.08
1986	0.82	0.91	2.07	5.74	3.34	4.66	3.72	3.69	7.13	1.32	0.66	0.22	22.54	34.28	38.31
1985	0.62	0.27	3.13	2.56	5.08	3.34	3.19	5.37	6.14	3.63	1.46	1.14	23.12	35.93	36.58
1984	0.69	1.46	1.11	2.74	2.71	7.91	3.17	4.13	3.74	4.49	0.33	2.06	21.66	34.54	35.52
1983	0.44	0.77	2.74	2.04	3.39	5.08	4.66	4.31	2.62	2.79	3.68	1.39	20.06	33.91	35.59
1982	2.27	0.23	2.21	2.05	4.82	2.28	3.36	3.45	3.60	3.43	2.89	3.22	17.51	33.81	29.73
1981	0.22	2.23	1.40	3.45	1.80	6.20	4.33	5.04	1.57	2.80	1.45	1.21	18.94	31.70	27.85
1980	1.14	0.94	1.16	0.95	1.52	5.08	3.71	5.78	4.00	1.08	0.29	0.24	20.09	25.89	28.64
1979	1.30	1.55	2.37	0.58	4.39	5.68	2.18	5.52	2.21	2.83	1.33	0.20	19.98	30.14	28.96
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1978	0.31	0.17	0.85	4.36	3.71	7.65	8.73	3.43	2.99	0.56	1.69	0.93	26.51	35.38	39.06
1977	0.79	1.29	4.30	2.19	2.69	4.78	3.94	5.23	3.89	4.02	1.48	1.36	20.53	35.96	30.14
1976	1.23	0.63	2.35	0.81	1.09	2.76	2.40	1.47	1.27	0.50	0.14	0.40	8.99	15.05	20.56
1975	3.85	0.76	2.03	6.13	5.66	7.90	3.18	6.33	1.59	0.65	5.14	0.76	24.66	43.98	41.07
1974	0.25	1.47	0.86	2.65	3.05	6.41	1.69	3.31	1.03	1.88	1.29	0.47	15.49	24.36	25.53
1973	1.37	1.22	1.40	1.42	4.57	1.64	3.14	4.22	3.15	1.04	2.34	1.43	16.72	26.94	27.03
1972	0.89	0.38	1.10	1.12	2.32	3.21	6.10	4.26	2.84	2.09	1.12	1.69	18.73	27.12	31.69
1971	0.98	1.68	1.06	1.32	3.66	4.31	3.27	2.50	3.30	6.16	2.71	0.60	17.04	31.55	31.82
1970	0.67	0.17	1.65	3.63	5.39	2.41	4.73	2.86	3.10	5.46	3.86	0.42	18.49	34.35	30.46
1969	2.17	0.50	0.83	1.97	2.40	3.21	4.39	0.59	0.31	2.49	0.87	2.49	10.90	22.22	25.54
1968	0.69	0.16	1.81	3.39	3.96	7.36	4.59	1.21	4.89	6.47	0.67	2.03	22.01	37.23	30.14
1967	3.10	1.44	0.82	2.66	1.67	7.43	1.99	3.67	0.78	1.49	0.09	0.50	15.54	25.64	28.10
1966	0.85	1.61	2.39	1.17	1.66	3.49	2.39	4.42	2.43	3.15	0.46	0.93	14.39	24.95	25.94
1965	0.33	1.48	3.68	3.84	6.05	4.51	5.06	3.46	5.42	1.52	2.18	1.83	24.50	39.36	36.74
1964	0.39	0.07	0.95	2.94	3.57	2.87	2.30	5.88	4.33	0.54	1.33	1.04	18.95	26.21	25.30
1963	0.40	0.34	1.17	2.15	4.70	3.62	2.12	1.87	3.20	0.63	0.64	0.73	15.51	21.57	21.93
1962	0.57	1.74	1.74	1.38	6.98	2.86	5.85	3.99	3.16	1.60	0.54	0.22	22.84	30.63	34.44
1961	0.18	0.63	2.04	2.58	4.73	1.83	3.74	1.78	3.55	2.68	2.15	1.34	15.63	27.23	23.01

1960	0.66	0.17	0.69	2.41	4.53	3.33	2.05	5.56	3.58	0.37	1.06	0.52	19.05	24.93	27.42
1959	0.04	0.37	0.34	0.49	6.40	2.14	3.27	5.87	3.34	2.55	0.53	1.36	21.02	26.70	25.04
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1958	0.27	0.11	0.35	2.14	1.87	2.54	2.99	4.54	1.50	1.78	0.87	0.13	13.44	19.09	19.43
1957	0.32	0.77	1.47	1.41	3.92	7.37	4.43	5.70	3.03	1.36	1.52	0.24	24.45	31.54	32.23
1956	0.62	0.16	1.40	0.71	2.86	7.00	5.34	5.53	0.80	2.13	1.53	0.15	21.53	28.23	28.09
1955	0.51	1.44	0.62	0.96	0.88	2.51	7.45	3.88	1.54	1.58	0.93	1.16	16.26	23.46	22.47
1954	0.26	0.43	1.72	4.66	3.11	4.82	2.57	3.07	3.68	1.79	0.54	0.35	17.25	27.00	28.13
1953	0.81	1.24	1.51	2.66	3.66	6.83	5.40	3.59	0.85	0.23	1.97	1.61	20.33	30.36	28.02
1952	1.08	1.18	2.63	0.70	3.28	4.86	4.76	4.93	0.40	0.03	1.07	0.37	18.23	25.29	28.73
1951	0.48	1.64	2.91	2.06	3.94	5.21	7.41	3.67	5.56	1.82	1.68	1.41	25.79	37.79	37.08
1950	1.42	0.61	2.67	2.70	3.96	1.13	3.53	1.50	1.95	1.21	1.16	1.83	12.07	23.67	23.42
1949	2.10	0.27	2.98	1.87	1.27	4.22	5.32	2.03	3.62	2.34	0.57	1.04	16.46	27.63	27.67
1948	0.20	1.86	1.55	2.05	0.74	2.94	2.53	3.71	0.99	0.84	2.37	0.78	10.91	20.56	21.10
1947	0.87	0.21	0.46	2.95	2.70	5.05	1.38	3.53	1.60	0.96	3.04	0.53	14.26	23.28	24.14
1946	0.77	1.31	1.16	0.95	3.25	6.81	2.31	0.71	5.68	2.77	1.86	0.76	18.76	28.34	26.13
1945	0.78	1.93	2.16	3.52	2.56	6.07	3.67	3.21	2.15	0.41	1.24	1.53	17.66	29.23	28.82
1944	0.50	1.30	1.43	2.53	5.67	7.18	4.17	3.53	0.89	0.16	2.35	0.26	21.44	29.97	30.81
1943	1.34	0.63	1.30	1.00	5.31	4.05	3.99	2.26	1.91	1.52	2.09	0.00	17.52	25.40	23.88
1942	0.15	0.44	2.20	3.10	7.56	2.91	3.89	2.82	7.04	0.70	0.38	1.01	24.22	32.20	36.65
1941	0.68	1.18	1.07	2.24	3.95	4.52	2.45	3.79	4.00	4.74	0.86	0.94	18.71	30.42	30.94
1940	0.37	0.93	2.23	1.39	1.97	5.74	1.93	4.29	0.37	1.77	4.16	1.13	14.30	26.28	21.63
1939	1.19	1.18	0.72	2.49	3.62	6.49	3.12	3.47	3.24	1.52	0.02	0.87	19.94	27.93	29.33
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1938	0.85	0.72	2.19	3.43	7.92	3.26	4.05	3.65	3.30	0.83	2.11	0.87	22.18	33.18	32.17
1937	1.23	0.52	0.91	2.53	5.73	2.57	1.06	4.69	1.85	1.66	0.53	0.61	15.90	23.89	24.31
1936	0.92	1.77	2.87	1.79	2.36	1.72	0.11	2.83	1.42	0.52	0.76	1.94	8.44	19.01	21.93
1935	1.56	0.23	1.44	2.42	3.22	5.32	2.98	3.54	1.90	4.28	0.80	1.06	16.96	28.75	30.25
1934	0.85	0.17	0.80	1.22	0.26	2.65	1.34	2.07	5.26	4.28	2.02	1.34	11.58	22.26	17.43
1933	0.75	0.77	1.85	1.46	6.71	1.53	2.12	0.95	3.25	1.44	0.66	0.71	14.56	22.20	24.47
1932	1.66	0.72	1.49	2.27	2.56	2.42	4.25	3.93	0.84	1.11	2.54	1.43	14.00	25.22	26.78
1931	0.17	0.99	1.63	1.03	1.34	4.55	0.88	3.74	2.43	2.13	3.87	0.64	12.94	23.40	21.06
1930	1.06	2.24	0.59	0.58	3.67	5.79	1.80	0.99	4.00	1.47	2.72	0.11	16.25	25.02	23.97
1929	1.61	1.04	1.28	1.87	1.55	3.46	2.87	2.71	4.27	2.33	0.48	0.44	14.86	23.91	24.90
1928	0.33	1.53	0.88	2.54	2.13	3.53	3.92	5.41	2.58	3.27	0.41	0.56	17.57	27.09	29.47
1927	0.51	0.46	2.61	2.79	4.25	5.65	1.97	2.49	4.35	2.21	1.59	2.82	18.71	31.70	30.16

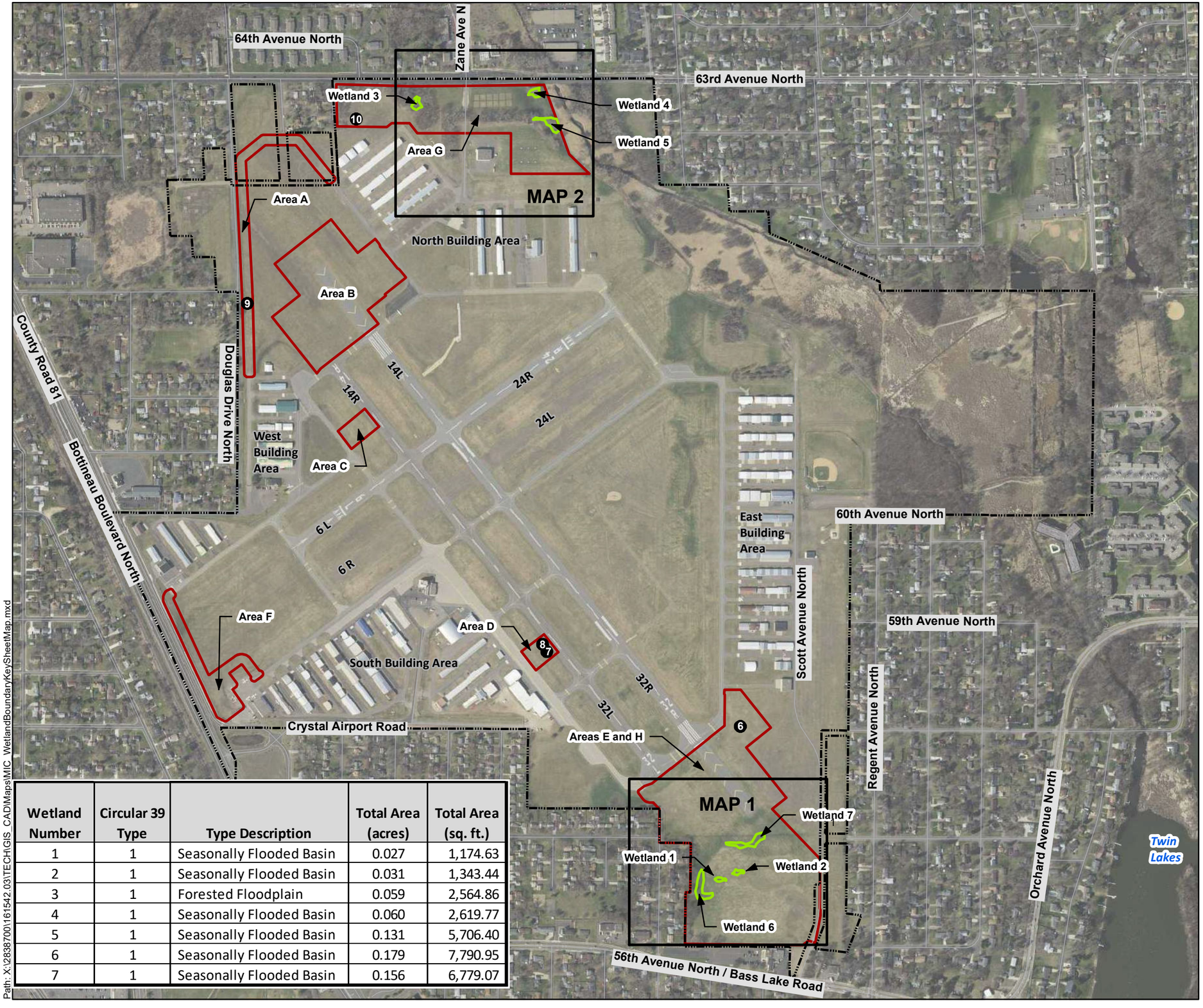
1926	0.91	0.62	1.48	0.53	1.22	3.85	2.91	3.80	5.52	1.75	1.93	1.40	17.30	25.92	22.78
1925	0.53	0.55	0.48	1.22	2.37	4.89	5.47	0.58	3.47	0.62	0.53	0.79	16.78	21.50	22.11
1924	0.47	0.60	1.57	4.32	1.26	6.30	1.69	8.04	3.90	0.93	0.62	1.00	21.19	30.70	29.93
1923	1.15	0.46	1.07	2.44	2.80	5.51	3.19	2.04	1.51	0.93	0.46	0.39	15.05	21.95	25.27
1922	0.83	3.38	1.87	1.41	2.56	5.08	1.67	1.72	2.24	1.24	3.73	0.13	13.27	25.86	23.44
1921	0.43	0.56	2.14	2.15	3.34	4.12	4.12	2.09	4.39	0.60	1.78	0.30	18.06	26.02	28.10
1920	1.84	0.43	2.81	2.27	2.97	7.99	1.40	1.66	3.12	2.77	1.26	0.73	17.14	29.25	30.25
1919	0.47	2.37	0.98	3.54	2.24	5.04	6.34	2.34	1.27	2.11	2.88	0.77	17.23	30.35	33.07
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1918	0.55	0.47	0.88	1.21	4.94	2.61	3.93	3.57	1.18	2.59	3.98	1.91	16.23	27.82	22.08
1917	2.06	0.72	2.96	1.69	3.47	3.71	4.20	2.88	2.05	2.10	0.07	0.57	16.31	26.48	26.70
1916	2.97	0.45	1.42	2.84	7.12	5.81	1.94	2.83	2.65	1.67	0.39	0.90	20.35	30.99	35.02
1915	1.36	2.17	1.14	1.74	4.64	5.26	5.99	3.61	2.83	2.77	3.76	0.46	22.33	35.73	31.27
1914	0.89	0.53	1.19	3.24	1.99	8.96	1.43	7.38	2.98	1.76	0.21	0.56	22.74	31.12	32.30
1913	0.44	0.73	1.35	2.11	3.03	2.35	7.95	1.74	4.04	2.75	0.91	0.05	19.11	27.45	26.61
1912	0.60	0.26	0.33	2.39	5.53	1.16	6.21	5.57	1.65	1.04	0.02	1.81	20.12	26.57	33.02
1911	0.85	0.91	1.01	2.46	4.08	6.37	4.37	3.53	5.28	6.09	1.30	1.93	23.63	38.18	30.70
1910	1.15	0.64	0.08	0.80	1.43	1.57	0.94	1.85	2.25	0.85	0.55	0.44	8.04	12.55	17.77
1909	1.69	2.27	0.33	2.01	3.58	3.31	4.63	2.17	3.60	1.76	2.82	2.48	17.29	30.65	28.27
1908	0.51	1.06	1.76	3.85	7.70	6.67	2.05	0.91	4.47	2.24	1.17	1.27	21.80	33.66	32.01
1907	1.26	0.87	0.81	1.12	2.44	4.43	3.37	5.18	4.66	1.46	0.95	0.62	20.08	27.17	29.86
1906	1.62	0.35	0.99	2.00	9.58	3.28	2.46	4.33	5.06	2.26	2.45	1.01	24.71	35.39	35.52
1905	0.83	0.65	0.82	0.83	4.31	8.18	3.24	4.39	5.83	2.74	2.95	0.16	25.95	34.93	35.73
1904	0.66	0.94	1.50	1.87	3.45	4.03	4.77	5.66	3.32	5.97	0.10	0.58	21.23	32.85	31.52
1903	0.32	0.70	2.07	3.52	4.72	1.17	6.69	4.84	7.37	4.05	0.40	0.87	24.79	36.72	37.72
1902	0.54	0.51	0.38	2.70	3.72	2.54	7.36	4.47	3.96	1.80	1.81	2.71	22.05	32.50	28.52
1901	0.42	0.31	2.20	1.37	1.36	5.67	2.14	2.24	4.37	0.78	0.92	0.64	15.78	22.42	26.74
1900	0.65	0.87	1.73	1.66	0.31	2.01	7.09	6.48	7.90	5.29	0.77	0.60	23.79	35.36	33.98
1899	0.82	1.24	2.74	0.77	3.56	5.07	1.61	3.54	1.62	3.62	0.44	1.22	15.40	26.25	28.37
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
1898	0.06	1.58	2.24	1.26	5.40	2.83	3.05	2.82	1.06	5.75	1.56	0.09	15.16	27.70	23.10
1897	2.07	1.23	3.70	1.32	1.83	7.58	5.31	2.09	2.40	1.71	0.91	0.18	19.21	30.33	36.00
1896	0.86	0.20	3.37	5.45	3.71	3.38	1.17	4.15	2.62	3.95	3.82	0.70	15.03	33.38	26.01
1895	0.96	0.53	0.48	1.78	2.75	3.06	3.70	2.01	4.35	0.06	0.88	0.16	15.87	20.72	25.29
1894	1.29	0.08	2.87	4.55	4.74	1.34	0.33	0.50	1.81	3.81	0.54	1.32	8.72	23.18	23.38
1893	1.25	1.71	2.09	5.03	2.58	1.50	2.21	4.63	2.63	2.19	1.08	2.60	13.55	29.50	25.26

1892	0.06	1.55	1.07	1.28	5.85	7.27	10.04	5.08	1.26	0.31	0.62	0.70	29.50	35.09	38.95
1891	0.87	1.67	1.42	2.32	1.32	3.45	2.88	3.19	1.94	1.54	0.86	3.09	12.78	24.55	

Appendix E. Wetland Boundary Maps

Wetland Boundary Map Sheet Key

CRYSTAL AIRPORT
Proposed Airfield Improvements



Wetland Number	Circular 39 Type	Type Description	Total Area (acres)	Total Area (sq. ft.)
1	1	Seasonally Flooded Basin	0.027	1,174.63
2	1	Seasonally Flooded Basin	0.031	1,343.44
3	1	Forested Floodplain	0.059	2,564.86
4	1	Seasonally Flooded Basin	0.060	2,619.77
5	1	Seasonally Flooded Basin	0.131	5,706.40
6	1	Seasonally Flooded Basin	0.179	7,790.95
7	1	Seasonally Flooded Basin	0.156	6,779.07

Legend

- Photo Location*
- Map Sheet
- Delineated Wetland
- Airport Boundary
- Project Area of Interest

* See Appendix G for Field Photographs

N

0 300 600 1,200 Feet

Project Information

T118N, R21W, S4 and
T119N, R21W, S33
Cities of Brooklyn Park, Brooklyn Center, and Crystal
Hennepin County, MN
Area of Interest = 50.1 acres
Field work conducted:
June 4 -5 and September 24 - 26, 2018

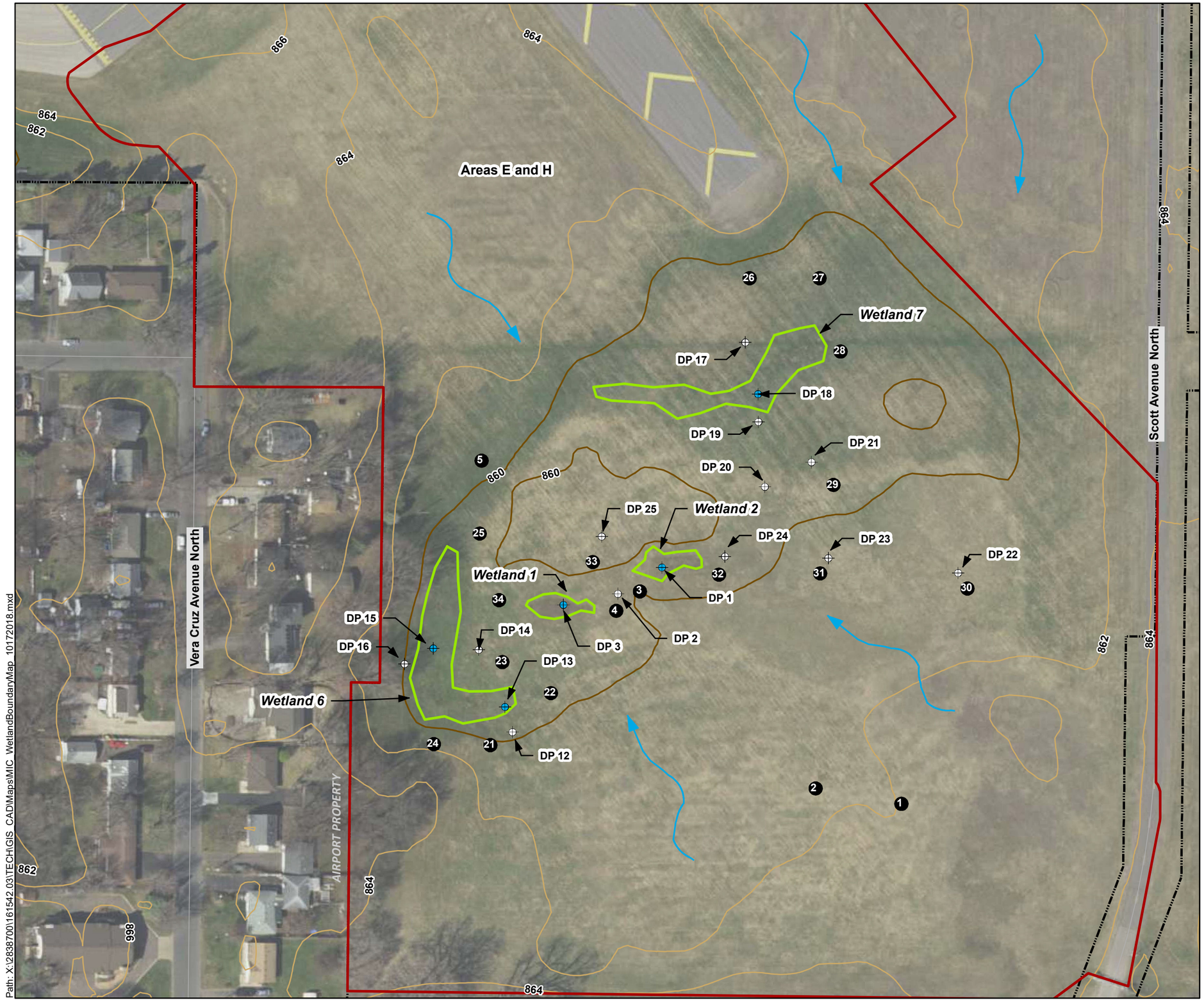
Image Source: MnGEO WMS Image Service, Hennepin County (2016 color 7-county)

Mead & Hunt

Path: X:\2838700\161542.03\TECH\GIS_CAD\Maps\MIC_WetlandBoundaryKeySheetMap.mxd

Wetland Boundary Map

CRYSTAL AIRPORT
Proposed Airfield Improvements



Legend

- Delineated Wetland

SAMPLING POINT TYPE

- Upland Data Point
- Wetland Data Point
- Photo Location *
- Flow Direction
- Ditch/Swale Flow
- Storm Sewer Inlet/Outlet
- Culvert
- Airport Boundary
- Project Area of Interest
- MNPublic Waters Basins

ELEVATION CONTOURS**

- Index
- Intermediate

PUBLIC WATERCOURSES

- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse

* See Appendix G for Field Photographs
** Contour interval is 2 feet

N

0 50 100 200 Feet

Project Information

T118N, R21W, Section 4 and
T119N, R21W, Section 33
Cities of Brooklyn Park, Brooklyn Center, and Crystal
Hennepin County, MN
Area of Interest = 50.1 acres
Field work conducted:
June 4 -5 and September 24 - 26, 2018

MAP 1 of 2

Mn Public Waters Data: Public Waters (PW) Basin and Watercourse Delineations, Hennepin County, MN Geospatial Commons

Contour Source:
Hennepin County GIS Office,
Data derived from Minnesota Department of Natural Resources LiDAR, 2012

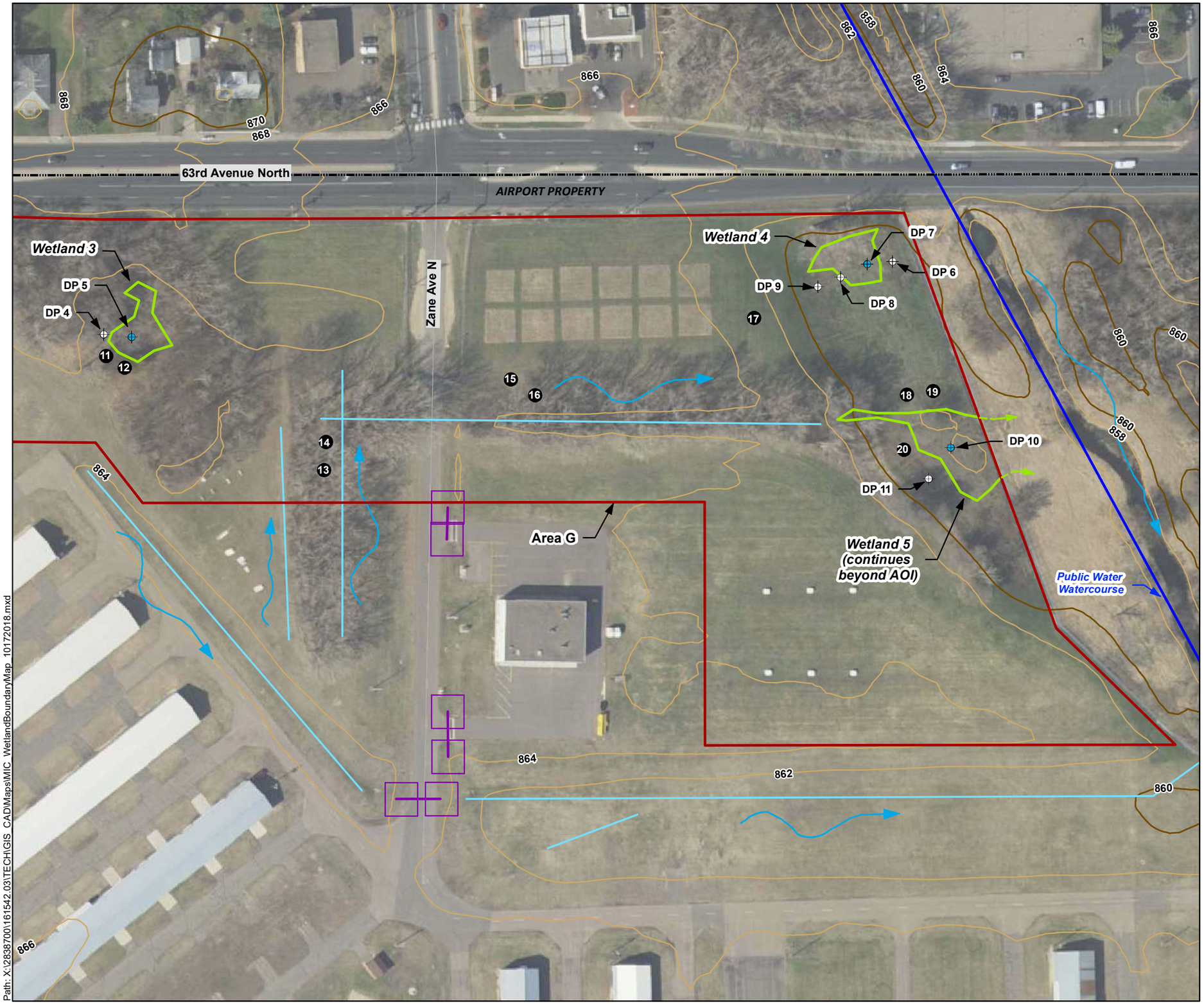
Image Source: MnGEO WMS Image Service, Hennepin County (2016 color 7-county)

Mead & Hunt

Path: X:\283870011\61542.031\TECH\GIS_CAD\Maps\MIC_WetlandBoundaryMap_10172018.mxd

Wetland Boundary Map

CRYSTAL AIRPORT
Proposed Airfield Improvements



Legend

- Delineated Wetland

SAMPLING POINT TYPE

- Upland Data Point
- Wetland Data Point
- Photo Location *
- Flow Direction
- Ditch/Swale Flow
- Storm Sewer Inlet/Outlet
- Culvert
- Airport Boundary
- Project Area of Interest
- MNPublic Waters Basins

ELEVATION CONTOURS**

- Index
- Intermediate

PUBLIC WATERCOURSES

- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse

* See Appendix G for Field Photographs
** Contour interval is 2 feet

N

0 50 100 200 Feet

Project Information

T118N, R21W, Section 4 and
T119N, R21W, Section 33
Cities of Brooklyn Park, Brooklyn Center, and Crystal
Hennepin County, MN
Area of Interest = 50.1 acres
Field work conducted:
June 4 -5 and September 24 - 26, 2018

MAP 2 of 2

Mn Public Waters Data: Public Waters (PW) Basin and Watercourse Delineations, Hennepin County, MN Geospatial Commons

Contour Source:
Hennepin County GIS Office,
Data derived from Minnesota Department of Natural Resources LiDAR, 2012

Image Source: MnGEO WMS Image Service, Hennepin County (2016 color 7-county)

Path: X:\2838700\161542.031\TECH\GIS_CAD\Maps\MIC_WetlandBoundaryMap_10172018.mxd

Mead & Hunt

Appendix F. Data Sheets

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 4, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP1
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S4, T118N, R21W
Landform (hillslope, terrace, etc.): shallow basin Local relief (concave, convex, none): concave Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.05585 Long: -93.348128 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification: PEM1A
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID: 2
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area was mowed recently; soil disturbance due to filling and grading.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	____	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. Eleocharis obtusa	30	X	OBL
2. Persicaria hydropiper	70	X	OBL
3. Alopecurus pratensis	5		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. *Persicaria hydropiper* identified on basis of reference. Very shallow, small basin; area mown recently.

50/20 Thresholds	20%	50%
Tree Stratum	____	____
Sapling/Shrub Stratum	____	____
Herb Stratum	21	52
Woody Vine Stratum	____	____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
☒ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☒ No ☐

SOIL

Sampling Point: DP1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					sand	
4-10	10YR 3/1	90	5YR 4/6	10	C	M	Sand	With some organic detritus
10-16	10YR 2/1	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☒ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicator Sandy Redox (S5) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☒ **No** ☐

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

Previously delineated NWI; saturation present on 2018, 2017, and 2016 aerial images (Google Earth)

Remarks: Wetland hydrology is indicated.

Photo: See **Photo 3**

Photo 3. Wetland 1. Data point 1, view to the northeast.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 4, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP2
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S4, T118N, R21W
Landform (hillslope, terrace, etc.): plain Local relief (concave, convex, none): none Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.055775 Long: -93.348304 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	If yes, optional Wetland Side ID:

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area mown recently; soil disturbance due to filling/grading.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Poa pratensis*	50	X	FACU
2. *Schedonorus arundinaceus*	50	X	FACU
3. *Trifolium repens*	5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Data point 2 is slightly higher than wetland sampling points (DP1 and DP3) on transect.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	21	53
Woody 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: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP2

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					sand	
4-14	10YR 3/1	90					sand	Very mixed; pebbles
	10YR 2/1	8	5YR 4/6	2	C	M	sand	
14-16+	10YR 2/1	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: Dug to refusal; hard, compacted layer

Depth (inches): 16"

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: Hydric soils are not present. Does not meet hydric soils indicators.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?
Yes ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:
Previously mapped NWI wetland area

Remarks: Wetland hydrology is neither present nor indicated.

Photo: See photo below.

Data Points 1 and 2, view to the east.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 4, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP3
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S4, T118N, R21W
Landform (hillslope, terrace, etc.): Basin Local relief (concave, convex, none): concave Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.055744 Long: -93.348522 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification: PEM1A
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID: 1
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area has been mowed recently.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	____	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Persicaria hydropiper*	60	X	OBL
2. *Scirpus atrovirens*	35	X	OBL
3. *Eleocharis obtusa*	7		OBL
4. *Alepocuris pratensis*	2		FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	104	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present; data point within small shallow basin, slightly lower than upland point (DP3) on transect.

50/20 Thresholds	20%	50%
Tree Stratum	____	____
Sapling/Shrub Stratum	____	____
Herb Stratum	21	52
Woody Vine Stratum	____	____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
☒ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☒ No ☐

SOIL

Sampling Point: DP3

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100					sand	
4-12	10YR 2/1	98	5YR 3/4	2	C	M	sand	
12-16	7.5YR 2.5/1	99	G1 6/5G	1	D	M	sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☒ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicator Sandy Redox (S5) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☒ **No** ☐

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

Previously delineated NWI; saturation present on 2018, 2017, and 2016 aerial images (Google Earth)

Remarks: Wetland hydrology is indicated.

Photo: See **Photo 4**

Photo 4. Wetland 2. Data point 3, view to the west.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 5, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP4
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S33, T119N, R21W
Landform (hillslope, terrace, etc.): terrace/plain Local relief (concave, convex, none): none Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.068843 Long: -93.355921 Datum: WGS84
Soil Map Unit Name: Forada sandy loam, 0 to 2 percent slopes (D10A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☒ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☐	No ☒	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer negundo*	30	X	FAC
2. *Ulmus pumila*	20	X	FACU
2. *Ulmus americana*	10		FACW
5.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rhamnus cathartica*	90	X	FAC
2. *Fraxinus pennsylvanica*	10		FACW
3. *Lonicera x bella*	5		FACU
4.			
5.			
	105	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Rhamnus cathartica*	50	X	FAC
2. *Allaria petiolata*	5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. *Parthenocissus quinquefolia*	10	X	FACU
2.			
	10	= Total Cover	

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Fails Prevalence indicator at 3.09. Very little change in elevation between the two data points.

50/20 Thresholds	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	20	50
Herb Stratum	11	27.5
Woody Vine Stratum		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of.	Multiply by:	
OBL species		x 1 =
FACW species	20	x 2 = 40
FAC species	170	x 3 = 510
FACU species	40	x 4 = 160
UPL species		x 5 =
Column Totals:	230 (A)	710 (B)

Prevalence Index = B/A = 3.09

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)

[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP4

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/2	100					Sandy loam	
20-22	10YR 6/3	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: Hydric soils are not present. Does not meet hydric soils criteria.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Remarks: Wetland hydrology is neither present or indicated.

Photo: See **Photo 11**

Photo 11. Wetland 3. Data point 4, view to the north.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 5, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP5
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S33, T119N, R21W
Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.068836 Long: -93.355811 Datum: WGS84
Soil Map Unit Name: Forada sandy loam, 0 to 2 percent slopes (D10A) NWI classification: PFO
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☒ **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 ☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID: 3
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	30	X	FACW
2. *Acer negundo*	10	X	FAC
3.			
4.			
5.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Fraxinus pennsylvanica*	20	X	FACW
2. *Rhamnus cathartica*	10	X	FAC
3. *Prunus serotina*	7		FACU
4. *Ulmus americana*	5		FACW
5.			
	42	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Rubus idaeus*	45	X	FAC
2. *Phalaris arundinacea*	40	X	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft)			
1. *Parthenocissus quinquefolia*	20	X	FACU
2.			
	20	= Total Cover	

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. Also, *Carex* sp. within the wetland, *Vitis riparia*, black ash on boundary of area. Open canopy area within forested area.

50/20 Thresholds	20%	50%
Tree Stratum	8	20
Sapling/Shrub Stratum	8	21
Herb Stratum	11	47.5
Woody Vine Stratum	2	10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)
Total Number of Dominant Species Across All Strata: 7 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 86 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)

[1]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?
Yes ☒ No ☐

SOIL

Sampling Point: DP5

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 2.5/1	100					Sandy loam	
5-9	7.5YR 2.5/1	95	7.5YR 4/4	5	C	M	Sandy loam	
9-11	10YR 2/1	100					Sandy loam	
11-18	10YR 7/2	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicator Redox Dark Surface (F6) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☒ **No** ☐

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

Remarks: Wetland hydrology is indicated.

Photo: See **Photo 12**

Photo 12. Wetland 3. Data point 5, view to the east.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 5, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP 6
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S33, T119N, R21W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.069048 Long: -93.352784 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒
Hydric Soil Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☐	No ☒

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☒
If yes, optional Wetland Side ID:

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area mown regularly; hydrologic alterations to surrounding area including construction of fence with berm on east and road embankment to north.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. *Bromus inermis*	35	X	UPL
2. *Poa pratensis*	30	X	FACU
3. *Stellaria meadia*	15		FACU
4. *Trifolium repens*	10		FACU
5. *Plantago major*	5		FACU
6. *Taraxacum officinale*	5		FACU
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP6

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5/N	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicator Thick Dark Surface (A12) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Remarks: Wetland hydrology is neither present or indicated.

Photo: See **Photo 17**

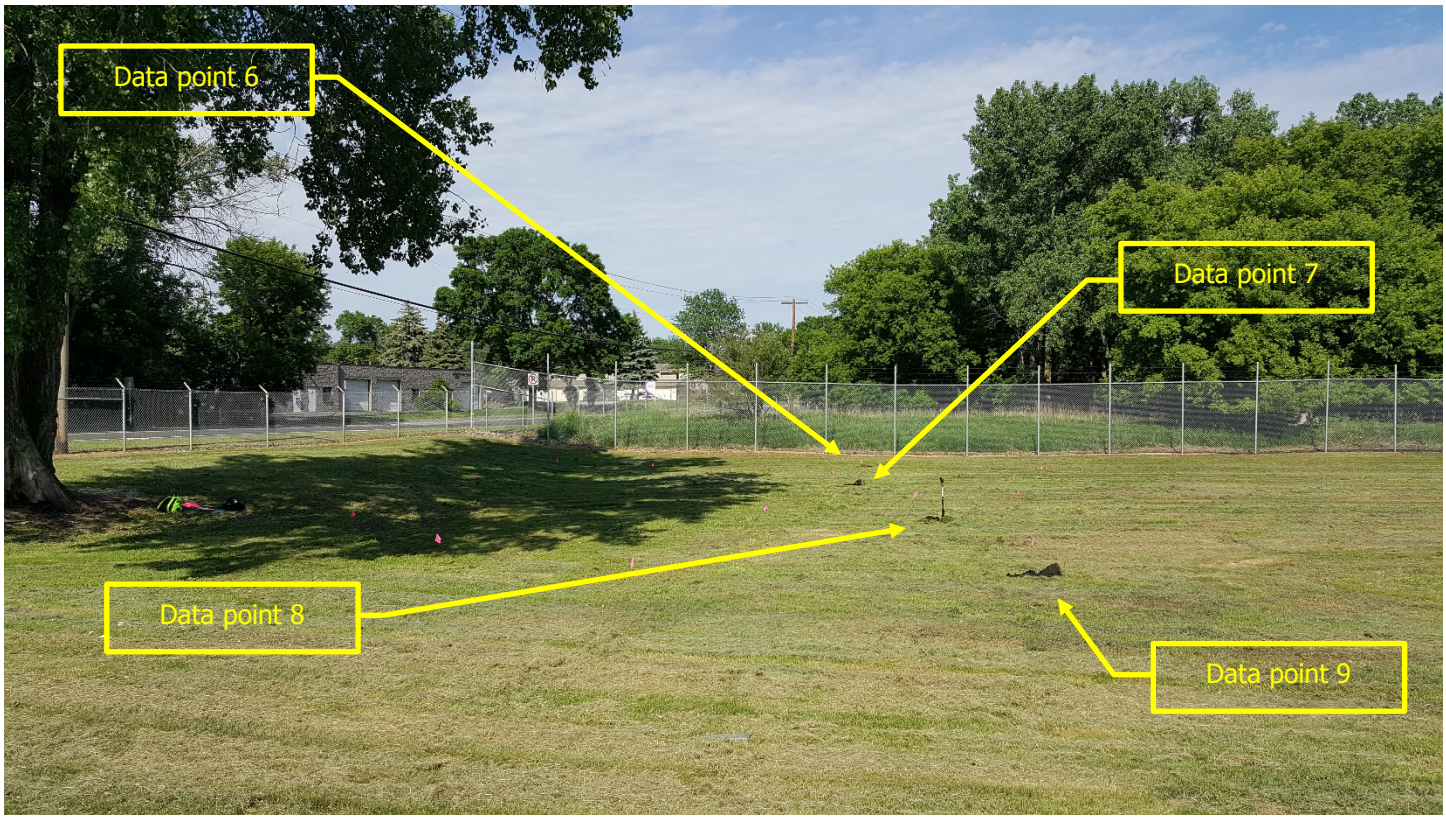


Photo 17. Wetland 4. Data points 6 through 9. View to the east.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 5, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP7
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S33, T119N, R21W
Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.069041 Long: -93.352884 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification: PEM1
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID: 4

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area mown regularly; hydrologic alterations to surrounding area including construction of fence with berm on east and road embankment to north.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	____	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Persicaria hydropiper*	98	X	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	98	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. Few small bare spots present. Slightly lower in elevation than upland sampling point (DP6) on transect.

50/20 Thresholds	20%	50%
Tree Stratum	____	____
Sapling/Shrub Stratum	____	____
Herb Stratum	19.5	49.5
Woody Vine Stratum	____	____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☒ No ☐

SOIL

Sampling Point: DP7

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5/N	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soil indicator Thick Dark Surface (A12) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☒ **No** ☐

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

Saturation present on 2018 aerial image (Google Earth)

Remarks: Wetland hydrology is indicated. Hydrology has been altered due to road construction and fence construction.

Photo: See **Photo 17**

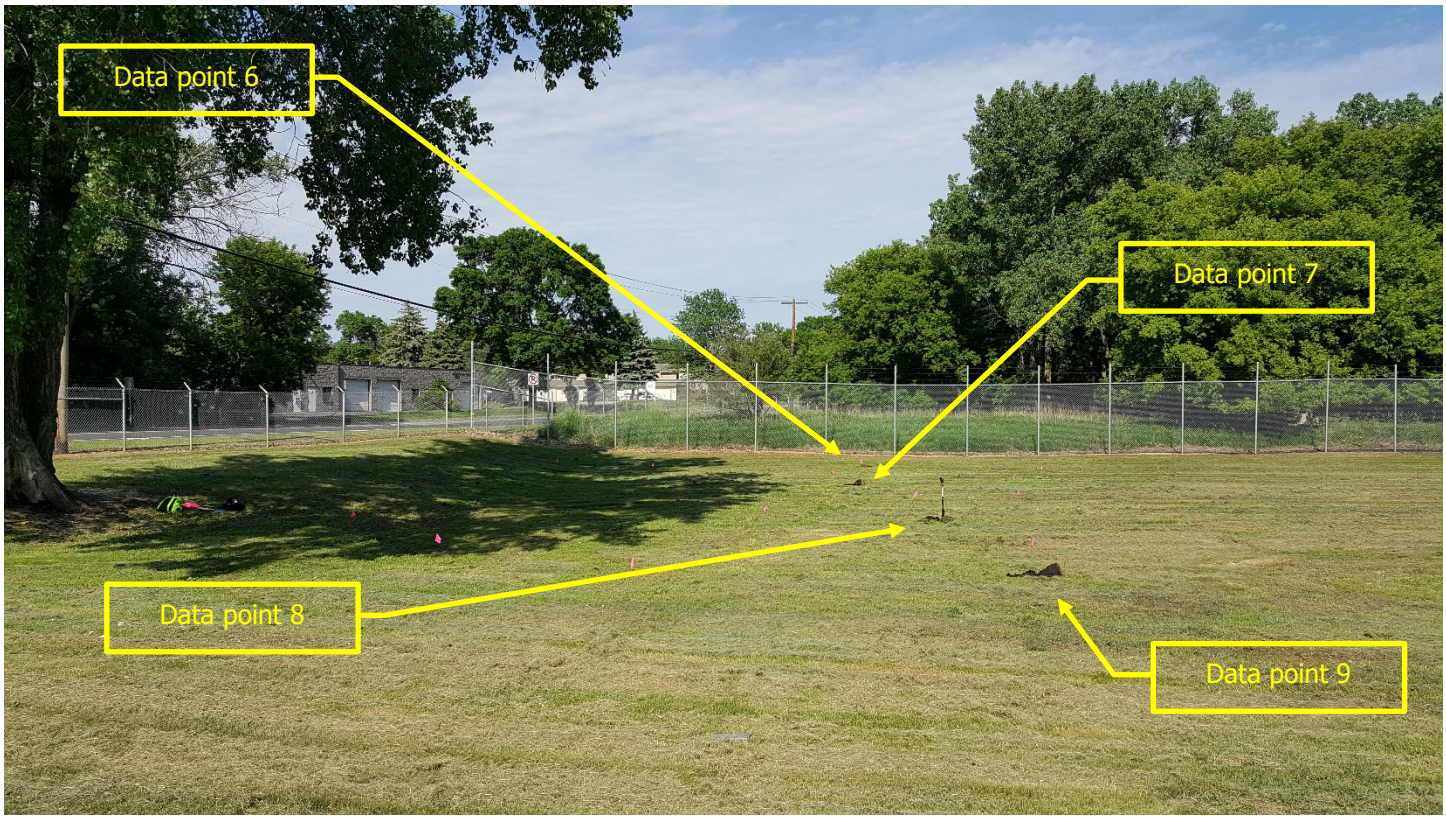


Photo 17. Wetland 4. Data points 6 through 9. View to the east.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 5, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP 8 upland
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S33, T119N, R21W
Landform (hillslope, terrace, etc.): basin edge Local relief (concave, convex, none): none Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.069003 Long: -93.35299 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☒	If yes, optional Wetland Side ID:

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area mown regularly; hydrologic alterations to surrounding area including construction of fence with berm on east and road embankment to north.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Poa pratensis*	40	X	FACU
2. *Bromus inermis*	25	X	FACU
3. *Persicaria hydropiper*	20	X	OBL
4. *Plantago major*	10		FACU
5. *Taraxacum officinale*	5		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Sampling point is slightly higher on slope than wetland sampling point DP7.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody Vine Stratum		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP8

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5/N	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soil is present. Hydric soils indicator Thick Dark Surface (A12) is satisfied. Within mapped hydric soil association.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Saturation visible on 2018 aerial image (Google Earth)

Remarks: Wetland hydrology is neither present nor indicated. Alteration to hydrology due to road construction and fence construction.

Photo: See **Photo 17**

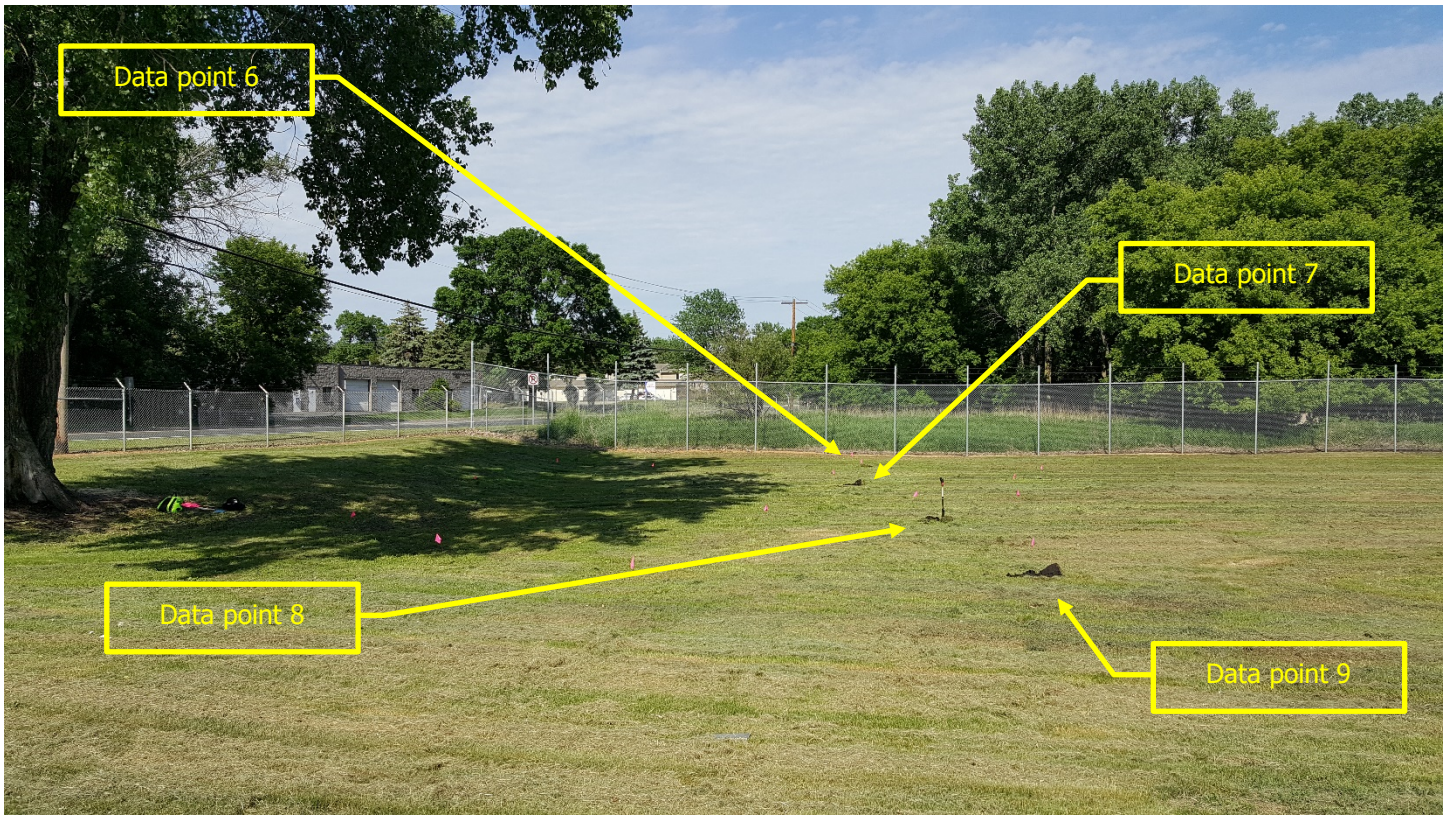


Photo 17. Wetland 4. Data points 6 through 9. View to the east.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 5, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP9
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S33, T119N, R21W
Landform (hillslope, terrace, etc.): footslope Local relief (concave, convex, none): convex Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.068977 Long: -93.353081 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☒	If yes, optional Wetland Side ID:

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area mown regularly; hydrologic alterations to surrounding area including construction of fence with berm on east and road embankment to north.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. *Poa pratensis*	70	X	FACU
2. Persicaria hydropiper	10		OBL
3. Stellaria meadia	7		FACU
4. Plantago major	5		FACU
5. Bromus inermis	5		UPL
6. Taraxacum officinale	3		FACU
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Data point is slightly higher on slope than data points DP8 and DP7 on transect.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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 OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP9

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5/N	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soil indicator Thick Dark Surface (A12) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Remarks: Hydrology is neither present nor indicated. Hydrology has been altered due to road construction and fence construction.

Photo: See **Photo 17**

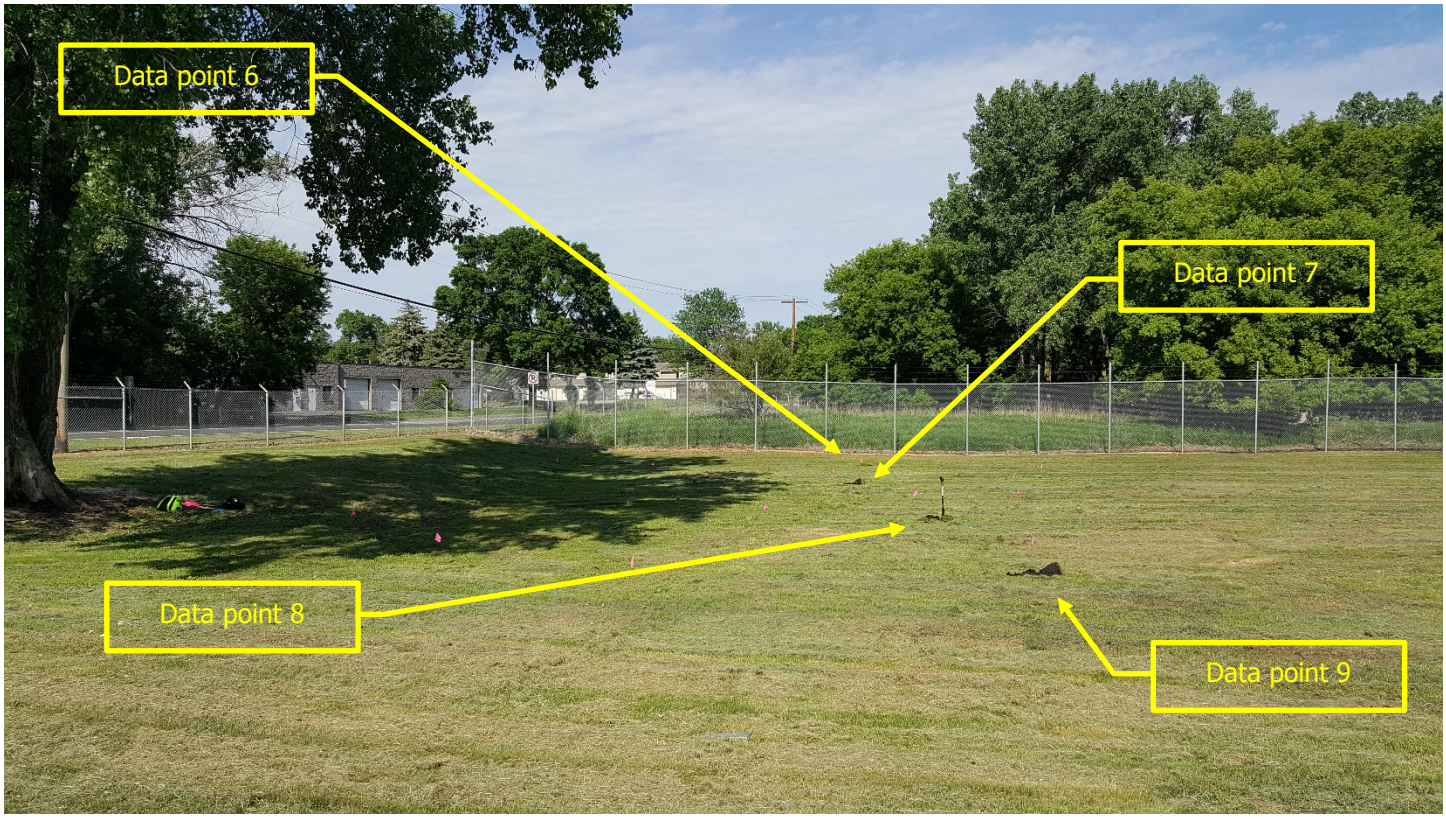


Photo 17. Wetland 4. Data points 6 through 9. View to the east.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 5, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP10
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S33, T119N, R21W
Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.068523 Long: -93.352553 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification: PEM
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID: 5

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area mown regularly; hydrologic alterations to surrounding area including construction of fence with berm on east and road embankment to north.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	____	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Persicaria hydropiper*	90	X	OBL
2. *Eleocharis obtusa*	3		OBL
3. *Phalaris arundinacea*	3		FACW
4. *Bromus inermis*	4		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Also, *Carex* sp. present within wetland. Data point is 1-2 feet lower than paired upland sampling point DP11.

50/20 Thresholds	20%	50%
Tree Stratum	____	____
Sapling/Shrub Stratum	____	____
Herb Stratum	20	50
Woody Vine Stratum	____	____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☒ No ☐

SOIL

Sampling Point: DP10

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5/N	100					Loam	
12-20	2.5/N	100					Loam	With undecomposed organic matter

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present; hydric soil indicator Thick Dark Surface (A12) is satisfied. Data point within mapped hydric soil.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☒ **No** ☐

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

Saturation present on 2018 and 2017 aerial images (Google Earth)

Remarks: Wetland hydrology is indicated. Hydrology has been altered due to road construction and fence construction.

Photo: See **Photo 18** for data points; **Photos 19 and 20** for general site

Photo 18. Wetland 5. Data points 10 and 11, view to the south.

Photo 19. Wetland 5. General, view to the south.

Photo 20. Wetland 5. General, view to the north.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Airfield Improvements City/County: Hennepin Sampling Date: June 5, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP11
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc. Section, Township, Range: S33, T119N, R21W
Landform (hillslope, terrace, etc.): midslope Local relief (concave, convex, none): none Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.068436 Long: -93.35264 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☒	If yes, optional Wetland Side ID:

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were drier than normal at the time of investigation. Area mown regularly; hydrologic alterations to surrounding area including construction of fence with berm on east and road embankment to north.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Poa pratensis*	95	X	FACU
2. *Persicaria hydropiper*	5		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Data point is 1-2 feet higher in elevation than paired wetland sampling point (DP10).

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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 OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:
Total % Cover of. Multiply by:
OBL species x 1 =
FACW species x 2 =
FAC species x 3 =
FACU species x 4 =
UPL species x 5 =
Column Totals: (A) (B)
Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP11

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5/N	100					loam	
12-20	2.5/N	100					loam	With undecomposed organic matter

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soil is present. Hydric soil indicator Thick Dark Surface (A12) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Remarks: Wetland hydrology is neither present nor indicated. Data point is 1-2 feet higher in elevation than paired wetland sampling point (DP10).

Photo: See **Photo 18** for data points; **Photos 19 and 20** for general site

Photo 18. Wetland 5. Data points 10 and 11, view to the south.

Photo 19. Wetland 5. General, view to the south.

Photo 20. Wetland 5. General, view to the north.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP12
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): footslope Local relief (concave, convex, none): convex Slope (%): >3%
Subregion (LRR or MLRA): K/155 Lat: 45.055385 Long: -93.348725 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☐	No ☒	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Area mown regularly; soil disturbance from fill/dumping of trash/debris

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	50	X	FACU
2. Digitaria ischaemum	30	X	FACU
3. Elymus repens	20	X	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. About 6 inches above paired wetland point (DP 13) with about 25 feet separation of the two points.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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: 3 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP12

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					Sandy loam	
8-16	10YR 4/3	100					Sand	Mixed, trash, glass, etc.
16-20	5YR 3/2	100					sand	
20-24	10YR 2/1	100					Silt	Original hydric layer

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: Hydric soils are not present. Does not meet hydric soils criteria. Very mixed soils in upper layers due to filling/dumping of materials.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Remarks: Wetland hydrology is neither present nor indicated. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night.

Photo: See **Photos 21 and 22** for data points; **Photos 24 and 25** for general site photos.

Photo 21. Wetland 6. Data points 12 and 13. View to the north.

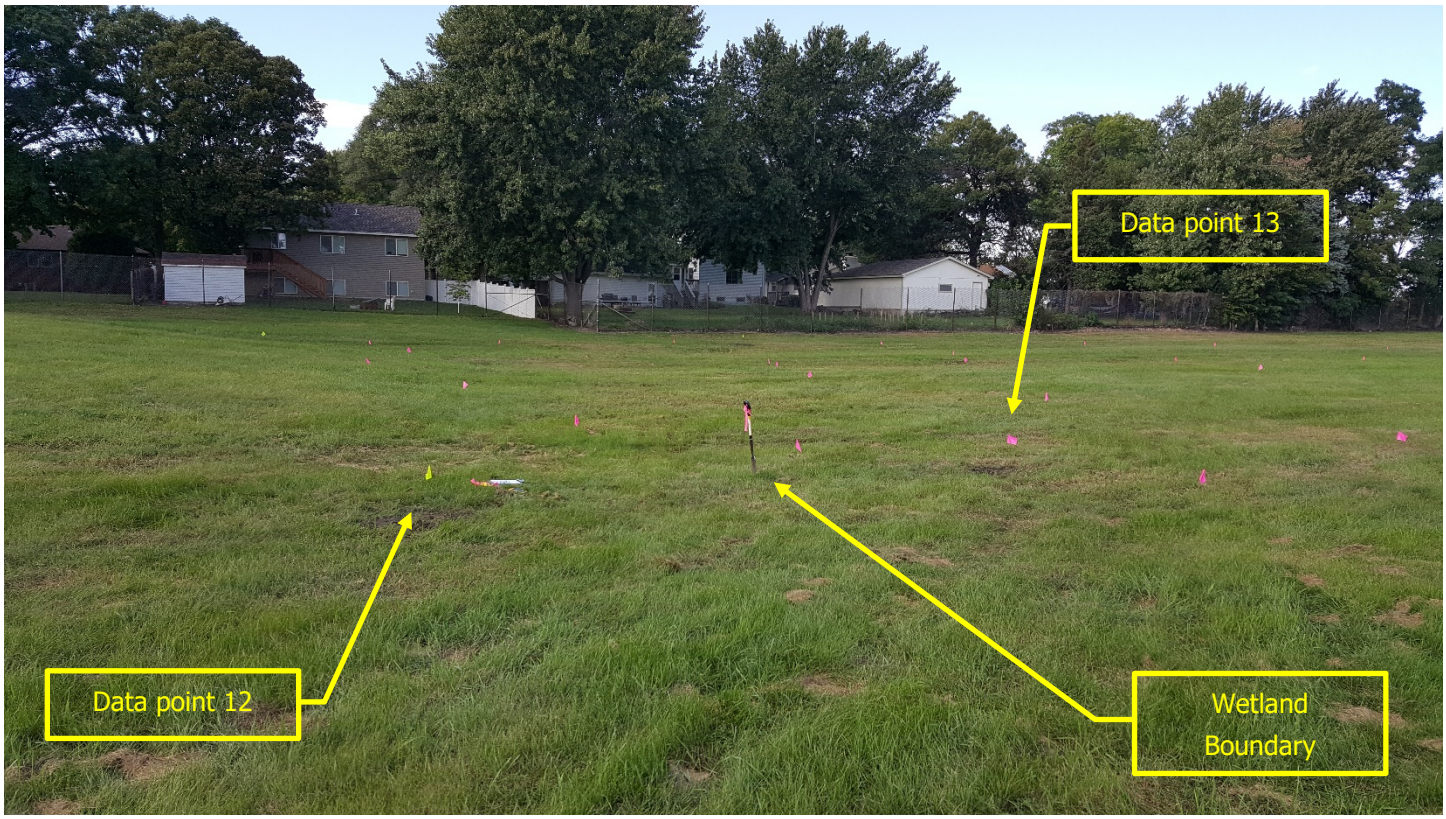


Photo 22. Wetland 6. Data points 12 and 13. View to the west.

Photo 24. Wetland 6. General, view to the north.

Photo 25. Wetland 6. General, view to the south.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP 13
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): swale/bottom Local relief (concave, convex, none): concave Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.055456 Long: -93.348754 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification: PEM
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID: 6

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Soils disturbed due to filling; vegetation regularly mowed.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Digitaria ischaemum	40	X	FACU
2. Echinochloa muricata	30	X	OBL
3. Poa pratensis	10		FACU
4. Elymus repens	10		FACU
5. Persicaria maculosa	5		FAC
6. Scirpus atrovirens	5		OBL
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present by PI of 2.9. Near boundary; vegetation shifts due to late season annuals, mowing.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody Vine Stratum		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of.	Multiply by:	
OBL species	35	x 1 = 35
FACW species	0	x 2 = 0
FAC species	5	x 3 = 15
FACU species	60	x 4 = 240
UPL species	0	x 5 = 0
Column Totals:	100 (A)	290 (B)

Prevalence Index = B/A = 2.9

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☒ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☒ No ☐

SOIL

Sampling Point: DP13

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Sand	With pebbles; fill layer
6-16	10YR 3/2	97	5YR 4/6	3	C	M	Sand	
16-22	10YR 2/1	100					Silt	Original hydric layer

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☒ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soil indicator Sandy Redox (S5) is satisfied, considering fill layer. Original hydric layer covered by 16 inches of fill materials.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 0

Indicators of Wetland Hydrology Present?
Yes ☒ **No** ☐

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

Remarks: Wetland hydrology is present and indicated. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night.

Photo: See **Photos 21 and 22** for data points; **Photos 24 and 25** for general site photos.

Photo 21. Wetland 6. Data points 12 and 13. View to the north.

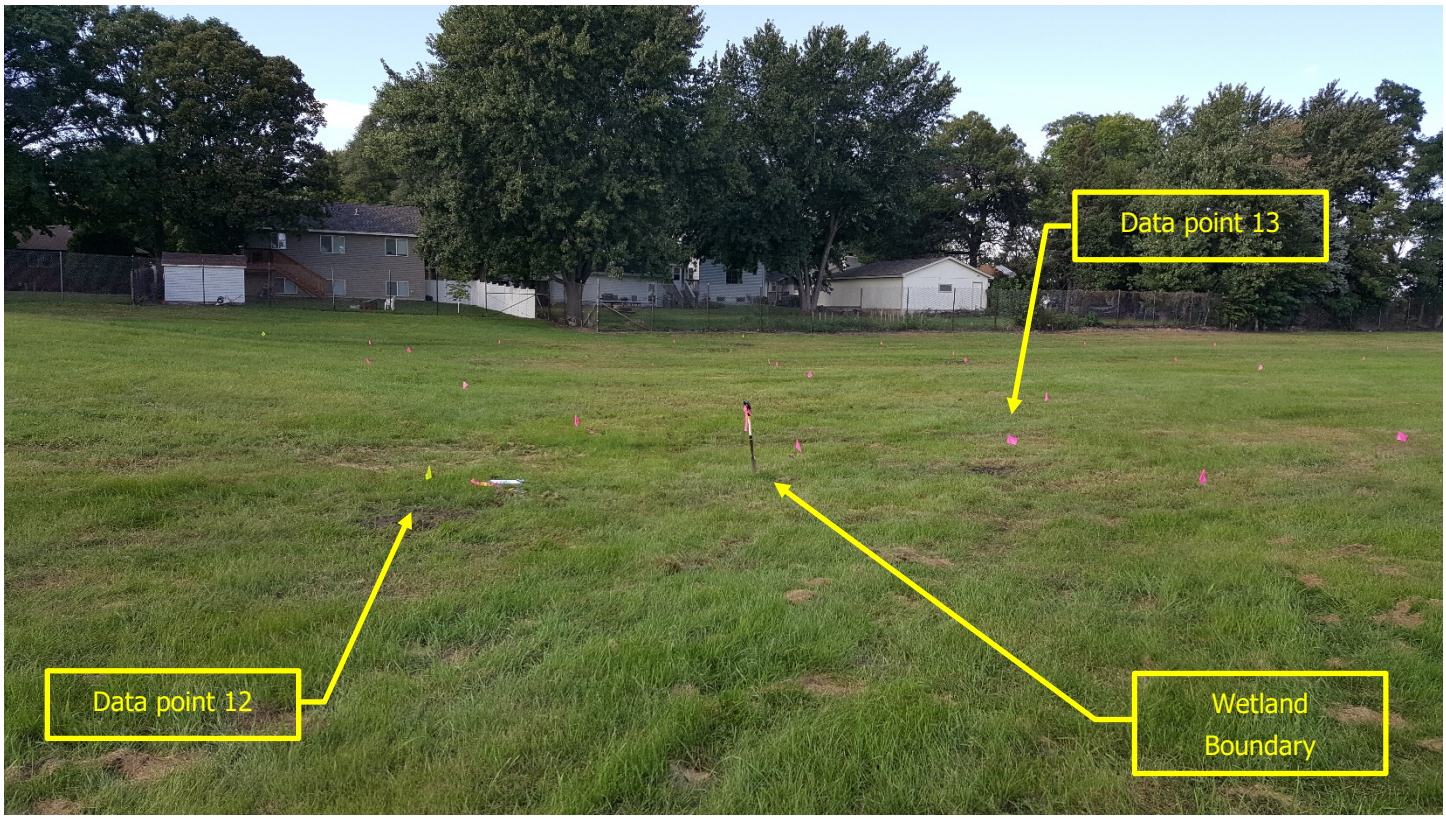


Photo 22. Wetland 6. Data points 12 and 13. View to the west.

Photo 24. Wetland 6. General, view to the north.

Photo 25. Wetland 6. General, view to the south.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP14
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.055618 Long: -93.348859 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Deposition of fill materials, area is mown regularly.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	70	X	FACU
2. Digitaria ischaemum	15		FACU
3. Elymus repens	10		FACU
4. Trifolium repens	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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 OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP14

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	97	5YR 4/6	3	C	M	Sandy loam	
7-22	10YR 3/2						Coarse sand	With small pebbles
22-24	10YR 2/1						muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicators Redox Dark Surface (F6) is satisfied. Fill material over original muck layer.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 2

Indicators of Wetland Hydrology Present?

Yes ☒ **No** ☐

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

Remarks: Wetland hydrology is present and indicated. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night.

Photo: See **Photo 23** for data points; See **Photos 24 and 25** for general site photo.

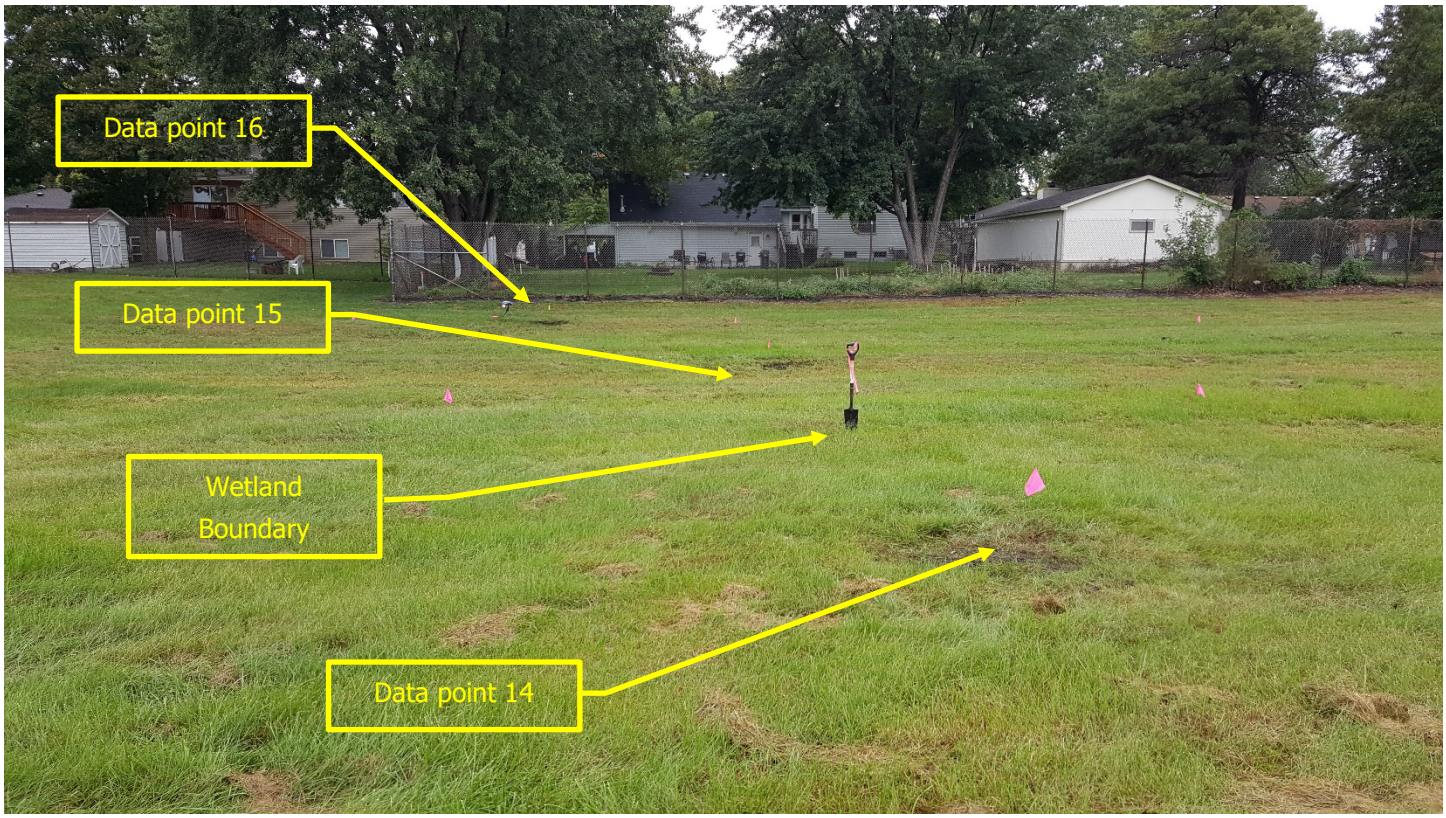


Photo 23. Wetland 6. Data points 14, 15, and 16. View to the west.

Photo 24. Wetland 6. General, view to the north.

Photo 25. Wetland 6. General, view to the south.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP 15
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.055621 Long: -93.349041 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification: PEM
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID: 6
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Digitaria ischaemum	55	X	FACU
2. Elymus repens	10		FACU
3. Persicaria maculosa	10		FAC
4. Alopecurus pratensis	10		FAC
5. Echinochloa muricata	10		OBL
6. Glechoma hederacea	5		FACU
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Vegetation mown regularly. Vegetation obscured by matted, saturated mown grass mulch. Vegetation shifts due to late season and mowing with near total coverage by annuals indicating problematic hydrophytic vegetation. Inspection of this area at June visit showed wetland vegetation consisting of spike rush (Eleocharis sp.), Scirpus atrovirens, and Persicaria sp. Undisturbed hydric soils and wetland hydrology are present.

50/20 Thresholds	20%	50%
Tree Stratum	____	____
Sapling/Shrub Stratum	____	____
Herb Stratum	20	50
Woody 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 OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of.	Multiply by:	
OBL species	10	x 1 = 10
FACW species	____	x 2 = ____
FAC species	20	x 3 = 60
FACU species	70	x 4 = 280
UPL species	____	x 5 = ____
Column Totals:	100 (A)	350 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☒ Problematic Hydrophytic Vegetation' (Explain)

[1]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?
Yes ☒ No ☐

SOIL

Sampling Point: DP15

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/1	100					muck	
20-22	10YR 5/1	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicators Thick Dark Surface (A12) is satisfied. Soils appear undisturbed by filling or grading.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 1
Water Table Present?	Yes ☒	No ☐	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 0

Indicators of Wetland Hydrology Present?

Yes ☒ **No** ☐

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

Remarks: Wetland hydrology is present. Standing water within sampling area. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night. Sampling point located in shallow basin with no outlet.

Photo: See **Photo 23** for data points; See **Photos 24 and 25** for general site photo.

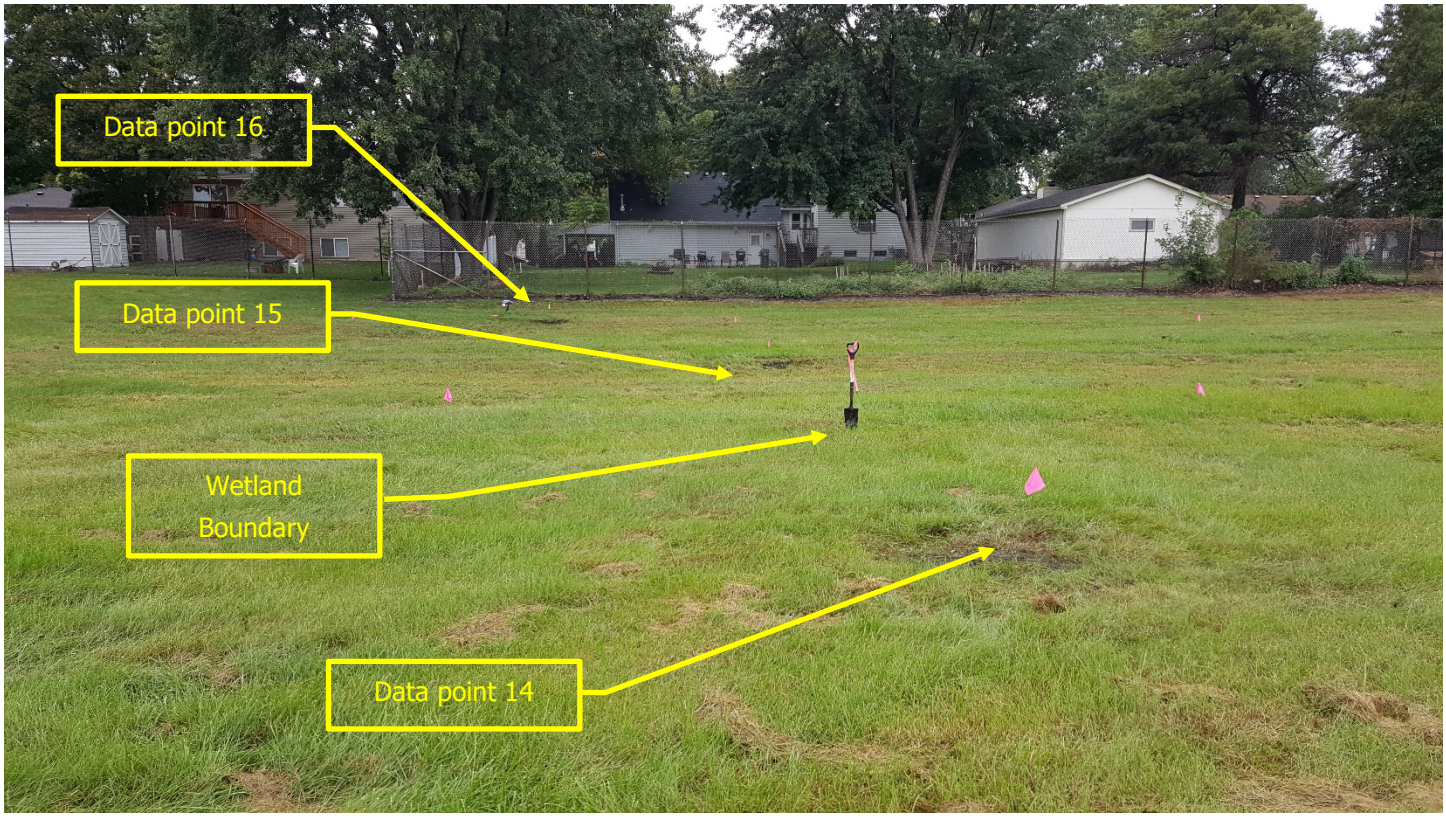


Photo 23. Wetland 6. Data points 14, 15, and 16. View to the west.

Photo 24. Wetland 6. General, view to the north.

Photo 25. Wetland 6. General, view to the south.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP 16
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): midslope Local relief (concave, convex, none): convex Slope (%): ~ 3%
Subregion (LRR or MLRA): K/155 Lat: 45.055578 Long: -93.349155 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation regularly mowed; soil disturbance due to filling.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Digitaria ischaemum	50	X	FACU
2. Elymus repens	30	X	FACU
3. Poa pratensis	15		FACU
4. Glechoma hederacea	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. About 35 feet separates this sampling point from paired wetland point (DP15) on a slight rise near fence about 2 feet higher than wetland point.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP16

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	97	5YR 3/4	3	C	M	Silt loam	
7-11	10YR 5/1	100					sand	
11-20	10YR 2/1	100					muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicators Redox Dark Surface (F6) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Remarks: Wetland hydrology is neither present nor indicated. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night.

Photo: See **Photo 23** for data points; See **Photos 24 and 25** for general site photo.

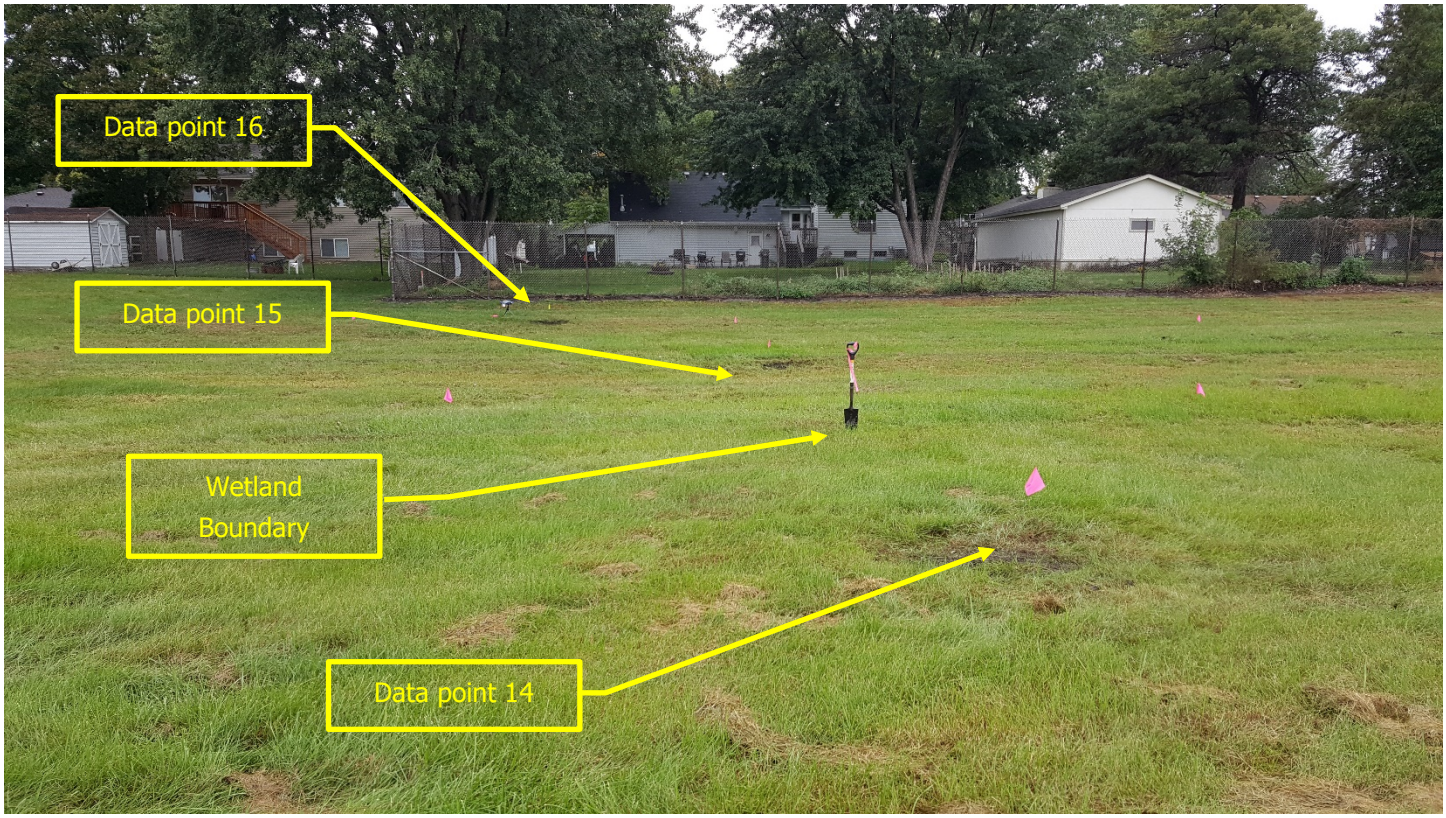


Photo 23. Wetland 6. Data points 14, 15, and 16. View to the west.

Photo 24. Wetland 6. General, view to the north.

Photo 25. Wetland 6. General, view to the south.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP17
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): shoulder Local relief (concave, convex, none): convex Slope (%): 3-4%
Subregion (LRR or MLRA): K/155 Lat: 45.056486 Long: -93.347796 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☐	No ☒	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Fill/grading slope for runway; vegetation mown regularly.

VEGETATION - Use scientific names of plants

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	50	X	FACU
2. Trifolium repens	20	X	FACU
3. Taraxacum officinale	15		FACU
4. Elymus repens	10		FACU
5. Oxalis stricta	5		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)

[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP17

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					silt	
6-16	10YR 4/1	50	7.5YR 4/4	1	C	M	sand	
	10YR 2/1	50					silt	
16-20	10YR 2/1	95	7.5YR 4/4	5	C	M	sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: Hydric soils are not present. Does not meet hydric soil criteria. Soils disturbed due to construction of grade slope for runway end.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?
Yes ☐ **No** ☒

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

Remarks: Wetland hydrology is neither present nor indicated. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night.

Photo: See **Photo 26** for data point; See **Photos 27 and 28** for general site photos.

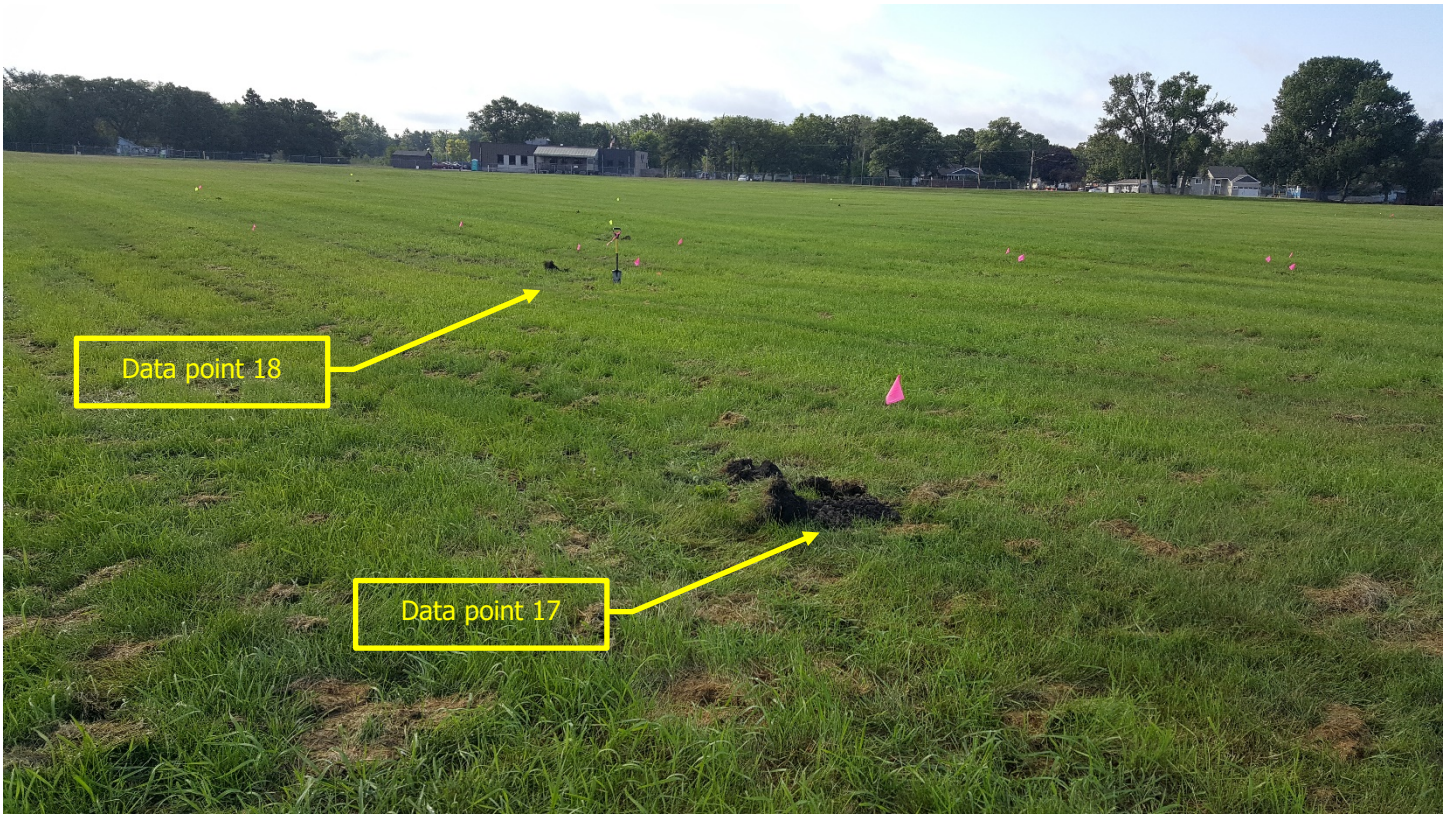


Photo 26. Wetland 7. Data points 17, 18, and 19. View to the south.

Photo 27. Wetland 7. General, view to the west.

Photo 28. Wetland 7. General, saturated conditions. View to the west.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP18
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.05634 Long: -93.347745 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification: PEM
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID: 7
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Persicaria maculosa	50	X	FAC
2. Elymus repens	15	X	FACU
3. Alopecurus pratensis	15	X	FAC
4. Echinochloa muricata	15	X	OBL
5. Digitaria ischaemum	5		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. Barnyard grass by mown culms with seed heads; Alopecurus by prior reference.

50/20 Thresholds	20%	50%
Tree Stratum	____	____
Sapling/Shrub Stratum	____	____
Herb Stratum	20	50
Woody Vine Stratum	____	____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of.	Multiply by:	
OBL species	15	x 1 = 15
FACW species	0	x 2 = 0
FAC species	65	x 3 = 195
FACU species	20	x 4 = 80
UPL species	0	x 5 = 0
Column Totals:	100 (A)	290 (B)

Prevalence Index = B/A = 2.9

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☒ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☒ No ☐

SOIL

Sampling Point: DP18

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	10YR 2/1						Muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicator Thick Dark Surface (A12) is satisfied. Soils appear undisturbed.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 0

Indicators of Wetland Hydrology Present?

Yes ☒ **No** ☐

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

Remarks: Wetland hydrology is present. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night. Sampling point within swale at base of grade slope at end of runway blastpad.

Photo: See **Photo 26** for data point; See **Photos 27 and 28** for general site photos.

Photo 26. Wetland 7. Data points 17, 18, and 19. View to the south.

Photo 27. Wetland 7. General, view to the west.

Photo 28. Wetland 7. General, saturated conditions. View to the west.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP19
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.056261 Long: -93.347743 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly; likely deposition of fill materials.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	50	X	FACU
2. Elymus repens	30	X	FACU
3. Trifolium repens	10		FACU
4. Persicaria maculosa	5		FAC
5. Plantago major	2		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Sampling point is about 25 feet from paired wetland point (DP18) and at a similar elevation.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP19

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2						Sandy loam	
6-10	10YR 2/2	97	5YR 4/4	3	C	M	Sandy loam	With pebbles
10-18	10YR 2/1	100					Silt/muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicators Redox Dark Surface (F6) is satisfied. Likely deposition of fill materials over original muck layer.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?
Yes ☐ **No** ☒

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

Remarks: Wetland hydrology is neither present nor indicated. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night.

Photo: See **Photo 26** for data point; See **Photos 27 and 28** for general site photos.

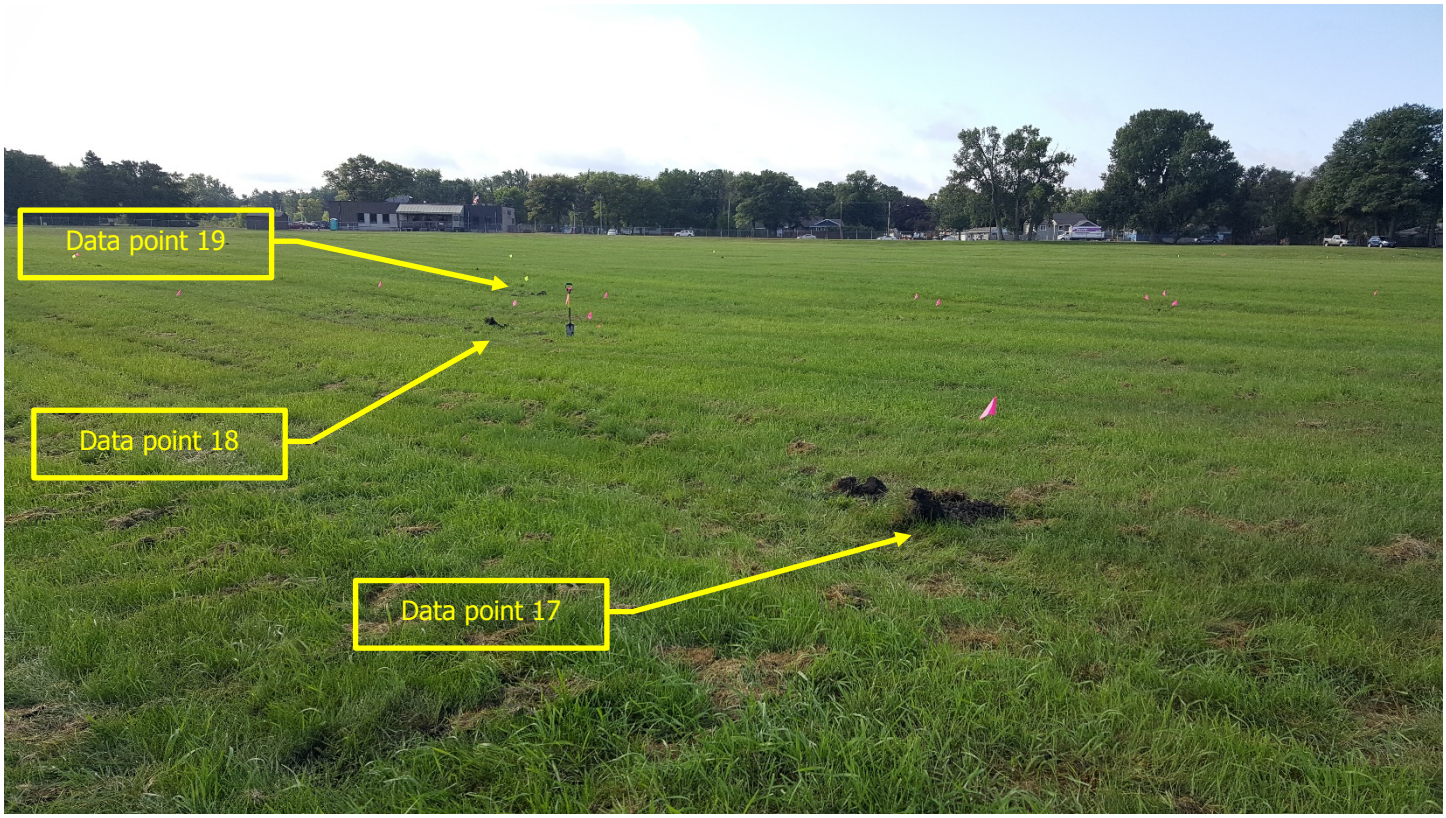


Photo 26. Wetland 7. Data points 17, 18, and 19. View to the south.

Photo 27. Wetland 7. General, view to the west.

Photo 28. Wetland 7. General, saturated conditions. View to the west.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 25, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP20
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.056078 Long: -93.347719 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly; likely deposition of fill materials.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	73	X	FACU
2. Trifolium repens	15		FACU
3. Elymus repens	10		FACU
4. Taraxacum officinale	2		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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 OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP20

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Sandy loam	
6-10	10YR 2/2	97	5YR 4/4	3	C	M	Sandy loam	With pebbles
10-18	10YR 2/1	100					Silt/muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicators Redox Dark Surface (F6) is satisfied. Likely deposition of fill materials over original muck layer.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 2

Indicators of Wetland Hydrology Present?
Yes ☒ **No** ☐

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

Remarks: Wetland hydrology is present and indicated. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night.

Photo: See **Photo 26**.

Photo 26. Wetland 7. Data points 17 and 20. View to the south.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 26, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP21
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.056147 Long: -93.347533 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly; likely deposition of fill materials.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Elymus repens	75	X	FACU
2. Taraxacum officinale	10		FACU
3. Poa pratensis	10		FACU
4. Trifolium repens	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Also present in in general vicinity shepherd's purse (Capsella bursa-pastoris: FACU) and plantain (Plantago major: FACU).

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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 OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP21

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	97	5YR 3/4	3	C	M	Sandy loam	
7-16	10YR 2/1	100					Muck	Original hydric layer
16-20	10YR 5/1	97	7.5YR 4/6	3	C	PL	sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicator Redox Dark Surface (F6) is satisfied. Likely deposition of fill materials over original muck layer.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

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

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Remarks: Soil pit open for 24 hours; wetland hydrology is neither present nor indicated. Heavy rainfall (4.5 inches) 4 days prior and 0.3 inches previous night.

Photo: See **Photo 29**.

Photo 29. Data Point 21, view to the north.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 26, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP22
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.055834 Long: -93.346948 Datum: WGS84
Soil Map Unit Name: Duelm loamy sand, 0 to 2 percent slopes (D17A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly; likely deposition of fill materials.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	45	X	FACU
2. Trifolium repens	20	X	FACU
3. Digitaria ischaemum	20	X	FACU
4. Ambrosia artemisiifolia	15		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Sampling point along transect consisting of DPs22 – 25 in previously mapped wetland.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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: 3 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP22

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					Sandy loam	
6-18	10YR 3/1	97	5YR 4/4	3	C	M	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicator Redox Dark Surface (F6) is satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 14

Indicators of Wetland Hydrology Present?

Yes ☐ **No** ☒

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

Remarks: Saturation and water table > 12 inches in depth; wetland hydrology neither present nor indicated. Heavy rainfall (4.5 inches) 5 days prior and 0.3 inches 2 days prior.

Photo: See **Photo 30**.

Photo 30. Data Point 22, view to the north.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 26, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP23
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.055876 Long: -93.347465 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly; likely deposition of fill materials.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	65	X	FACU
2. Trifolium repens	15		FACU
3. Elymus repens	10		FACU
4. Digitaria ischaemum	8		FACU
5. Ambrosia artemisiifolia	1		FACU
6. Potentilla arguta	1		FACU
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Sampling point along transect consisting of DPs22 – 25 in previously mapped wetland.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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 OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP23

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					Sandy loam	
6-14	10YR 3/1	95	7.5YR 4/6	5	C	M	Sandy loam	
14-16	10YR 3/1	100					Sandy loam	Many undecomposed twigs, sticks, bark

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: hard pan

Depth (inches): 16

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicator Redox Dark Surface (F6) is satisfied. Likely deposition of fill materials over original muck layer. Dug to refusal at 16 inches in depth.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☐	No ☒	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 16

Indicators of Wetland Hydrology Present?
Yes ☐ **No** ☒

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

Remarks: Water table > 12 inches in depth; wetland hydrology is neither present nor indicated. Heavy rainfall (4.5 inches) 5 days prior and 0.3 inches 2 days prior.

Photo: See **Photo 31**.

Photo 31. Data point 23, view to the northwest.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 26, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP24
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): <1%
Subregion (LRR or MLRA): K/155 Lat: 45.055881 Long: -93.347878 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly; likely deposition of fill materials.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	40	X	FACU
2. Elymus repens	40	X	FACU
3. Trifolium repens	15		FACU
4. Ambrosia artemisiifolia	10		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Sampling point along transect consisting of DPs22 – 25 in previously mapped wetland.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	21	52.5
Woody 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: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: DP24

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/1	98	7.5YR 4/6	2	C	M	sand	
6-16	10YR 3/1	97	5YR 3/4	3	C	M	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☒ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: hard pan

Depth (inches): 6

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicators Sandy Redox (S5) and Redox Dark Surface (F6) are satisfied. Difficult to dig below 6 inches in depth.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☐	No ☐	Depth (inches): ____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 13
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 12

Indicators of Wetland Hydrology Present?
Yes ☒ **No** ☐

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

Remarks: Hole open for 2 hours; sampled near wetland 2. Potential groundwater gradient. Wetland hydrology is present and indicated. Heavy rainfall (4.5 inches) 5 days prior and 0.3 inches two days prior.

Photo: See **Photo 32**.

Photo 32. Data Point 24, view to the northwest.

This page left intentionally blank.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Crystal Airport (MIC) Runway Improvements City/County: Hennepin Sampling Date: September 26, 2018
Applicant/Owner: Metropolitan Airports Commission State: Minnesota Sample Point: DP25
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 4, T118N, R21W
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): < 1%
Subregion (LRR or MLRA): K/155 Lat: 45.055937 Long: -93.348369 Datum: WGS84
Soil Map Unit Name: Seelyeville and Markey soils, depressional, 0 to 1 percent slopes (D30A) NWI classification:
Are climatic hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? **Yes** ☐ **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 ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☒	No ☐	If yes, optional Wetland Side ID:
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were within normal range at the time of investigation. Vegetation mown regularly; likely deposition of fill materials.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	60	X	FACU
2. Elymus repens	20	X	FACU
3. Trifolium repens	15		FACU
4. Taraxacum officinale	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. Sampling point along transect consisting of DPs22 – 25 in previously mapped wetland.

50/20 Thresholds	20%	50%
Tree Stratum		
Sapling/Shrub Stratum		
Herb Stratum	20	50
Woody 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: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)
[1]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?
Yes ☐ No ☒

SOIL

Sampling Point: 25

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/1	98	7.5YR 4/6	2	C	M	sand	
6-16	10YR 3/1	97	5YR 3/4	3	C	M	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☒ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149 B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

[3]1ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric

- ☐ 2 cm Muck - (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Peat or Mucky Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils are present. Hydric soils indicators Sandy Redox (S5) and Redox Dark Surface (F6) are satisfied.

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)
- ☐ Marl Deposits (B15)
- ☐ 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)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Microtopographic Relief (D4)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 17
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 12

Indicators of Wetland Hydrology Present?
Yes ☒ **No** ☐

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

Remarks: Hole open for 2 hours. Wetland hydrology is present and indicated. Heavy rainfall (4.5 inches) 5 days prior and 0.3 inches two days prior.

Photo: See **Photo 33**.

Photo 33. Data Point 25, view to the north.

This page left intentionally blank.

Appendix G. Field Photographs

Site Photos

Photo 1. South Perimeter Road, view to the east.

Photo 2. South Perimeter Road, view to the northwest.

Photo 3. Wetland 2. Data point 1, view to the northeast.

Photo 4. Wetland 1. Data point 3, view to the west.

Photo 5. Runway 32L End. General, view to the northeast.

Photo 6. Runway 32R End. General infield, view to the east.

Photo 7. Taxiway connector. General infield, view to the southeast.

Photo 8. Taxiway connector. General infield, view to the northwest.

Photo 9. North Perimeter Road. General infield, view to the north.

Photo 10. Non-aeronautical Development Area. General infield, view to the northeast.

Photo 11. Wetland 3. Data point 4, view to the north.

Photo 12. Wetland 3. Data point 5, view to the east.

Photo 13. Non-aeronautical Development Area. Wooded drainage ditch, view to the south.

Photo 14. Non-aeronautical Development Area. Wooded drainage ditch, view to the north.

Photo 15. Non-aeronautical Development Area. General infield, view to the north.

Photo 16. Non-aeronautical Development Area. General infield, view to the northeast.

Photo 17. Wetland 4. Data points 6 through 9. View to the east.

Photo 18. Wetland 5. Data points 10 and 11, view to the south.

Photo 19. Wetland 5. General, view to the south.

Photo 20. Wetland 5. General, view to the north.

Photo 21. Wetland 6. Data points 12 and 13. View to the north.

Photo 22. Wetland 6. Data points 12 and 13. View to the west.

Photo 23. Wetland 6. Data points 14, 15, and 16. View to the west.

Photo 24. Wetland 6, General, view to the north.

Photo 25. Wetland 6, General, view to the south.

Photo 26. Wetland 7. Data points 17, 18, and 19. View to the south.

Photo 27. Wetland 7. General, view to the west.

Photo 28. Wetland 7. General, saturated conditions. View to the west.

Photo 29. Data point 21, view to the north.

Photo 30. Data point 22, view to the north.

Photo 31. Data point 23, view to the northwest.

Photo 32. Data point 24, view to the northwest.

Photo 33. Data point 25, view to the north.

Photo 34. Wetlands 1 and 2. Late season conditions, view to the east.

Appendix H. Delineator Qualifications

BRAUNA HARTZELL, GISP
GEOGRAPHIC INFORMATION SYSTEM (GIS)/IMAGE PROCESSING ANALYST

EXPERIENCE (GIS)

Brauna Hartzell has more than 20 years of experience applying GIS software and database design techniques to support wetlands and water resources, historic preservation, community planning, transportation, aviation and military planning, and municipal infrastructure and storm water management. She has worked extensively with GIS and mapping software including ArcGIS desktop and ARC/INFO workstation and has specialized experience with 3D Analyst, Network Analyst and Spatial Analyst. She also collects environmental field data using hand-held GPS units and post-processes information for inclusion in databases and use in spatial analyses. Brauna collaborates with personnel from multiple disciplines to solve complex spatial problems through scripting and spatial analysis to deliver results and data for project-specific needs. She utilizes geoprocessing models, Python, and VBA to meet analytical needs of projects.

Brauna is experienced with GIS-related data submittal requirements associated with the Federal Energy Regulatory Commission (FERC) and the Federal Aviation Administration (FAA) data standardization initiatives. She has extensive experience developing Geodatabases with the Spatial Data Standards for Facility, Infrastructure, and Environment (SDSFIE) standard and creating Federal Geographic Data Committee (FGDC)-compliant metadata.

Brauna has specialized experience with using 3D data formats for spatial analysis, contour generation and manipulation, and geospatial modeling. She is adept in the use of LiDAR-derived data and DTMs in support of hydrology and hydraulic analyses. Additionally, she has extensive experience with SSURGO databases and the National Hydrography Dataset.

EXPERIENCE (WETLAND/ENVIRONMENTAL)

Brauna Hartzell has more than fifteen years of experience in wetland delineation, wetland permitting, and restoration projects. She performs wetland and field delineations conforming to current United States Army Corps of Engineers (USACE) including the Northcentral and Northeast Regional Supplement and State standards, designs custom field data collection applications, collects field data using hand-held Global Positioning Systems (GPS) data collectors and tablets, and prepares National Environmental Policy Act (NEPA) documentation. Brauna has successfully guided numerous projects through the Section 404 permitting process.

Brauna has performed numerous wetland delineations in the Upper Midwest. She conducts wetland mitigation site monitoring according to established site-specific assessment protocols, performs vegetation surveys, and analyzes and presents field collected data in graphical and tabular form. She also assists in mitigation site design and construction specifications development.

Areas of Expertise

- Geographic Information Systems (GIS)
- Remote-sensing image processing
- Digital mapping
- Database design
- Programming
- Wetland delineation and permitting

Education

- MS, Environmental Monitoring, 1994, University of Wisconsin, Madison
- BS, Biological Science, 1982, Florida State University, Tallahassee, Florida

Registration/Certification

- Certified GIS Professional (GISP), GIS Certification Institute

Training and Seminars

- Building Web Applications Using the ArcGIS API for Flex, ESRI
- Geodatabase Design Concepts, ESRI
- Grasses, Sedges, and Rushes Workshop, University of Wisconsin–LaCrosse, 2017
- Vascular Flora of Wisconsin, University of Wisconsin – Madison, Spring 2002
- Wetlands Ecology, University of Wisconsin – Madison, Spring 2003
- Grasses: Identification and Ecology Workshop, University of Wisconsin – Milwaukee workshop, 2002
- GPS Field Collection Techniques Training Workshop for Trimble GeoXH, Seiler Instruments
- Basic Wetland Delineation Workshop, University of Wisconsin–LaCrosse, 2002
- Basic Hydric Soil Identification Workshop, University of Wisconsin – LaCrosse, 2005
- Advanced Wetland Delineation Workshop, University of Wisconsin – LaCrosse, 2007
- Critical Methods in Delineation, University of Wisconsin-LaCrosse, 2007, 2008, 2009, and 2017
- Wildlife Inventory and Monitoring, University of Wisconsin – Milwaukee workshop, 2015

RELATED PROJECTS (WETLANDS)

Wetland Delineations
Various Clients
Midwest USA
Brauna performed wetland delineations in accordance with the Routine On-Site Method of 1987 United States Army Corps of Engineers (USACE) wetland delineation manual at various sites in Wisconsin and Minnesota. Work included conducting the delineation, documenting field investigations and site conditions, creating wetland boundary maps, and report writing. Delineations were performed for the following projects:

- Pellet Subdivision – Middleton, Wisconsin, 2002
- Potter's Creek Subdivision – Green Bay, Wisconsin, 2003
- Oak Street Bridge Design – La Crosse, Wisconsin, 2003
- Winona Municipal Airport – Winona, Minnesota, 2003 & 2009
- State Trunk Highway (STH) 29 – Marathon County, Wisconsin, 2003
- Hampton Heights Subdivision – Ledgeview, Wisconsin, 2004
- County Trunk Highway (CTH) W – Oconto County, Wisconsin, 2004
- Town of Rockland Preliminary Plat – Brown County, Wisconsin, 2004
- Mourning Dove Subdivision – Oconto County, Wisconsin, 2004
- Cinnamon Ridge Subdivision – Suamico, Oconto County, Wisconsin, 2004
- Kenosha Regional Airport – Kenosha, Wisconsin, 2005
- County Trunk Highway (CTH) A – Lincoln County, Wisconsin
- CTH D – Vernon County, Wisconsin, 2006
- Burton Street – Beloit, Wisconsin, 2006
- Central Wisconsin Airport – Mosinee, Marathon County, Wisconsin, 2008
- State Trunk Highway (STH) 67, Fond du Lac County, Wisconsin, 2011
- Interstate Highway 90/94 Corridor Study, 2014 & 2015
- Ontonagon County Airport, Ontonagon County, Michigan, 2016
- Central Wisconsin Airport – Mosinee, Marathon County, Wisconsin, 2016
- Little Rock Lake, Vilas County, Wisconsin, 2016
- Green Bay-Austin Straubel International Airport, 2017
- Lake Elmo Airport, Lake Elmo, Minnesota, 2017
- STH 48/US 53 Interchange, Rice Lake, Wisconsin, 2017

Joint Section 404 – WCA Permit and Compensatory Mitigation Plan, 2017
Detroit Lakes-Becker County Airport
Detroit Lakes, MN
The proposed project at the Airport includes a relocation of the Runway 13 threshold 1,000 feet to the southeast to provide a 5,200-foot long runway which accommodates an instrument approach with CAT-I minimums. Additionally, a full-length taxiway will be constructed. In total, the proposed project will address airfield design deficiencies, improve runway pavement condition, and meet runway length requirements. Approximately 14 acres of wetland fill will be necessary to achieve project needs. A compensatory mitigation plan is included in the permit application. Brauna served as the lead preparer of the permit application.

Past Employment
- Information Management Systems, Inc.
- Adult Communities Total Services, Inc.
- Archeological Assessments, Inc.
- University of Wisconsin – Madison

No. of Years With Mead & Hunt
- Hired 08/28/1992

No. of Years With Other Firms
- Four

BRAUNA HARTZELL, GISP (CONTINUED)

Wetland Delineation, Lake Elmo Airport, 2017
Metropolitan Airports Commission
Lake Elmo, Minnesota
Brauna served as lead wetland delineator in support of alternatives analysis for an environmental assessment for a proposed runway relocation and associated improvements. The area of interest is approximately 130 acres is size and resulted in the delineation of nine wetlands, one of which was in agricultural production. Wetland types encountered include: shallow marsh, fresh wet meadows, and shrub swamps. A functional assessment was performed using the MN Rapid Assessment Method (MNRAM), updating existing information and assessing newly delineated wetlands.

Wetland Delineation, Green Bay-Austin Straubel International Airport, 2017
Wisconsin Bureau of Aeronautics
Brown County, Wisconsin

Brauna served as lead wetland delineator in support of an environmental assessment for a proposed expansion to the East General Aviation apron and regrading associated with Runway 6/24. The area of interest is approximately 65 acres is size, covering airport infield areas, which resulted in the delineation of 23 emergent wet-meadow wetlands.

Wetland Delineation, STH 48/US 53 Interchange Improvements, 2017
Wisconsin Department of Transportation
Rice Lake, Wisconsin
Brauna served as the lead wetland delineator in support of permitting for interchange improvements to address safety, geometric and operational deficiencies, and improve facilities for non-motorized traffic. The area of interest is approximately 17.5 acres in size and resulted in the delineation of nine wetlands. Wetland types encountered include: fresh wet meadows and ditch wetlands.

Wetland Delineation, Ontonagon County Airport, 2016
Michigan Bureau of Aeronautics
Ontonagon County, Michigan
Brauna served as the lead wetland delineator in support of permitting and on-site mitigation activities related to proposed wetland disturbance in another area of the airport. The area of interest is approximately 19.4 acres in size and resulted in the delineation of 11 wetlands in areas previously in agricultural production. Brauna also performed groundwater well monitoring and data analysis in support of mitigation site design.

Wetland Delineation, Central Wisconsin Airport, 2016
Wisconsin Bureau of Aeronautics
Mosinee, Marathon County, Wisconsin
Brauna served as the lead wetland delineator in support of master planning activities related to determining the viability of shifting Runway 17/35 to the south. The area of interest is approximately 70 acres in size and resulted in the delineation of three large wetlands on airport property and two off-site. The three on-site wetlands experience regular mowing and other maintenance activities as well as show evidence of groundwater contact on a sloping terrain with a seasonal high-water table; off-site wetlands consisted of an alder and a hardwood swamp.

Little Rock Lake Wetland Survey, 2016
National Ecological Observatory Network (NEON), Boulder, CO
Vilas County, Wisconsin
Brauna served as the lead wetland scientist in support of site equipment layout investigations for long-term ecological monitoring. A total of four wetlands were delineated within the area of interest at this mesotrophic seepage lake covering about 39 acres. Each proposed equipment installation site was surveyed and wetlands delineated in close proximity to any proposed location.

Interstate Highway (IH) 90/94 Corridor Study, 2013-2017
Wisconsin Department of Transportation (WisDOT) Southwest Region
Portage, Juneau, Sauk, and Columbia Counties, Wisconsin
Mead & Hunt is leading a team that is conducting a corridor study of IH 90/94 from US12/WIS 16 to IH39. The project consists of evaluating operational and safety issues, review of the interchanges and ramps within the corridor, and evaluating possible expansion. Environmental studies are being conducted and include; cultural resources surveys, endangered species surveys, contaminated material investigations, noise analysis and wetland delineations. Brauna is a wetland scientist assisting in the delineation, wetland field data collection and mapping. Cost: $210 million

STH 67 Resurfacing Design and Environmental Documentation, 2011
Wisconsin Department of Transportation (WisDOT) Northeast Region
Fond du Lac County, Wisconsin
Mead & Hunt lead redesign of this 20 mile corridor of STH 67 spanning Fond du Lac County through both rural and developed sections. In support of environmental documentation, a wetland delineation was performed within the right-of-way for the 20 mile corridor. Wetland types encountered include: shallow marsh, fresh wet meadows, shrub swamps, and riparian wetlands. In total, 69 wetlands were delineated. Brauna assisted with wetland delineation and survey, mapping and data management.

Wetland Mitigation, Runway 14/32 Safety Area, 2004-2011
WisDOT Bureau of Aeronautics
Madison, Wisconsin
Brauna served as project scientist for this reconstruction of a runway safety area and railroad within a state natural area. 140 acres of fen and sedge meadow were restored and enhanced, and 6,000 feet of Starkweather creek was restored with an annually flooded riparian corridor. The project also included restoration of ten acres of swamp forest and 35 acres of upland buffer, plus negotiation of annual management and monitoring to enhance rare plant habitats within Cherokee Fen. The mitigation cost was more than $1.5 million, with a total project construction cost of $25 million. Brauna assisted with wetland monitoring and collection of botanical and hydrologic data for compliance. She also monitored for invasive species.

KIMBERLY SHANNON
ENVIRONMENTAL SCIENTIST

Kimberly Shannon is an environmental scientist with over a decade of experience. Over the years she has gained professional experience in coordinating and completing a variety of project types including oil and gas, electric transmission, nuclear, transportation, commercial development, and local government. She has honed her regulatory and technical skills while providing excellent service to diverse clients. Her technical expertise and strongest skills as a consultant include the identification, mapping, and delineation of streams and wetlands; 404 permitting and compensatory mitigation; United States Army Corps of Engineers (USACE) coordination, and assisting various clients through the 404 permitting process. Kimberly also has professional experience in the preparation and coordination of environmental assessment and categorical exclusion documents in support of the National Environmental Policy Act (NEPA) process, habitat evaluation for threatened and endangered species, proposal writing and pricing, technical writing and editing, training junior staff, and working with project managers, colleagues and clients to achieve project goals and objectives in a timely and cost effective manner. She coordinates with subcontractors and science/environmental staff in offices across the country to complete field work, reports, permits, and data deliverables.

RELATED PROJECTS

Mitigation Coordination for Oklahoma Department of Transportation (ODOT) with Multiple Agencies, EC 1660, 2015-present
ODOT
Statewide, Oklahoma
Kimberly is assisting ODOT with the coordination of various mitigation projects across Oklahoma. As part of this contract she is working directly with the USACE, other consultants, and the Oklahoma Chapter of The Nature Conservancy, a key mitigation partner for ODOT. Assisting TNC with production of a mitigation master plan for TNC's Oka' Yanahli Preserve in Pontotoc County, OK.

Kimberly's years of various environmental project experience includes:

- Waters re-evaluations and mitigation plans – ODOT
- Mitigation plan for Durant Bypass – ODOT
- Local government contract for statewide county road and bridge projects – ODOT
- BNSF Railroad separation EA – ODOT
- Delineations, 404 permitting, and mitigation planning in Texas and Oklahoma – QuikTrip
- Natural gas liquids trunk line right of way assessments, reports and 404 permitting in OK, KS, TX, CO included over 400 miles and 1,000 waterbodies assessed – DCP Midstream, LLC
- Wetland delineations and site spot checks in Uintah Basin, Utah; Senior delineator for site-specific survey on Ute and Ouray Reservation – Constellation Energy Partners (CEP)
- Section 7 consultation and biological assessment (BA) for the American Burying Beetle in Tulsa, OK – Tulsa Botanic Garden

Areas of Expertise

- Permitting and licensing
- NEPA
- Public involvement
- Regulatory compliance
- Environmental Assessments
- Environmental Reports
- Stream and wetland delineation

LinkedIn url

- https://www.linkedin.com/pub/kimberly-shannon/29/412/a38

Education

- MS, Applied and Natural Science, Oklahoma State University, 1997
- BS, Biology, Oklahoma State University, 1994
- Certificate, GIS, Tulsa Community College, 2010

Training and Seminars

- "Permitting and Training," Federal Energy Regulatory Commission (FERC), 2013
- "Advanced Problems in Hydric Soil Evaluation," North Carolina State University, 2010
- "Contractor Orientation Safety Course," Burlington Northern Santa Fe Railroad (BNSF), Union Pacific Railroad (UPRR), 2009
- "Regional Supplement Seminar," Wetland Training Institute, 2008

Presentations

- NEPA Updates for Oklahoma, Wallace Engineering, 2009
- Panel Presentation: Careers in the Frontier of the Environment, Women in Science Conference, 2008
- Panel Presentation: Landowner Relationships, Natural Areas Associations Conference, 2004

Past Employment

- Delineations, habitat assessments, vegetation mapping, aquatic ecology surveys, and NRC site audits in support of COL application and ER Luminant Generation Company – Comanche Peak Nuclear Power Plant, Glen Rose, TX
- Coordinated staff for weeks of biological monitoring of seismic drilling and receiver line crews at Tishomingo – NWR Chesapeake Energy

Ontonagon County Airport, 2016
Michigan Bureau of Aeronautics
Ontonagon County, Michigan
Kim served as a wetland delineator in support of permitting and on-site mitigation activities related to a proposed wetland disturbance in another area of the airport. The area of interest spans approximately 19.4 acres and resulted in the delineation of 11 wetlands in areas previously in agricultural production. Kim also assisted groundwater well monitoring in support of mitigation site design.

Waters Re-Evaluations and Mitigation, 2009-January 2010
Oklahoma Department of Transportation (ODOT)
Statewide, Oklahoma
Kimberly assisted with multiple re-evaluations of potentially jurisdictional waterbodies related to bridge replacement projects across Oklahoma. Delineation reports, 404 permits, and mitigation plans were prepared for the ODOT. *This project was completed while Kimberly was employed with another firm.*

Mitigation Projects, 2009-2015
Oklahoma Department of Transportation (ODOT)
Statewide, Oklahoma
Kimberly prepared compensatory mitigation plans for 404 Permit Applications in support of ODOT road and bridge improvement projects across Oklahoma. She conducted and coordinated site assessments, site selection, landowner correspondence and coordination, site planning, agency coordination, and monitoring plans for multiple mitigation projects.

Mitigation Plan, Durant Bypass, May 2010-2015
Oklahoma Department of Transportation (ODOT)
Durant, Oklahoma
Kimberly prepared a compensatory mitigation plan for a 404 permit in support of the ODOT's bypass loop around US70 in Durant, Oklahoma. She coordinated with the United States Army Corps of Engineers (USACE), ODOT, subcontractors, and the City of Durant during the project.

Delineation, Reporting, and 404 Permitting, November 2011-April 2012
QuikTrip
Dallas/Fort Worth Metroplex, Texas
Kimberly led and completed multiple delineations, protected species habitat evaluations, reporting efforts, and 404 permitting (NWP39) including mitigation bank and agency coordination for the client. *This project was completed while Kimberly was employed with another firm.*

- Kleinfelder
- Enercon Services
- George M. Sutton Avian Research Center
- Oklahoma Biological Survey
- Tulsa Community College
- Oklahoma Chapter of the Nature Conservancy

No. of Years With Mead & Hunt
- Hired 05/04/2015

No. of Years With Other Firms
- 10

Delineation, Reporting, and 404 Permitting for 72-TC, May 2014-September 2014
QuikTrip Corporation
Muskogee, Oklahoma
Kimberly coordinated and completed the delineation, protected species habitat evaluations, reporting efforts, and 404 permitting (NWP39) including mitigation plan preparation and agency coordination for the client. *This project was completed while Kimberly was employed with another firm.*

Local Government Contract for Statewide County Road and Bridge Projects
Oklahoma Department of Transportation (ODOT)
Statewide Oklahoma
These similar county-level projects included the delineation of potentially jurisdictional waterbodies, assessment of potential habitat for federally protected species, reporting efforts, the completion of project specific National Environmental Policy Act (NEPA) clearance documents, tribal coordination, and coordination with Oklahoma Department of Transportation (ODOT) contacts and county commissioners. Kimberly assisted with the coordination and completion of field assessments and related reports in support of the Categorical Exclusion (CE) documents. She also coordinated report review with ODOT and preparation of the CE report. *This project was completed while Kimberly was employed with another firm.*

Southern Hills Natural Gas Liquids Trunk Line ROW Assessments, Reports and 404 Permitting, December 2011-July 2012
DCP Midstream, LLC
Meade County, Kansas and Beaver, Harper, Woodward, Major, Blaine, Kingfisher, Logan, Oklahoma, Lincoln, and Pottawatomie Counties, Oklahoma
Kimberly reviewed and classified over 500 waterbodies along approximately 260 miles of pipeline right-of-way. She reviewed all right-of-way feature maps and coordinated field data for the presence of potentially jurisdictional waters and potential threatened and endangered species habitat for a large trunk line pipeline in Oklahoma. Kimberly classified and coordinated mapping efforts with GIS professionals and the client to assist with horizontal directional drilling (HDD) boring locations in order to avoid or minimize impacts to jurisdictional waterbodies. These data were used to complete delineation reports, 404 permitting (NWP12) and to prepare engineering alignment sheets. As appropriate, Kimberly coordinated directly with the Tulsa and Fort Worth District Regulatory Branch of the United States Army Corps of Engineers for the timely completion and issuance of NWP12. She worked directly with the client's environmental project manager to assist with reroutes and attended alignment sheet review meetings. *This project was completed while Kimberly was employed with another firm.*

Southern Hills Natural Gas Liquids Lateral Lines Right-of-Way Assessments, Reports and 404 Permitting, March-August 2012
DCP Midstream, LLC
Woodward, Woods, Major, Logan, and Lincoln Counties, Oklahoma
Kimberly classified over 300 waterbodies along approximately 88 miles of pipeline right-of-way. She reviewed all right-of-way feature maps and coordinated field data for the presence of potentially jurisdictional waters and potential threatened and endangered species habitat for multiple lateral pipelines in Oklahoma. Kimberly classified and coordinated mapping efforts with GIS professionals and the client to assist with horizontal directional drilling (HDD) boring locations in order to avoid or minimize impacts to jurisdictional waterbodies. These data were used to complete delineation

reports, 404 permitting (NWP12) and to prepare engineering alignment sheets. As appropriate, Kimberly coordinated directly with the Tulsa and Fort Worth District Regulatory Branch of the United States Army Corps of Engineers for the timely completion and issuance of NWP12. She worked directly with the client's environmental project manager to assist with reroutes and attended alignment sheet review meetings. *This project was completed while Kimberly was employed with another firm.*

Chitwood/Sholem Lateral Pipeline Right-of-Way Assessments, Reports and 404 Permitting, April-August 2012
DCP Midstream, LLC
Jefferson County, Oklahoma and Clay and Jack Counties, Texas
Kimberly classified over 189 waterbodies along approximately 31.5 miles of pipeline right-of-way. She reviewed all right-of-way feature maps and coordinated field data for the presence of potentially jurisdictional waters and potential threatened and endangered species habitat for multiple pipelines in Oklahoma and Texas. Kimberly classified and coordinated mapping efforts with GIS professionals and the client to assist with horizontal directional drilling (HDD) boring locations in order to avoid or minimize impacts to jurisdictional waterbodies. These data were used to complete delineation reports, 404 permitting (NWP12) and to prepare engineering alignment sheets. As appropriate, Kimberly coordinated directly with the Tulsa and Fort Worth District Regulatory Branch of the United States Army Corps of Engineers for the timely completion and issuance of NWP12. She worked directly with the client's environmental project manager to assist with reroutes and attended alignment sheet review meetings. *This project was completed while Kimberly was employed with another firm.*

Wetland Delineations and Site Spot Checks, May-September 2014
Constellation Energy Partners (CEP)
Uintah Basin, Utah
Kimberly worked in the Uintah Basin in northeast Utah on multiple occasions to assist as a Senior Delineator for site-specific waters and wetlands delineations, section block (square mile) surveys, and site spot checks for waterbodies on the Ute and Ouray Reservation. *This project was completed while Kimberly was employed with another firm.*

Biological Assessment (BA) for the American Burying Beetle, 2007-2008
Tulsa Botanic Garden
Tulsa, Oklahoma
In response to a federal nexus via a nationwide permit application for the construction of a dam at the Oklahoma Centennial Botanical Gardens, Kimberly prepared a biological assessment in response to Formal Section 7 Consultation with United States Fish and Wildlife Service for the American Burying Beetle. *This project was completed while Kimberly was employed with another firm.*

Wetland Inventory, 2006-2007
Camp Gruber Maneuver Training Center
Muskogee County, Oklahoma
As directed by EO 11990, Kimberly was part of a team that assessed the Camp Gruber site for new wetlands and verification of previously identified wetlands, included delineation of waterbodies subject to the jurisdiction of the United States Army Corps of Engineers (USACE). *This project was completed while Kimberly was employed with another firm.*■