Appendix M – Water Resources

Wetland Delineation Report

Ann Arbor Municipal Airport

Runway 6/24 Extension

Report prepared for

City of Ann Arbor, Michigan

Report prepared by

Mead & Hunt

www.meadhunt.com

December 2019

Table of Contents

Appendices

Tables

1. Introduction

Ann Arbor Municipal Airport (ARB) (Airport) is a general aviation airport owned and operated by the City of Ann Arbor (City), Michigan. The Airport is at the intersection of State Street and Ellsworth Road in Pittsfield Township, less than 5 miles from downtown Ann Arbor. The 837 acres of Airport property is currently located entirely within Pittsfield Township having been annexed by the City of Ann Arbor for water rights before Pittsfield Township became a charter township in 1972. The Airport is bordered on the west by single-family residences and a mix of commercial, office, and residential land use on the south, north, and east. Several parcels lying within airport property are in agricultural production. The largest of these fields parallels Lohr Road on the west; another large parcel is situated to the south of Runway 6/24. The Airport property spans two watersheds: the Wood Outlet Drain – Saline River subwatershed (HUC 12: 041000020403), part of the Raisin River Watershed and the Swift Drain – Huron River subwatershed (HUC 12: 040900050403), part of the Huron River Watershed. A project location map is presented in Appendix A.

The airfield at ARB consists of two runways and a supporting taxiway. The paved primary runway 6/24 is 3,505 feet long and 75 feet wide. A full-length parallel taxiway and five connector taxiways provide access between the runway, hangars, and apron areas. ARB also has a turf runway, Runway 12/30, that is 2,750 feet in length and 110 feet in width. This runway is used seasonally for smaller light aircraft. Taxiway A parallels Runway 6/24 and has connector taxiways A1, A2, and A3 that provide access between the runway and taxiway. Connector Taxiways B and C provide access between the parallel taxiway and the main apron as well as T-hangars on the north side of the airfield. Connector Taxiway A1 provides access to additional hangars that exist on the east side of the airfield. Fueling, flight training, aircraft rental and storage, and aircraft maintenance services are available from two full-service fixed-base operators.

The Airport is considering an extension of Runway 6/24 (primary runway) to meet the fleets mixed needs of the Airport. The proposed action would shift the primary runway 150 feet to the southwest and extend the existing 3,505-foot runway to meet the requirements of existing users. Additional major development items include the following:

- Extend Runway 6 by 795 feet
- Extend parallel Taxiway A to match Runway 6 extension
- Extend runway and taxiway lighting and guidance signage
- Relocate/reconstruct FAA owned Runway 6 Runway End Identifier Lights (REILS)
- Reconfigure taxiway intersection with Runway 24 and taxilane to the East Apron
- Remove FAA owned and decommissioned Runway 24 Omni-Directional Approach Lights (ODALs)

In support of an environmental assessment for the extension of Runway 6/24, a wetland delineation was conducted by Mead & Hunt, Inc. (Mead & Hunt) within an Area of Interest (AOI) over two field visits on October 10, 2018 and June 4 – 6, 2019. The AOI comprises 82.2 acres located in Sections 16 and 17, Township 3 South, Range 6 East, Washtenaw County, Michigan. A total of three wetlands and one stream were identified within the AOI.

This report summarizes the results of the wetland delineation. Delineator qualifications are provided in Appendix I. 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; 17 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 and Washtenaw County 1-foot elevation contour maps.
- U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) soil survey, Web Soil Survey. Accessed at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
- U.S. Fish and Wildlife National Wetland Inventory (NWI) Wetlands Mapper. Accessed at https://www.fws.gov/wetlands/data/mapper.html.
- Michigan Department of Environment, Great Lakes, and Energy (EGLE), Wetlands Map Viewer. Accessed at https://www.mcgi.state.mi.us/wetlands/mcgiMap.html#.
- 2016 National Wetland Plant List (Lichvar, R.W., D. L. Banks, W. N. Kirchner, and N. C. Melvin, 2016).
- Aerial photography from the following sources:
    - MapWashtenaw (Washtenaw County Web Map Viewer). Accessed at https://www.washtenaw.org/1197/MapWashtenaw
    - USDA-FSA National Agriculture Imagery Program (NAIP). Accessed as a GIS map service at https://gis.apfo.usda.gov/arcgis/rest/services
    - Google Earth

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: Midwest Region* (U.S. Army Corps of Engineers, 2010). 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 Midwest Regional 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 was 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 11 data points— seven in uplands and four in wetlands— 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 from active airfield areas 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, FEMA Floodplain Map, and NRCS Soils Map
- Appendix C – Previous Wetland Mapping
- Appendix D – WETS Analysis and Climatic Data
- Appendix E – Historic Aerial Imagery
- Appendix F – Wetland Boundary Maps
- Appendix G – Data Sheets
- Appendix H – Field Photographs
- Appendix I – Delineator Qualifications

3. Results and Discussion

A. Site Description

The AOI covers approximately 82.2 acres on Airport property. The AOI is split into two sections situated at the runway ends: approximately 10.4 acres at the Runway 24 end and 71.8 acres at the Runway 6 end. Areas surrounding the four Runway 24 Omni-Directional Approach Lights (ODALs) east of State Street each consist of about 400 sq. ft. The fifth ODAL (Area B) west of State Street at the runway end has previously been removed but the area was examined.

Nearly all infield areas consist of grasses and forbs and are mown on a regular basis. The airfield is relatively flat with little elevation change over the active airside areas. Topography within the active airfield varies from a high of about 830 ft (NAVD 1988) at the Runway 6 end to about 825 ft at the Runway 24 end, sloping gently from the southwest to northeast along the axis of the main runway.

The high point on airport property is located near the intersection of Ellsworth and Lohr roads in the northwest corner of the property. Most of the area to the west of the active airfield is in agricultural production as is a parcel south of the main runway. Surface runoff generally flows from north to south from higher points along Ellsworth Road to lower portions along the southern property boundary.

Topographic mapping (contour interval 1-foot) from the Southeast Michigan Council of Governments (SEMCOG) is presented in Appendix B.

Two drains traverse the airport property. The unnamed western drain carries flows from north of airport property and joins the Wood Outlet before continuing to the south off airport property. A portion of the unnamed drain as it turns to the east is carried through reinforced concrete pipe covered by a wide berm. Another drain, the Mallets Creek – Airport Branch, located east of State Street flows to the northeast.

Infield areas are actively managed by regular mowing. At the time of field work, many areas within the AOI had been mowed, with adequate regrowth observed, making upland vegetation identifiable in most cases. Upland areas at Runway 6 end were dominated by a mix of grasses and forbs consisting of smooth brome, Kentucky blue grass, orchard grass, white clover, common goat's beard, English plantain, common yarrow, bladder campion, and yellow hawkweed. The dominant upland species found at the Runway 24 end included orchard grass, timothy, brome, Kentucky blue grass, chicory, spotted knapweed, dandelion, red clover, Canada thistle, and English plantain.

A large wooded area at the southwest corner of Airport property outside of the airport fence was not delineated although it is part of the project AOI. Depending on the length of the extension chosen for the final preferred alternative, trees within this area may or may not penetrate the approach surface for Runway 6. A LiDAR survey of the area is in process and once completed trees that penetrate the approach surface will be identified. Options for reducing impacts to this area will be explored at a future date.

(1) Soils Mapping

The majority of land within the AOI (62%) is covered by three hydric soil units – Adrian muck, Edwards muck, and Palms muck. These very deep, very poorly drained soils formed in herbaceous organic materials over sandy, loamy or marly deposits on outwash, lake or till plains. Typical soils profiles consist of deep black (N 2.5/ or 10YR 2/1) and/or dark reddish brown (5YR 3/2) and black (5YR 2.5/1) sapric materials on slopes of 0 to 6 percent.

Soils from the Matherton series (MdA) make up a significant component (27.2%) of the soils within the AOI. This deep, somewhat poorly drained soil series is marked by dark grayish brown (10YR 3/2) and grayish brown (10YR 5/2) sandy loam horizons over a brown (10YR 5/3) sandy clay loam to 19 inches in depth occurring on slopes from 0 to 6 percent. This soil unit is rated as non-hydric.

Generally, mucky hydric soils from the Palms, Edwards, and Adrian soil units cover the southeast side of Airport property while non-hydric soils are mapped on the northwest half of the airport. Areas in agricultural production are generally underlain by soils from the Fox sandy loam series (FoA and FoB). An agricultural field to the south of the runway near the Runway 6 end is covered by Palms muck. The long-term farmer of this field indicated that it has been farmed for many years and that there is no tilling.

Soils present within the AOI are summarized in Table 1. Soils rated as hydric are bolded 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)
Ad	**Adrian muck**	**29.4**	**Depressions on till plains, outwash plains, lake plains, moraines, deltas, and/or valley trains**	**Yes (100)**
Ee	**Edwards muck, shallow variant**	**8.4**	**Depressions on moraines, till plains, lake plains, and/or outwash plains**	**Yes (100)**
FoA	Fox sandy loam, till plain, 0 to 2 percent slopes	0.1	Outwash plains, outwash terraces	No (4)
FoB	Fox sandy loam, till plain, 2 to 6 percent slopes	4.1	Outwash plains, outwash terraces	No (4)
MdA	Matherton sandy loam, 0 to 4 percent slopes	27.2	Drainageways on glacial drainage channels, outwash plains, terraces	No (0)
Pa	**Palms muck**	**24.1**	**Depressions on till-floored lake plains, moraines, till plains**	**Yes (100)**
Sb	**Sebewa loam, disintegration moraine, 0 to 2 percent slopes**	**0.1**	**Drainageways, drainageways on stream terraces**	**Yes (94)**

Map unit symbol	Map unit name	Percent of AOI	Primary Landform	Hydric Rating (Percent)
WaA	Wasepi sandy loam, 0 to 4 percent slopes	6.5	Drainageways on deltas, valley trains, strand plains, lake plains	No (2)

(2) Aquatic Resources

The National Wetland Inventory (NWI) indicates several areas of mapped wetlands within the airport property: two large areas mapped as forested/shrub wetland are shown outside of the fence line, both in association with drains, and a large area of emergent wetland is mapped in the southwest corner of the Airport. No wetlands are mapped for the north portion of the AOI while emergent wetland is shown with the southern portion of the AOI.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) Wetlands Map Viewer also shows mapped wetlands in similar areas with the extension of wetland mapping towards Ellsworth Road at the northern end of the AOI.

The Michigan Department of Environmental Quality (MDEQ)[1] provided a Wetland Identification report as part of an Environmental Assessment (EA) conducted in 2009 in which a small wetland near the east apron was determined not to be regulated by the State. A wetland delineation at the Runway 24 end was performed by the MDEQ later in 2009. This covered an area near the east apron and corresponds to Wetland 1 delineated as part of this report. Previous wetland mapping and the Wetland Identification report are presented in Appendix C.

(3) Antecedent Climatic Conditions

An assessment of antecedent climatic conditions was made using precipitation data for the three months prior to field work on both site visits. This analysis indicated that climatic conditions were within normal range for the October 2018 field visit and were wetter than normal for the June 2019 visit (see Appendix D).

Three days prior to the June 2019 site visit, approximately 0.71 inches of rain fell on site followed by 0.21 inches during the site visit. Precipitation data for June is presented in Appendix D.

(4) Historic Aerial Photograph Review

Aerial photographs from 1940, 1960, 1966, 1979, 1984, 1990, 1993, 1997, 1998, 2005, 2010, 2015, and 2018 were reviewed to assess areas within the AOI for wet signatures. These photos were accessed from the MapWashtenaw (Washtenaw County Web Map Viewer) at https://www.washtenaw.org/1197/MapWashtenaw and are presented in Appendix E. GoogleEarth images from 2016, 2017, and 2018 are also presented in Appendix E.

[1] The Michigan Department of Environment, Great Lakes, and Energy (EGLE) was previously called the Michigan Department of Environmental Quality (DEQ).

The earliest photograph in this collection, taken in 1940, shows most of the AOI in agricultural crop production, including the southwestern corner of the AOI. The original configuration of the airport is visible with two paved runways situated adjacent to State Street. Several hangars and a building are accessed directly from State Street on the east side of the airport.

By 1960, Runway 6/24 has been constructed along with more buildings and hangars along State Street. Most of the airport's property is in agricultural production. The original runways appear to be out of use, replaced by the current Runway 6/24. In the 1966 aerial photo, the current parallel taxiway is in use and the turf runway has been constructed. Facilities have been added on the northwest side of the primary runway including hangars and an apron. Most of the west side of the airport remains in agricultural production.

A terminal building north of the main ramp and more hangars, both an expansion of the first hangars at the Runway 24 end and several new hangars west of the main ramp, are seen in the 1979 aerial. Pavement from the original airport layout appears to provide access to the east apron along State Street. Areas in agricultural production remain the same.

Between 1979 and 1997 little change in the number and type of buildings is seen and the overall configuration of the runways and taxiway remains the same. By 1984, land use changes are noted in the southwest corner of Airport property. The bulk of the westernmost portion of Area G outside of the airport fence appears to have gone out of agricultural production and by 1997, isolated trees and shrubs can be seen in this area. As well, in 1997, the unnamed drain running north-to-south is now piped under a berm directly in line with the extension of the runway centerline. This also corresponds to where the drain curves to the east to join the Wood Outlet.

The 2005 aerial gives an excellent picture of land use at the Airport – drier agricultural fields in the west, a wetter field to the south, a former farm field in the extreme southwestern corner reverting to a forested/shrub area, mown turf areas around active runway areas on the east, and hangars and other pavement areas outside the active runways on the north and east.

Areas at each runway end will now be discussed separately to highlight observations of interest.

Area A

Aerials are available from 2009, 2010, 2012, 2015, 2016, 2017, and 2018. Starting in 2009, a wet signature is observed directly adjacent to the east apron. Evidence of consistent saturation is seen in the 2009, 2012, 2016, 2017, and 2018 photos, each likely taken early in the growing season. The 2010 and 2015 photos do not show a wet signature but likely these were taken later in the growing season. This wet signature corresponds to an area that was formerly bounded by pavement from the original airport configuration. This has resulted in a shallow closed basin that collects surface runoff and precipitation.

Area G

The area between the berm and the airport fence (which demarcates the area delineated) shows a somewhat more complicated history in the years from 2005 to 2018. Photos are available from 2010, 2015, 2016, 2017, and 2018 from GoogleEarth and from Washtenaw County from 2010, 2015, and 2018. In 2005, this area is in agricultural production in the north half and is fallow or minimally maintained on the south half. By 2010, the whole area west of the berm has been converted to farming, likely in response to increased commodity prices seen in 2008. The southern half, though, is generally more wet, largely due to overland flow from the drain which exits from the culvert short of the southern airport fence line and instead drains to the west fence line. In drier years, apparently successful crops are attained. A sinuous flow path can be seen in 2015 and 2018 (Washtenaw County) from the culvert exit flowing along topographic lows to the wooded area beyond the fence line on the western side of the field. This area was investigated at the June 2019 field visit.

(5) Atypical Conditions Analysis

The Airport has a long history within Washtenaw County, serving general aviation and corporate business aviation needs and providing aviation education and private hangars since being dedicated in 1928. Within airport property, construction and agricultural activities over the Airport's history have affected many areas on the landscape which have experienced some or all of the following disturbances:

- Grading, filling, mixing, transportation, and compaction of native soils.
- Introduction of cool-season turf grasses.
- Agricultural disturbance and compaction due to plowing and harvesting.
- Changes to topography and drainage.
- Substitution of pipe drainage for natural sheet flow in some areas.
- Regular mowing of most airport property, which encourages the growth of grass species over forbs.

Within the AOI, though, normal circumstances were considered to be present due to the long period of time since construction and that regular vegetation maintenance is largely confined to upland areas. Soils were found to be intact at sampling points and vegetation regrowth at the time of field work was sufficient to make plant identification reliable.

B. Findings

(1) Wetlands

A total of three wetlands were delineated within the AOI. Wetland boundary maps with sampling point locations are presented in Appendix F followed by data sheets and field photographs in Appendices G and H, respectively. Table 2 summarizes the delineated wetlands which are described in detail below.

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

Wetland	NWI Type	Dominant Vegetation	Total Area within AOI (Acres)	Total Area within AOI (Sq. Ft)
1	PEM1	Reed canary grass	2.582	112,453.367
2	PEM1	Reed canary grass	0.144	6,269.759
3	PEM1	Cattail; reed canary grass	0.506	22,041.387
Total			3.232	140,764.513

(a) Wetland 1 (PEM1)

Wetland 1 (W1) is a large shallow triangular basin located in the northern portion of the AOI. The wetland plant community is dominated by emergent vegetation within its core. The taxilane and east apron pavement confines the eastern side of the wetland. The southern and western boundaries are formed by remnant portions of the original airport pavement sections, now covered by vegetation.

NWI wetland mapping does not show wetlands mapped in this area. However, a wetland determination performed in 2009 as part of a previous Environmental Assessment found a small wetland in this area (See Appendix C).

Vegetation is mown two or three times a year in accordance with an agreement with the local Audubon Society. The site was visited two times, first on October 10, 2018 and a second site visit occurred in early June 2019. At both site visits, sufficient regrowth had occurred to make plant identification reliable.

Sampling points DP1 (wetland), DP2 (wetland), and DP3 (upland) were taken in this area. The locations of these sampling points are found on the Wetland Boundary Maps in Appendix F. Data sheets and field photographs are presented in Appendices G and H.

Vegetation

At wetland sampling point DP1, reed canary grass (*Phalaris arundinacea*: FACW) dominates most of the central part of the wetland while on the boundary at wetland sampling point DP2, a somewhat more diverse mix of species consisted of Limestone-Meadow Sedge (*Carex granularis*: FACW), red osier dogwood (*Cornus alba*: FACW), and buckthorn (*Rhamnus cathartica*: FAC).

Other species observed in the wetland consisted of swamp milkweed (*Asclepias incarnata*: OBL), cut-leaf water-horehound (*Lycopus americanus*: OBL), and some large patches of purple-stem aster (*Symphyotrichum puniceum*: OBL).

The dominant species within W1 are hydrophytic (FAC, FACW, or OBL) and meet the hydrophytic vegetation criterion.

Hydrology

At the October 2018 field visit, wetland hydrology was indicated by meeting secondary indicators Geomorphic Position (D2) and a positive FAC-Neutral Test. No dry-season water table was noted.

Wetland hydrology was present and indicated at the second field visit in June 2019. About 0.25 inches of rain fell the morning of the field visit and environmental conditions were wetter than normal. At data point DP2 (wetland), primary indicators High Water Table (A2), and Saturation (A3) were met by the presence of a water table found at 7 inches in depth and saturation at ground surface. Secondary indicators Geomorphic Position (D2) and Saturation Visible on Aerial Imagery (C9) were also met. Wet signatures indicative of saturation are visible on recent aerial images from 2018, 2017, and 2016. Standing water was present within the wetland.

Soils

Palms muck (Pa), a deep and very poorly drained muck soil unit, underlies the wetland. At sampling point DP1 (wetland) taken near the core of the wetland, the soil profile showed a layer of black (10YR 2/1) silt loam over a thin layer with a mixed matrix of black (10YR 2/1) and grayish brown (10YR 5/2) that included small pebbles and rocks. This appears to be a fill layer under which was a black (10YR 2/1) silt loam to 22 inches in depth that likely was the original soil layer pre-airport construction. This profile did not meet thickness requirements for the Depleted Dark Surface (F7) indicator but due to the disturbed nature of the soils and the presence of both hydrophytic vegetation and wetland hydrology and a previous wetland determination, the hydric soils criterion was determined to be satisfied. See Photo 1 in Appendix H.

At Sampling point DP2 (wetland), taken in June 2019, hydric soils were indicated by meeting the Depleted Matrix (F3) soils indicator. A thin surface layer of very dark gray (10YR 3/1) loam overlays a thin stony fill layer of dark gray (10YR 4/1) sandy loam. Below these layers is a dark gray (10YR 4/1) sandy loam with strong brown (7.5YR 4/6) redox features underlain by a black (N 2.5/) silt loam to 20 inches in depth. This soil profile satisfies the Depleted Matrix (F3) hydric soils indicator.

Wetland Boundary

The wetland boundary was based on distinct differences in vegetation, soils, and topography. The upland sampling point (DP3) was taken approximately 25 feet to the north of DP2, the wetland sampling point. The elevation difference between these two sampling points on the northern side of the basin was about 0.5 feet. The southern side of the wetland showed a more distinct elevation change of about 1-2 feet as remnant portions of the original airport pavement sections were encountered.

In transition to uplands, vegetation shifted to include smooth brome (*Bromus inermis*: FACU), spotted knapweed (*Centaurea maculosa*: UPL), and buckthorn as dominants. The soil profile was similar to the other two sampling points in this wetland although indicators of hydric soils were lacking. Wetland hydrology was present at the upland data point with a High Water Table (A2) at 9 inches in depth and Saturation (A3) at the surface.

(b) Wetlands 2 (PEM1)

Wetland 2 (W2) is located in a low shallow area at the western corner of the airport fence line. The wetland plant community is dominated by emergent vegetation while the fence is lined with mature 25-30 foot buckthorn trees. The wetland continues beyond the fence.

The area does not appear to have been mown but tractor ruts were present due to the need for turning area for agricultural activities in the farm field to the north. A tree clearing debris pile sits atop a higher ridge to the north of the wetland. From an analysis of historic aerial imagery, this area was covered by a tree and shrub plant community until about 2008.

Wetland 2 does not appear on previous NWI wetland mapping. NRCS soils mapping shows Edwards muck (Ee) underlying this area.

Sampling points DP6 (wetland) and DP7 (upland) were taken in Wetland 2. The locations of these sampling points are found on the Wetland Boundary Maps in Appendix F. Data sheets and field photographs are presented in Appendices G and H.

Vegetation

The herbaceous plant community within Wetland 2 is dominated by reed canary grass (*Phalaris arundinacea*: FACW) as seen at wetland sampling point DP6. Other species observed in the wetland include cottonwood saplings (*Populus deltoides*: FAC) and Indian-Hemp (*Apocynum cannabinum*: FAC).

The dominant species within Wetland 2 is hydrophytic (FAC, FACW, or OBL) and satisfies the hydrophytic vegetation criterion.

Hydrology

Standing water was present throughout Wetland 2. About 0.25 inches of rain fell the morning of the field visit and environmental conditions were wetter than normal. Water appears to drain to the south and west over fairly gentle slopes beyond the airport fence. At wetland sampling point (DP6), wetland hydrology was present and indicated. Primary indicators Surface Water (A1), High Water Table (A2), and Saturation (A3) were met by the presence of surface water to one inch in depth, a water table found at the surface, and saturation at the ground surface. Secondary hydrology indicator Geomorphic Position (D2) was also met.

Soils

Edwards muck (Ee) underlies this shallow area of Wetland 2. At sampling point DP6 (wetland) dug to a depth of 20 inches, the soil profile shows a black (10YR 2/1) silt loam layer over very dark gray (10YR 3/1) silt loam with yellowish red (5YR 4/6) redox features which met the Redox Dark surface (F6) hydric soils indicator. Deeper in the soil profile, a thin light reddish gray depleted soil layer (2.5YR 7/1) which did not meet thickness nor depth requirements for a depleted matrix overlaid a high chroma mineral layer that did not indicate a buried muck layer.

Wetland Boundary
The wetland boundary was based on distinct differences in vegetation and topography. The upland sampling point (DP7) was taken upslope about 15 feet away from the paired wetland sampling point. The elevation difference between these two sampling points was about one foot. Dominants in the herb stratum were Canada thistle (*Cirsium arvense*: FACU) and Kentucky blue grass (*Poa pratensis*: FAC) which failed the Prevalence Index at 3.61. In transition to uplands, smooth brome and orchard grass (*Dactylis glomerata*: FACU), red columbine (*Aquilegia canadensis*: FACU), and Dame's rocket (*Hesperis matronalis*: FACU) were observed along the slight ridge above Wetland 2.

The light reddish gray depleted soil layer (2.5YR 7/1) seen at the wetland point was found at 16 inches in depth at upland sampling point DP7. While digging deeper was precluded by the high water table, this soil likely would have meet criteria for Thick Dark Surface (A12). Wetland hydrology was present with a High Water Table (A2) at 12 inches.

(c) Wetland 3 (PEM1)
Wetland 3 is a small depressional area dominated by emergent vegetation including cattails and reed canary grass. The wetland is located to the east of a culvert exiting from a wide berm which carries flows from the north through an unnamed drain. A portion of the drain is now carried through reinforced concrete pipe and daylights about 250 feet short of a connecting culvert under the airport fence to the open channel drain beyond airport property. See Wetland Boundary Map 2 in Appendix F.

Flows exit the culvert and spread over the eastern portion of the berm. Under normal flow conditions, drainage seems to generally follow the top of the berm to the connecting culvert on the fence line. Under wetter conditions, higher flows spill over the berm on both sides which has resulted in a sinuous flow path to the west through the southern part of the agricultural field.

The wetland is fed by drainage exiting from the culvert. At the time of the June 2019 site visit, hydrological conditions were wetter than normal, and 0.25 inches of rain fell the morning of field investigation. Woody debris had accumulated at the culvert exit (See Photos 31 and 32 in Appendix H), blocking the normal eastern flow of water which resulted in steady flow down the side of the berm through the farm field to the west of the berm.

The wetland is bounded by a slight rise in elevation associated with the farm field on the west and by a slight rise in elevation on the south side along the fence. The top of the berm forms the northern boundary. The wetland continues beyond the fence.

Sampling points DP9 (upland), DP10 (wetland), and DP11 (upland) were taken on a transect through Wetland 3. The locations of these sampling points are found on the Wetland Boundary Maps in Appendix F. Data sheets and field photographs are presented in Appendices G and H.

Vegetation

The herbaceous plant community within Wetland 3 is dominated by cattail (*Typha angustifolia*: OBL) and reed canary grass (*Phalaris arundinacea*: FACW). The wetland consists of a central core dominated by cattails as seen at wetland sampling point DP10 which is surrounded by reed canary grass. Other species observed in the wetland include purple-stemmed aster (*Symphyotrichum puniceum*: OBL), sedge (*Carex* sp.), and curly dock (*Rumex crispus*: FAC). Vegetation was observed over about 40% of central core's surface.

Hydrology

Wetland hydrology was present and indicated in Wetland 3. About 0.25 inches of rain fell the morning of the field visit and environmental conditions were wetter than normal. No standing water was observed in the wetland although a High Water Table (A2) to a depth of 12 inches was observed at wetland sampling point DP10. In addition, secondary indicators of wetland hydrology Geomorphic Position (D2) and a positive FAC-Neutral Test (D5) were also satisfied. Fine debris materials on the thinly vegetated surface were also noted within the core of the wetland indicating standing water earlier in the season.

Soils

Palms muck (Pa) underlies the Wetland 3. At sampling point DP10 (wetland), the soil profile shows a black (10YR 2/1) silt loam layer over dark gray (10YR 4/1) silt loam with yellowish red (5YR 4/6) redox features starting at 12 inches in depth. This soil profile satisfies the Depleted Below Dark Surface (A11) hydric soils indicator.

Wetland Boundary

The wetland boundary was based on distinct differences in vegetation, soils, hydrology, and topography. The upland sampling point (DP9) was taken about 35 feet south of DP10. The elevation difference between these two sampling points was about one foot. Dominants in the herb stratum were Orchard grass (*Dactylis glomerata*: FACU) and Canada thistle (*Cirsium arvense*: FACU). In transition to uplands on this side of the wetland, other species noted were Canada goldenrod (*Solidago canadensis*: FACU), yellow wood sorrel (*Oxalis stricta*: FACU), common yarrow (*Achillea millefolium*: FACU) and English plantain (*Plantago lanceolata*: FACU). Wetland hydrology was neither present nor indicated at DP9. Hydric soils were found to cross boundary here by meeting the Depleted Matrix (F3) and Depleted Below Dark Surface (A11) hydric soils indicators.

On the north side of Wetland 3, upland sampling point DP11 revealed a plant community dominated by smooth brome (*Bromus inermis*: FACU), Kentucky blue grass, Canada thistle, Canada goldenrod, and Orchard grass which failed the Prevalence Index at 3.75. Wetland hydrology was neither present nor indicated at DP11 and hydric soils indicators were also lacking.

(2) Streams

The unnamed western drain carries flows from north of the airport property and joins the Wood Outlet before continuing to the south off airport property. A portion of the unnamed drain as it turns to the east is carried through reinforced concrete pipe covered by a wide berm. A portion of the open-channel drain was delineated. It is summarized in Table 3.

Table 3. Summary of Streams within the Area of Interest

Stream	NWI Type	Dominant Vegetation	Total Length within AOI (Linear Ft)
1	R4	Buckthorn, green ash, American elm; amur and tatarian honeysuckle, Dame's rocket, smooth brome, poison ivy	300.2
Total			300.2

(a) Stream 1 (R4)

Stream 1 (S1) is a narrow steep-sided open channel drain flowing to the south. Stream 1 is the portion of this channel north of the culvert entrance within the AOI. The stream width (top-of-bank) is 15-20 feet with the channel depth about 10-12 feet. Water was flowing in the stream at the time of field investigation. The width of flow was 2-3 feet and the water depth was 6-8 inches. Flow through the mostly silty stream bottom was clear and there was no noticeable odor. The length of the drain within the AOI was shaded by trees or shrubs.

The steep sides were covered by a mix of buckthorn, amur honeysuckle (*Lonicera maackii*: UPL), Tatarian honeysuckle (*Lonicera tatarica*: FACU), green ash (*Fraxinus pennsylvanica*: FACW), American elm (*Ulmus americana*: FACW), cherry (*Prunus* sp.), and black walnut (*Juglans nigra*: FACU) in the tree stratum. Dame's rocket (*Hesperis matronalis*: FACU), smooth brome, orchard grass, poison ivy (*Toxicodendron radicans*: FAC), and Virginia creeper (*Parthenocissus quinquefolia*: FACU) represented the herb stratum.

The ordinary high water mark was determined along the bed-and-banks and by observing a change in the plant community. No scour, deposition, shelving, litter/debris, or wracking was observed.

No other water bodies were identified during the delineation.

C. Uplands

Uplands within the AOI consisted primarily of managed landscapes covered by a mixture of grasses and forbs and agricultural fields in row crop production. Several areas were investigated and documented with data points. See Wetland Boundary Maps in Appendix F for the locations of the sampling points.

(1) Areas B - F

Areas B – F located east of State Street are small areas encompassing each of the four existing decommissioned Runway 24 ODALs. These areas were visited during the October 10, 2018 site visit. The project proposes the removal of the lights and stanchions, and the concrete pads on which they rest. Each of the concrete pads are underlain by fill materials and are slightly elevated over the surrounding wetter areas. Two data points, taken during the October 2018 field visit, documented general conditions in this area (DPs 4 and 5).

Hydric soils criteria were satisfied at DP4 with a Depleted Matrix (F3) while at DP5 soils were very disturbed. Depleted layers within the soil profile at DP5 did not meet thickness requirements. At both sampling points, wetland hydrology was neither present nor indicated. Soils pits dug to 22 inches did not reveal a dry-season water table. Hydrophytic vegetation was not present at either sampling point.

(2) Area G

To the south of the Runway 6 end, a portion of an agricultural field lies within the AOI. This area was investigated with soils test pits during the June 2019 site visit. This area is underlain by Palms muck and has been in agricultural production for many years. The current farmer reported that it has not been tiled.

The soil profile showed a thick black to about 18 inches over a 4-inch layer of dry reddish brown undecomposed fibrous organic material. Wetland hydrology was neither present nor indicated within the newly planted field. Weedy vegetation present consisted of yellow rocket (*Barbarea vulgaris*: FAC), Indian-hemp (*Apocynum cannabinum*: FAC), goosefoot (*Chenopodium album*: FACU), dandelion (*Taraxacum officinale*: FACU), and curly dock (*Rumex crispus*: FAC).

To the west of the berm, flows from the culvert exit had collected in a low spot in the farm field near the western fence. Data point DP8 sampled this area. The field had been planted to soybeans earlier in the Spring but nearly all vegetation was absent around DP8 due to the wet soil conditions. A few soybean plants and Indian-hemp shoots were present. The soil profile revealed silty clay loams of very dark gray (10YR 3/1) over a black (10YR 2/1) layer to 20 inches. No redoximorphic features were observed. This soil profile did not satisfy hydric soils criteria.

While surface water was present to a depth of 6 inches within the sampling area, the bottom of the soil pit showed no water table or saturation at 16 inches. Therefore, wetland hydrology was present.

D. Summary

In summary, the majority of land within the AOI (62%) is covered by three hydric soil units – Adrian muck, Edwards muck and Palms muck. Soils from the non-hydric Matherton series (MdA) make up a significant component (27.2%) of the remaining soils under the AOI. Three wetlands and one stream were identified within the AOI under normal circumstances. Environmental conditions were within normal range for the October 2018 field visit and wetter than normal for the June 2019 field visit. Eleven (11)

sampling points document conditions within the AOI. The wetland boundary was determined by the observation of multiple indicators of wetland hydrology associated with wetland vegetation on soils exhibiting Depleted Below Dark Surface (A11), Thick Dark Surface (A12), Depleted Matrix (F3), and Redox Dark Surface (F6) in depressional basins. Wetland hydrology was indicated by primary and secondary indicators observed as Surface Water (A1), High Water Table (A2), Saturation (A3), Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), and positive FAC-Neutral Test (D5). The boundary determinations primarily relied on the absence of one or more wetland criteria: lack of hydrophytic vegetation, wetland hydrology indicators, and hydric soils. Distinct topographic breaks often found along the basin edges also aided the boundary determination.

One steep-sided stream was delineated within the AOI along an unnamed drain flowing south. The ordinary high water mark was determined along the bed-and-banks and by observing a change in the plant community. No other water bodies were identified during the delineation.

4. Conclusions

A total of three separate wetland boundaries enclosing 3.232 acres were delineated within the AOI at the Ann Arbor Municipal Airport. One stream of length 300.2 ft was delineated within the AOI. A jurisdictional determination for these wetlands may be needed from the EGLE. A Part 303, PA451 wetland fill permit from the EGLE may be needed for any wetland mitigation activities within the jurisdictional wetland boundaries. Independent review by local land use authorities and adoption of the wetland boundaries under shoreland/wetland zoning ordinances may also be required. Final authority over the project rests with the above federal, state, and local agencies.

The wetland and water boundaries established by this work are valid only for the subject project and any use or interpretation of its findings for areas outside the project area of interest is not supported. The user of this wetland boundary report is advised that changing environmental conditions may affect the future validity of the wetland boundaries so established.

5. Certifications 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: Midwest (U.S. Army Corps of Engineers, 2010).

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 waters and 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: December 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 Michigan 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/.

- Michigan Department of Environment, Great Lakes, and Energy (EGLE), Wetlands Map Viewer. Accessed at https://www.mcgi.state.mi.us/wetlands/mcgiMap.html#.

- National Wetlands Inventory from the U.S. Fish and Wildlife Service Wetlands Mapper. Accessed at https://www.fws.gov/wetlands/data/mapper.html.

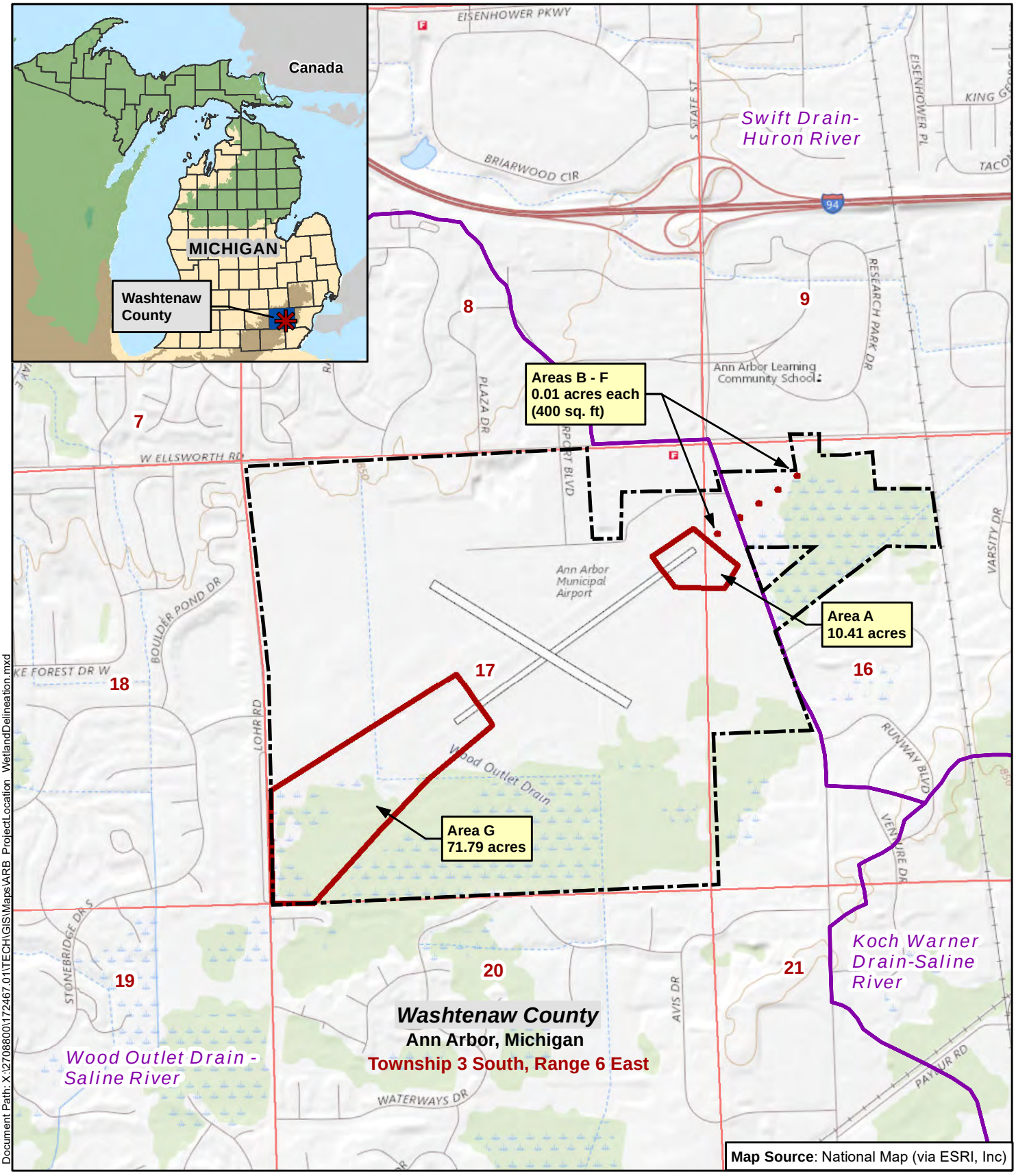
- Soils Survey of Washtenaw County, MI. U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, Web Soil Survey available online at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

- U.S. Army Corps of Engineers, 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0),* ed. J.S. Wakely, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

- U.S. Department of Agriculture, Natural Resource Conservation Service (USDA, NRCS), 2017. *Field Indicators of Hydric Soils in the United States*, Version 8.1, ed. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz. USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils.

- USDA-FSA National Agriculture Imagery Program (NAIP). Accessed as a GIS map service at https://gis.apfo.usda.gov/arcgis/rest/services.

Appendix A. Project Location and Topography Map



Project Location

Ann Arbor Municipal Airport

0 500 1,000 2,000 Feet

N

Legend

LRR SUBREGION

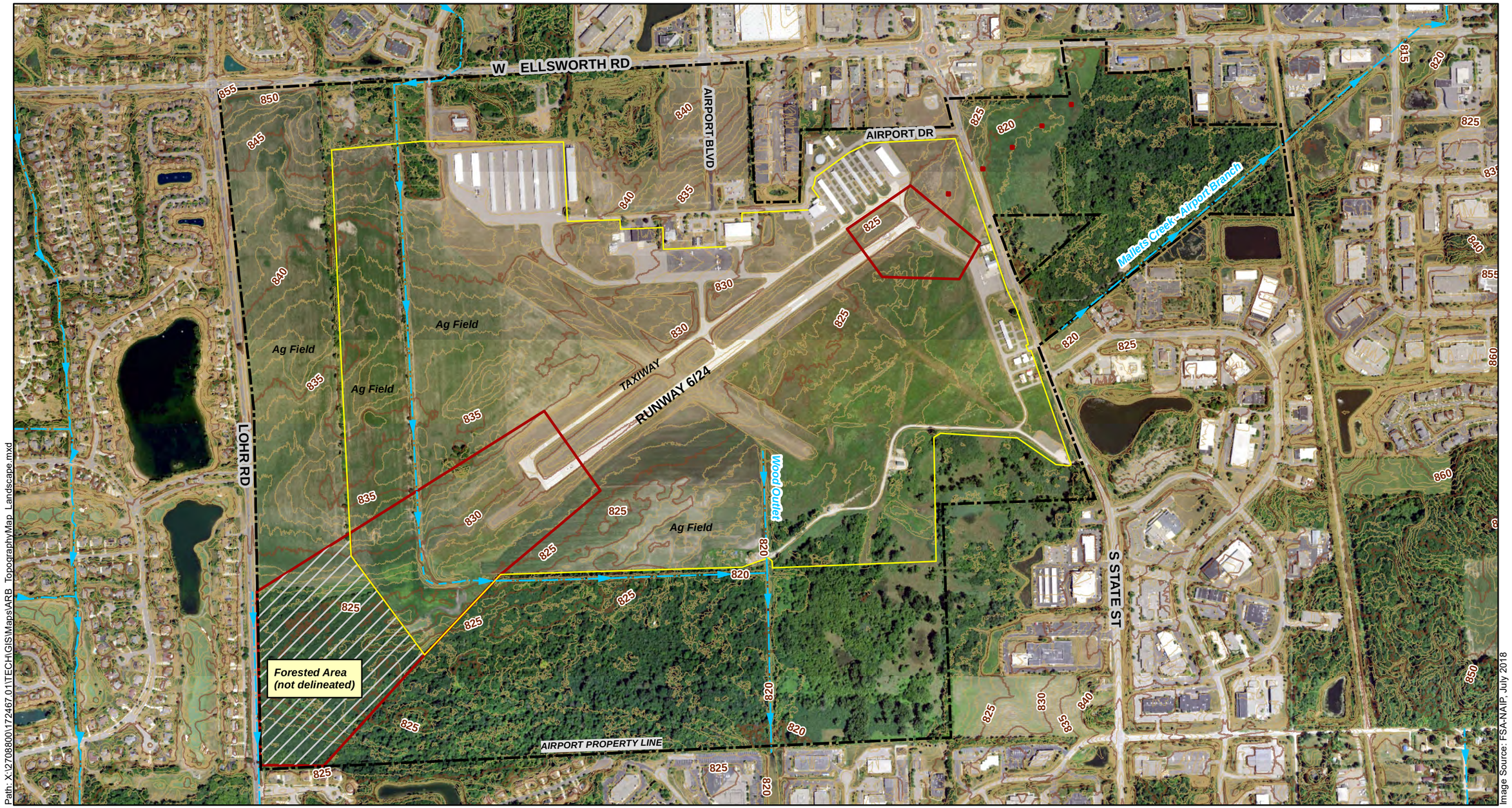
- K
- L
- M

- Airport Property Boundary
- Watershed Boundary
- Project Area of Interest (AOI)
- Section Line

Project Information

T3S, R6E, Sections 16 and 17
Ann Arbor Municipal Airport
Washtenaw County, MI
LRR subregion: M
USACE Regional Supplement: Midwest
Area of Interest = 82.2 acres
Field work conducted: October 10, 2018 and June 3 - 6, 2019

Appendix B. Detailed Topographic, FEMA Floodplain, and NRCS Soils Maps



Path: X:\2708800\172467.01\TECH\GIS\Maps\ARB_TopographyMap_Landscape.mxd

Image Source: FSA-NAIP, July 2018

Topography Map

Ann Arbor Municipal Airport

Data Sources:

Elevation data: Washtenaw County from 2017
LiDAR data. The contour elevation interval is 1 foot.
Streams: Washtenaw County

Legend

- Project Area of Interest (AOI)
- Area not delineated
- Piped Drainage
- Stream
- Airport Property Boundary
- Fence

Contour Type*

- Index
- Intermediate

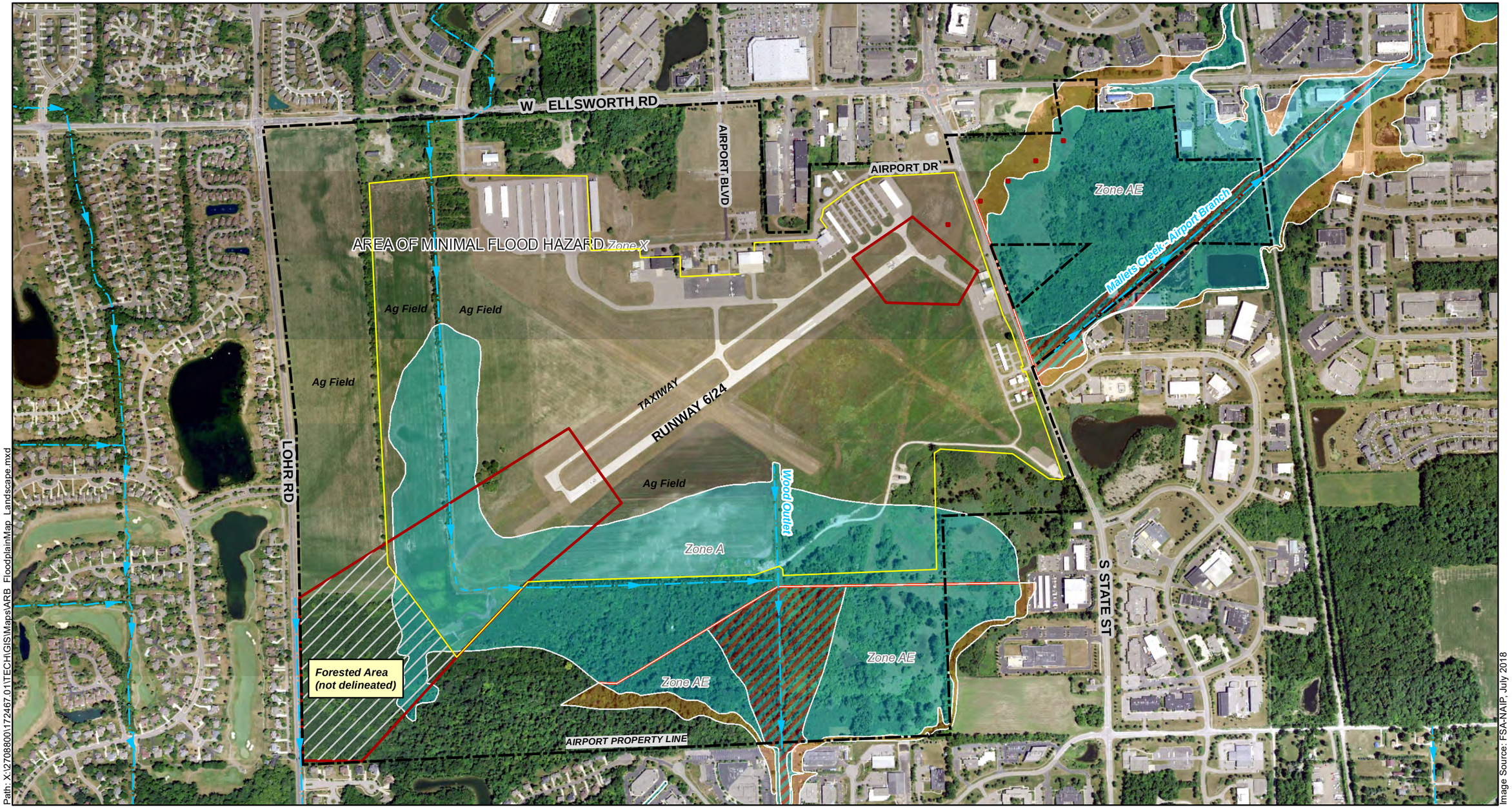
* Contour interval is 1 foot

0 250 500 1,000 1,500 Feet

N

Project Location

T3S, R6E, Sections 16 and 17
Ann Arbor Municipal Airport
Washtenaw County, MI
LRR subregion: M
USACE Regional Supplement: Midwest
Area of Interest = 82.2 acres
Field work conducted: October 10, 2018
and June 3 - 6, 2019



FEMA Floodplain Map

Ann Arbor Municipal Airport

Data Sources:

Streams: Washtenaw County
Floodplains: FEMA National Flood Hazard Layer
(https://hazards.fema.gov/gis/nfhl/services)

Legend

- Project Area of Interest (AOI)
- Area not delineated
- Piped Drainage
- Stream
- Airport Property Boundary
- Fence

Flood Hazard Zones

Zone Type

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

Flood Hazard Boundaries

- Other Boundaries
- Limit Lines
- SFHA / Flood Zone Boundary

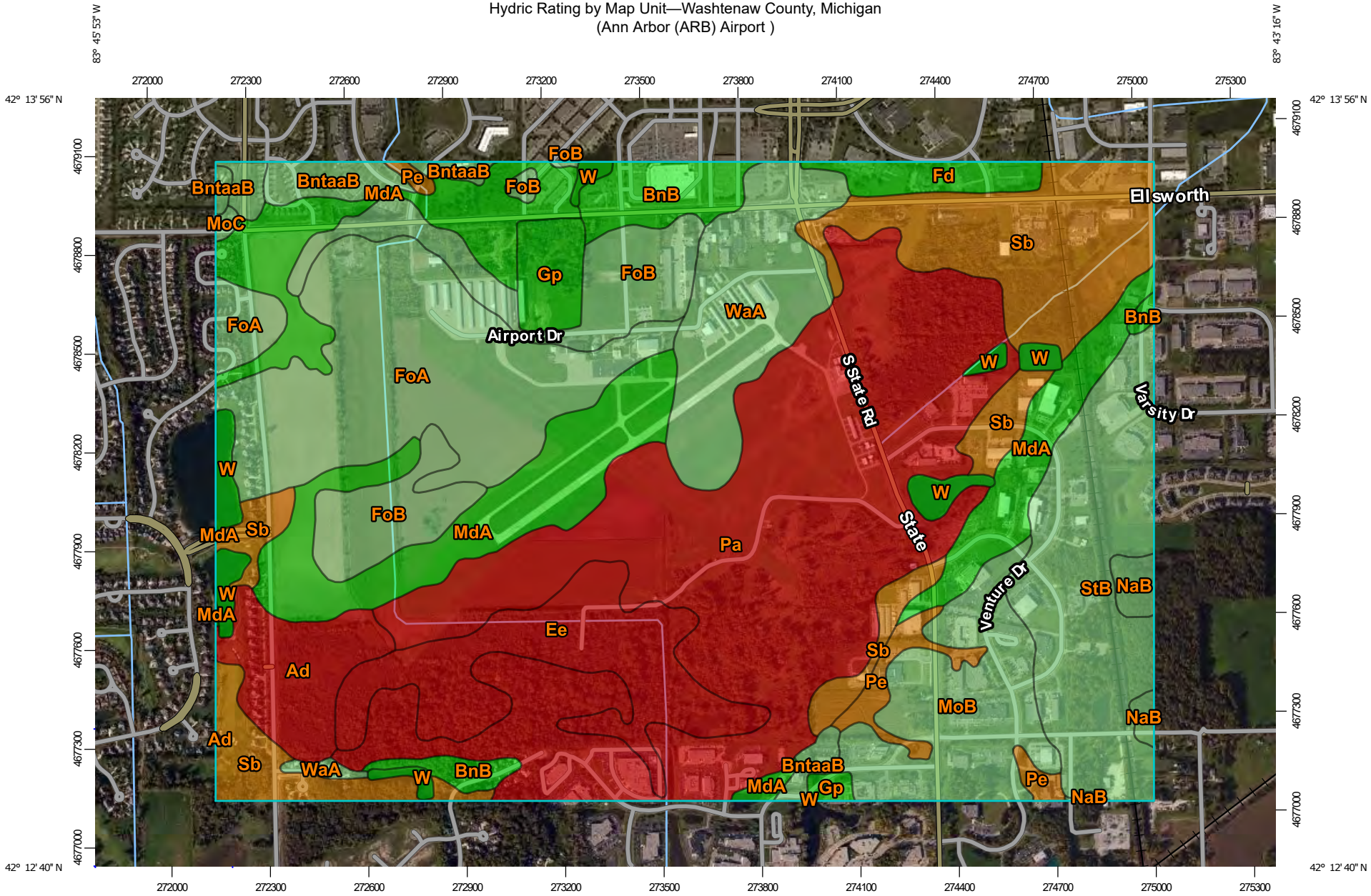
N

0 250 500 1,000 1,500 Feet

Project Location

T3S, R6E, Sections 16 and 17
Ann Arbor Municipal Airport
Washtenaw County, MI
LRR subregion: M
USACE Regional Supplement: Midwest
Area of Interest = 82.2 acres
Field work conducted: October 10, 2018
and June 3 - 6, 2019

Hydric Rating by Map Unit—Washtenaw County, Michigan
(Ann Arbor (ARB) Airport)



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 1:20,000.

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: Washtenaw County, Michigan
Survey Area Data: Version 17, Sep 7, 2018

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

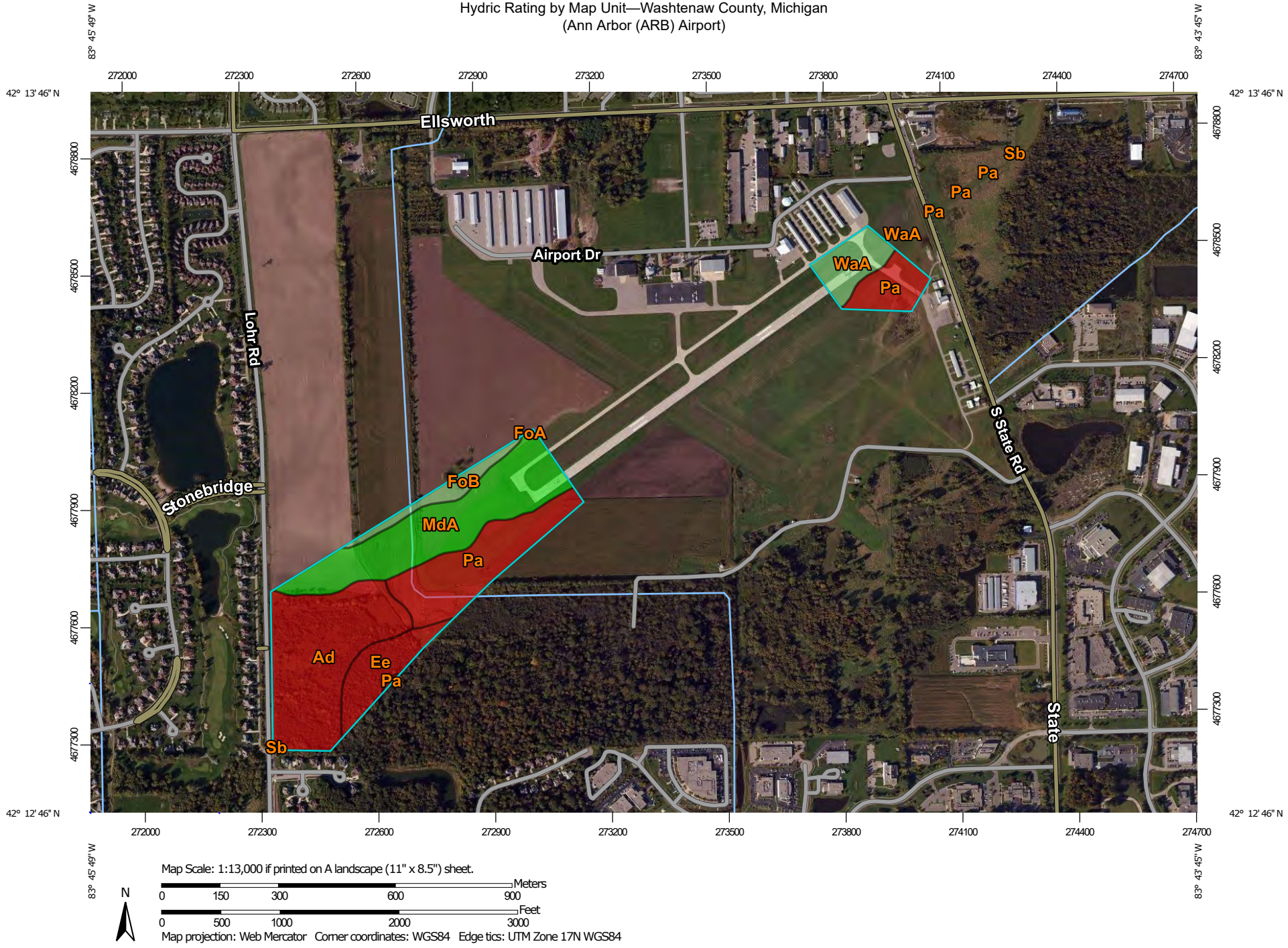
Date(s) aerial images were photographed: Sep 18, 2011—Sep 27, 2014

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
Ad	Adrian muck	100	38.2	2.8%
BnB	Boyer loamy sand, 1 to 6 percent slopes	0	30.4	2.2%
BntaaB	Blount loam, 2 to 6 percent slopes	4	20.6	1.5%
Ee	Edwards muck, shallow variant	100	80.0	5.8%
Fd	Fill land	0	15.0	1.1%
FoA	Fox sandy loam, till plain, 0 to 2 percent slopes	4	150.5	10.9%
FoB	Fox sandy loam, till plain, 2 to 6 percent slopes	4	76.4	5.5%
Gp	Gravel pit	0	19.4	1.4%
MdA	Matherton sandy loam, 0 to 4 percent slopes	0	161.9	11.8%
MoB	Glynwood loam, 2 to 6 percent slopes	4	75.6	5.5%
MoC	Morley loam, 6 to 12 percent slopes	3	1.3	0.1%
NaB	Nappanee silty clay loam, 2 to 6 percent slopes	4	8.3	0.6%
Pa	Palms muck	100	348.4	25.3%
Pe	Pewamo clay loam, 0 to 2 percent slopes	92	15.6	1.1%
Sb	Sebewa loam, disintegration moraine, 0 to 2 percent slopes	94	134.6	9.8%
StB	St. Clair clay loam, 2 to 6 percent slopes	2	104.1	7.6%
W	Water	0	22.6	1.6%
WaA	Wasepi sandy loam, 0 to 4 percent slopes	2	74.6	5.4%
Totals for Area of Interest			**1,377.3**	**100.0%**

Hydric Rating by Map Unit—Washtenaw County, Michigan
(Ann Arbor (ARB) Airport)



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 1:20,000.

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: Washtenaw County, Michigan
Survey Area Data: Version 18, Sep 16, 2019

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

Date(s) aerial images were photographed: Sep 18, 2011—Mar 21, 2012

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
Ad	Adrian muck	100	24.2	29.4%
Ee	Edwards muck, shallow variant	100	6.9	8.4%
FoA	Fox sandy loam, till plain, 0 to 2 percent slopes	4	0.0	0.1%
FoB	Fox sandy loam, till plain, 2 to 6 percent slopes	4	3.4	4.1%
MdA	Matherton sandy loam, 0 to 4 percent slopes	0	22.4	27.2%
Pa	Palms muck	100	19.8	24.1%
Sb	Sebewa loam, disintegration moraine, 0 to 2 percent slopes	94	0.1	0.1%
WaA	Wasepi sandy loam, 0 to 4 percent slopes	2	5.3	6.5%
Totals for Area of Interest			**82.2**	**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–MI161-Washtenaw County, Michigan					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
Ad: Adrian muck	Adrian	92	Depressions on till plains,depressions on outwash plains,depressions on lake plains,depressions on moraines	Yes	1,3
	Edwards	2	Depressions on moraines,depressions on till plains,depressions on lake plains,depressions on outwash plains	Yes	1,3
	Gilford	2	Depressions on lake plains,depressions on deltas,depressions on valley trains,depressions on outwash plains	Yes	2,3
	Granby	2	Depressions on outwash plains,depressions on lake plains	Yes	2,3
	Houghton	2	Depressions on moraines,depressions on till plains,depressions on lake plains,depressions on outwash plains	Yes	1,3
Ee: Edwards muck, shallow variant	Edwards	90	Depressions on moraines,depressions on till plains,depressions on lake plains,depressions on outwash plains	Yes	2,3,4
	Edwards	4	Depressions on outwash plains,depressions on moraines,depressions on till plains,depressions on lake plains	Yes	1,3

Hydric Soil List - All Components–MI161-Washtenaw County, Michigan					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
	Adrian	3	Depressions on till plains,depressions on outwash plains,depressions on lake plains,depressions on moraines	Yes	1,3
	Houghton	3	Depressions on till plains,depressions on lake plains,depressions on outwash plains,depressions on moraines	Yes	1,3
FoA: Fox sandy loam, till plain, 0 to 2 percent slopes	Fox	85-95	Outwash plains,outwash terraces	No	—
	Matherton	0-12	Drainageways on stream terraces,drainageways	No	—
	Sebewa	0-10	Drainageways on stream terraces,drainageways	Yes	2,3
FoB: Fox sandy loam, till plain, 2 to 6 percent slopes	Fox	85-95	Outwash plains,outwash terraces	No	—
	Matherton	0-12	Drainageways,drainageways on stream terraces	No	—
	Sebewa	0-10	Drainageways on stream terraces,drainageways	Yes	2,3
MdA: Matherton sandy loam, 0 to 4 percent slopes	Matherton	90	Drainageways on glacial drainage channels,drainageways on outwash plains,drainageways on terraces	No	—
	Fox	5	Knolls on terraces,knolls on glacial drainage channels,knolls on moraines,knolls on kames,knolls on outwash plains	No	—

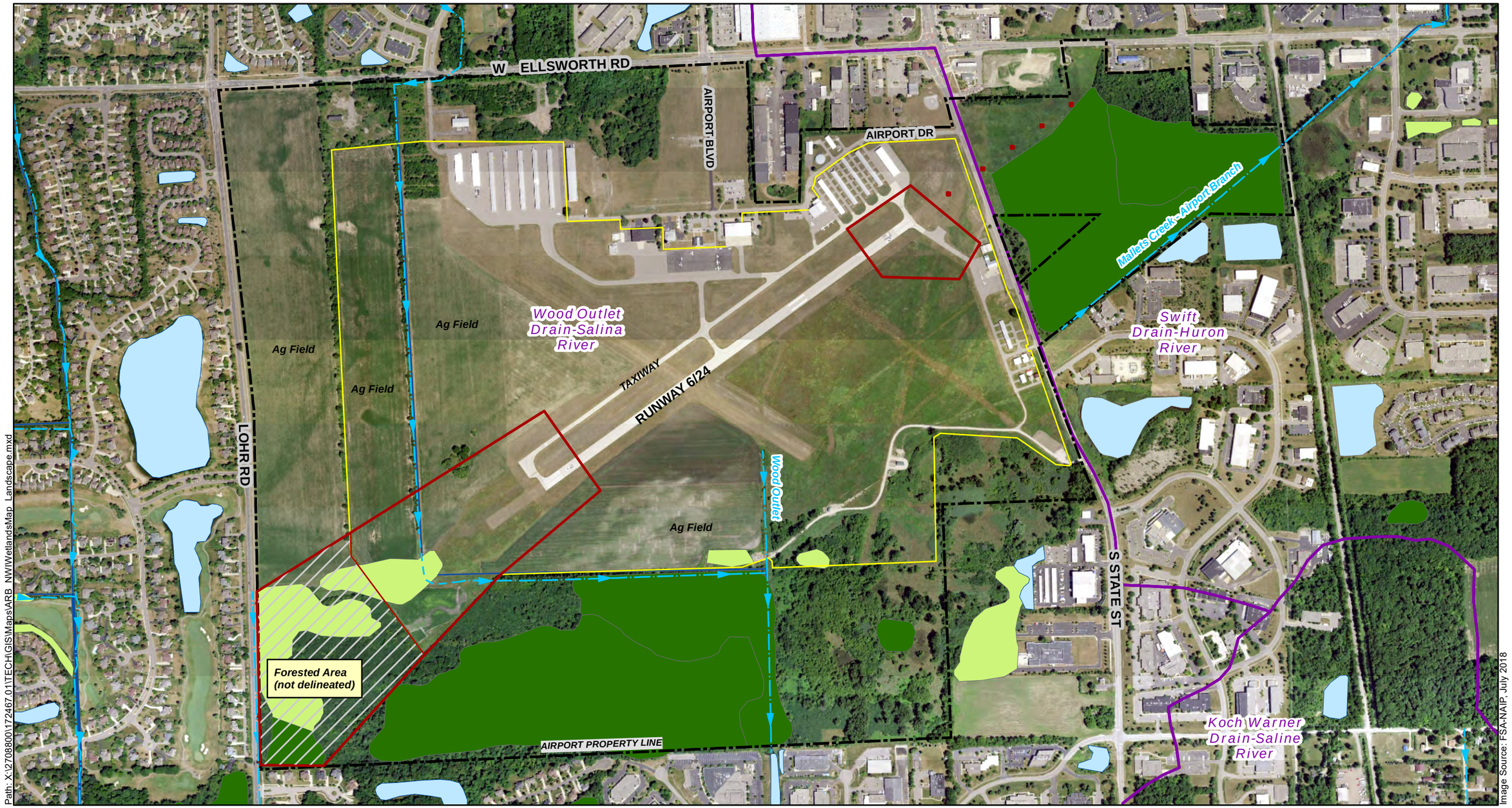
Hydric Soil List - All Components–MI161-Washtenaw County, Michigan					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
	Wasepi	5	Drainageways on deltas,drainageways on glacial drainage channels,drainageways on outwash plains,drainageways on lake plains	No	—
Pa: Palms muck	Palms	85	Depressions on till-floored lake plains,depressions on moraines,depressions on till plains	Yes	1,3
	Adrian	3	Depressions on till-floored lake plains,depressions on outwash plains,depressions on lake plains,depressions on moraines	Yes	1,3
	Brookston	3	Depressions on moraines,depressions on till plains	Yes	2,3
	Edwards	3	Depressions on moraines,depressions on till plains,depressions on till-floored lake plains,depressions on outwash plains	Yes	1,3
	Houghton	3	Depressions on outwash plains,depressions on moraines,depressions on till plains,depressions on till-floored lake plains	Yes	1,3
	Pewamo	3	Depressions on moraines,depressions on till plains,depressions on till-floored lake plains	Yes	2,3
Sb: Sebewa loam, disintegration moraine, 0 to 2 percent slopes	Sebewa	85-95	Drainageways,drainageways on stream terraces	Yes	2,3
	Matherton	0-12	Drainageways on stream terraces,drainageways	No	—

Hydric Soil List - All Components–MI161-Washtenaw County, Michigan					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
	Gilford	0-8	Drainageways on stream terraces,drainageways	Yes	2,3
WaA: Wasepi sandy loam, 0 to 4 percent slopes	Wasepi	90	Drainageways on deltas,drainageways on valley trains,drainageways on strand plains,drainageways on lake plains	No	—
	Boyer	3	Knolls on strand plains,knolls on terraces,knolls on valley trains,knolls on kames	No	—
	Ypsi	3	Drainageways on till-floored lake plains,drainageways on ground moraines	No	—
	Gilford	2	Depressions on lake plains,depressions on deltas,depressions on valley trains,depressions on strand plains	Yes	2,3
	Matherton	2	Drainageways on valley trains,drainageways on strand plains,drainageways on terraces	No	—

Data Source Information

Soil Survey Area: Washtenaw County, Michigan
Survey Area Data: Version 18, Sep 16, 2019

Appendix C. Previous Wetland Mapping



Path: X:\2708800\172467.01\TECH\GIS\Maps\ARB_NWIWetlandsMap_Landscape.mxd

Image Source: FSA-NAIP, July 2018

National Wetland Inventory Map

Ann Arbor Municipal Airport

Data Sources:

Streams: Washtenaw County
Wetlands: FWS National Wetlands Inventory (NWI)

Legend

- Project Area of Interest (AOI)
- Area not delineated
- Piped Drainage
- Stream
- Watershed Boundary
- Airport Property Boundary
- Fence

NWI WETLAND TYPE

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

0 250 500 1,000 1,500 Feet

N

Project Location

T3S, R6E, Sections 16 and 17
Ann Arbor Municipal Airport
Washtenaw County, MI
LRR subregion: M
USACE Regional Supplement: Midwest
Area of Interest = 82.2 acres
Field work conducted: October 10, 2018 and June 3 - 6, 2019

U.S. Fish and Wildlife Service

National Wetlands Inventory

Ann Arbor (ARB) Michigan Airport

October 4, 2018

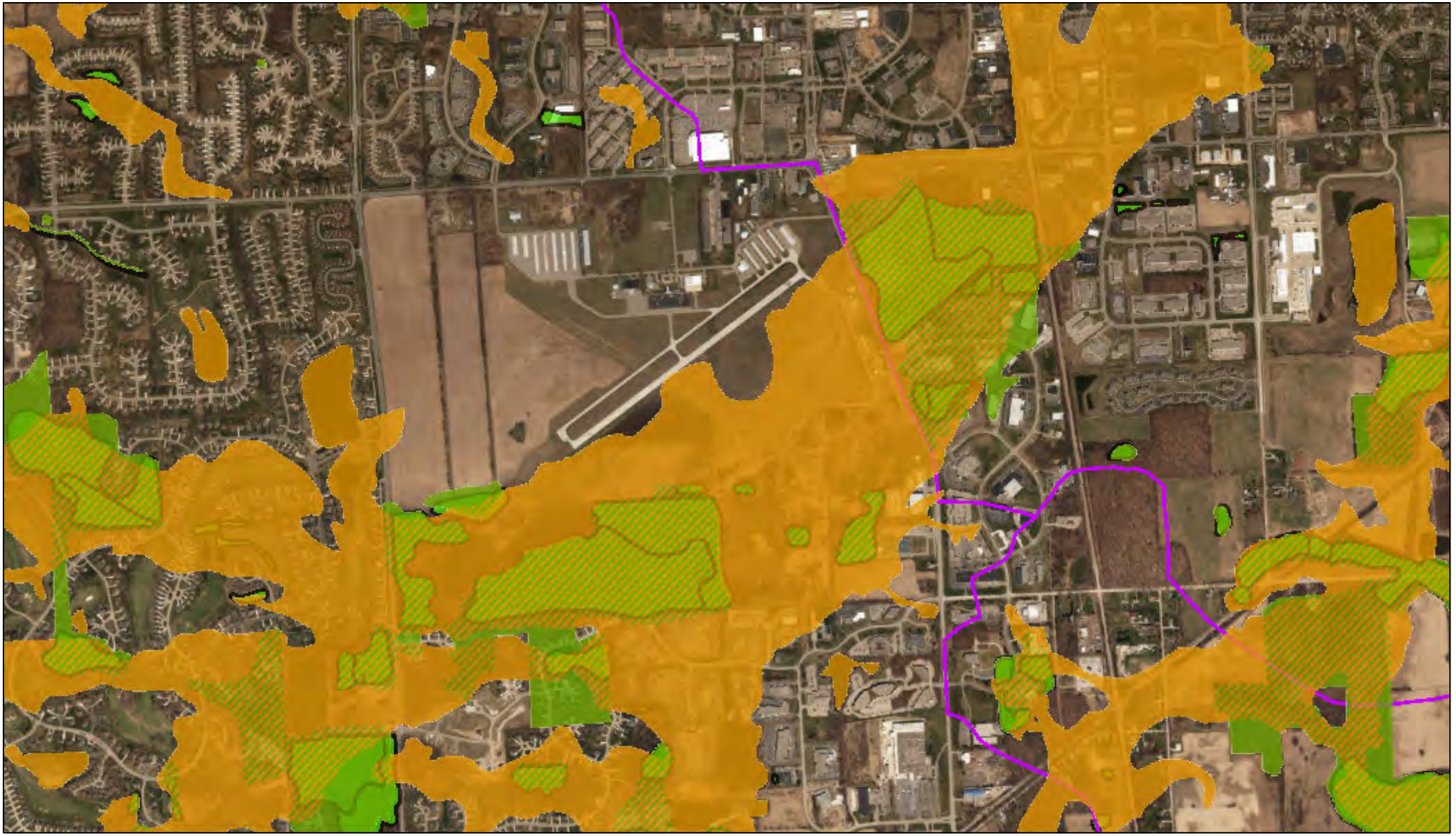
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Wetlands Map Viewer



June 1, 2019

Part 303 Final Wetlands Inventory

- Wetlands as identified on NWI and MIRIS maps
- Soil areas which include wetland soils
- Wetlands as identified on NWI and MIRIS maps and soil areas which include wetland soils
- HUC 12 Watershed
- National Wetlands Inventory 2005

1:19,201

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

July 22, 2009

Michigan Department of Transportation
Attn: Ms. Molly Lamrouex
2700 Port Lansing Rd.
Lansing, MI 48909

Dear Ms. Lamrouex:

SUBJECT: Express Wetland Identification Report
Wetland Identification File Number: 09-81-0001-WA

The Department of Environmental Quality (DEQ) conducted a Level 2 Express Wetland Identification Review of 5 acres of an approximately 300-acre property (Property Tax Identification Number Ann Arbor Municipal Airport) located in Town 03S, Range 06E, Section 17, Pittsfield Township, Washtenaw County on July 21, 2009. The wetland review was conducted in accordance with Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); and Rule 4 (1), Wetland Identification and Assessment (R 281.924) of the Administrative Rules for Part 303. This is a report of our findings in response to your Wetland Identification Application.

Based on our site review, which included a review of the dominant vegetation, hydrology, and soils, as well as an in-office review of pertinent information, the DEQ finds that the 5-acre review area does not contain wetland regulated by the state. The wetland within the review area is not regulated by the state since it is not within 500 feet of an inland lake or stream or within 1,000 feet of the Great Lakes or their connecting waters. The DEQ lacks jurisdiction under Part 303 for activities occurring within the Wetland Identification Review area.

Please be aware that this Wetland Identification Report does not constitute a determination of the presence of wetland that may be regulated under local ordinances or federal law. The U.S. Army Corps of Engineers (USACE) retains regulatory authority over certain wetlands pursuant to Section 404 of the Clean Water Act (CWA), and specifically those wetlands associated with navigable waters of the state. Navigable waters are generally the Great Lakes, their connecting waters, and portions of river systems and lakes connected to these waters. In other areas of the State, the DEQ is responsible for identification of wetland boundaries for purposes of compliance with the CWA under an agreement with the U.S. Environmental Protection Agency.

Your Wetland Identification Review area does not appear to be within those areas regulated by the USACE. However, should you desire more information, please contact the USACE at 313-226-2218.

This Wetland Identification Report is limited to findings pursuant to Part 303 and does not constitute a determination of jurisdiction under other DEQ administered programs. Any land use activities undertaken within the review area may be subject to regulation pursuant to the NREPA under the following parts.

Floodplain Regulatory Authority found in Part 31, Water Resources Protection
Part 91, Soil Erosion and Sedimentation Control
Part 301, Inland Lakes and Streams

The findings contained in this report do not convey, provide, or otherwise imply approval of any governing act, ordinance, or regulation, nor does it waive the obligation to acquire any applicable state, county, local, or federal approvals. This Wetland Identification Report is not a permit for any activity that requires a permit from the DEQ.

The findings contained in this report are binding on the DEQ until July 21, 2012, a period of three years from the date of this Wetland Identification Report. Please contact me if you have any questions regarding this report.

Sincerely,

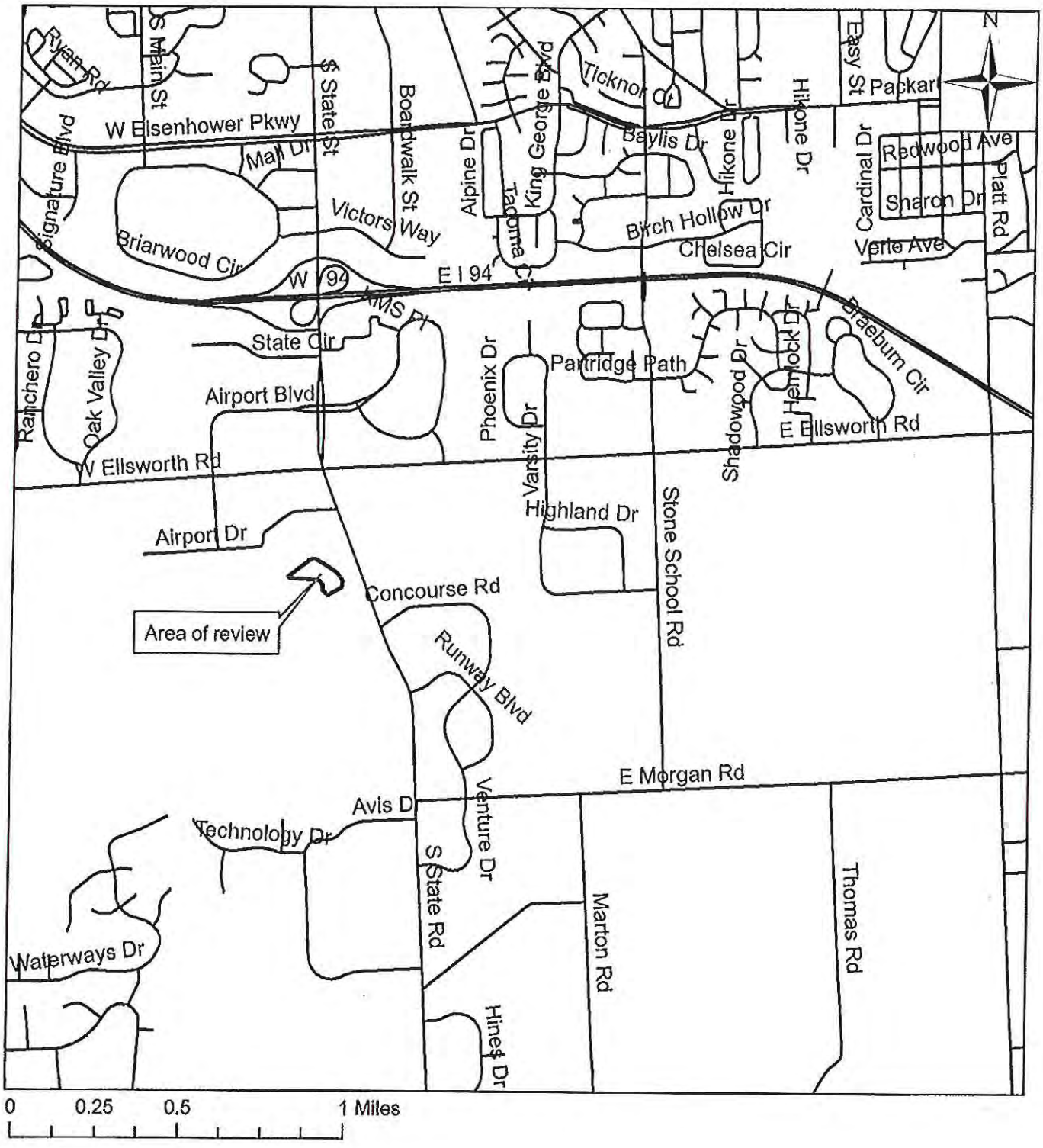
Peg Bostwick for

Todd Losee
Wetland Identification Program Coordinator
Land and Water Management Division
517-335-3457

Enclosures

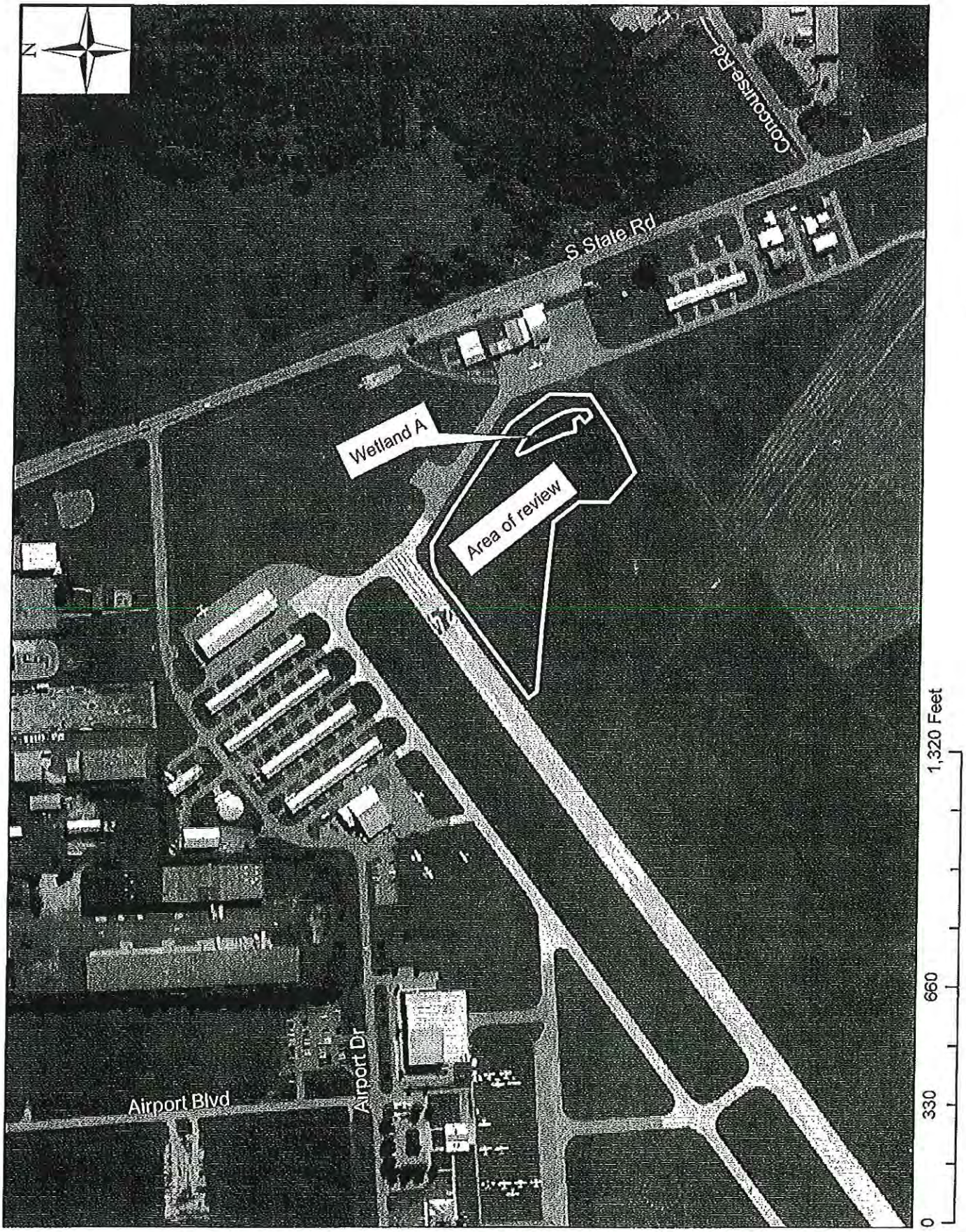
cc: Washtenaw County CEA
Washtenaw County Health Department
Pittsfield Township Clerk
Mr. Matt Kulhanek, City of Ann Arbor
Mr. Justin Pung, DEQ
Mr. Todd Losee, DEQ

Michigan Dept. of Transportation
09-81-0001-WA



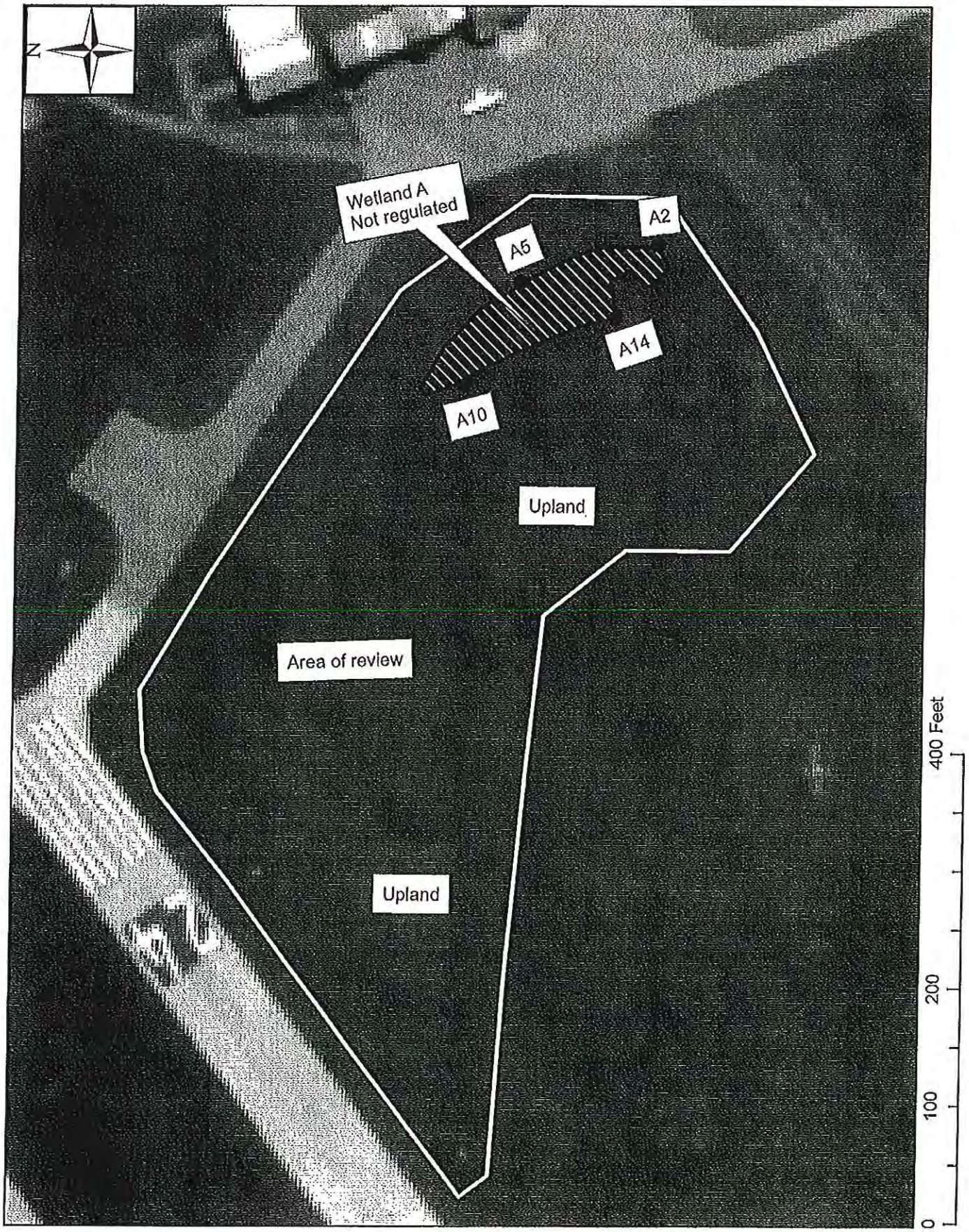
Site location map

Michigan Dept. of Transportation
09-81-0001-WA



Area of review in relation to the Ann Arbor Airport

Michigan Dept. of Transportation
09-81-0001-WA



Wetland A, the only wetland within the area of review, is not regulated.

Appendix D. WETS Analysis and Climatic Data

WETS Analysis Worksheet

Project Name: **Ann Arbor Airport**
Period Of Interest: July - September, 2018
Station: **ANN ARBOR U OF MICH, MI**
County: Washtenaw, MI
Normals Period: 1971 - 2010

Long-term rainfall records

	Month	30% chance <	Normal	30% chance >
1st month prior:	September	2.19	3.31	3.97
2nd month prior:	August	2.03	3.53	4.3
3rd month prior:	July	2.18	3.36	4.03
		Sum =	**10.2**	

Site Determination

Site Rainfall (in)	Condition (Dry/Normal*/Wet)	Condition** Value	Month Weight	Product
4.07	Wet	3	3	9
3.67	Normal	2	2	4
1.14	Dry	1	1	1
Sum = **8.88**			Sum***=	**14**

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

Determination:

	Wet
	Dry
X	Normal

**Condition value:
Dry = 1
Normal = 2
Wet = 3

***If sum is:
6 to 9 then period has been drier than normal
10 to 14 then period has been normal
15 to 18 then period has been wetter than normal

Precipitation data source:
http://agacis.rcc-acis.org/

Reference:

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

WETS Analysis Worksheet

Project Name: **Ann Arbor Airport**
Period Of Interest: March - May, 2019
Station: **ANN ARBOR U OF MICH, MI**
County: Washtenaw, MI
Normals Period: 1971 - 2010

Long-term rainfall records

	Month	30% chance <	Normal	30% chance >
1st month prior:	May	2.40	3.31	3.91
2nd month prior:	April	2.42	3.22	3.77
3rd month prior:	March	2.12	2.75	3.18
		Sum =	**9.28**	

Site Determination

Site Rainfall (in)	Condition (Dry/Normal*/Wet)	Condition** Value	Month Weight	Product
3.00	Normal	2	3	6
4.71	Wet	3	2	6
4.66	Wet	3	1	3
Sum = **12.37**			Sum***=	**15**

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

Determination: **X** Wet
____ Dry
____ Normal

**Condition value:
Dry = 1
Normal = 2
Wet = 3

***If sum is:
6 to 9 then period has been drier than normal
10 to 14 then period has been normal
15 to 18 then period has been wetter than normal

Precipitation data source:
http://agacis.rcc-acis.org/

Reference:

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

WETS Table

WETS Station: ANN ARBOR U OF MICH, MI								
Requested years: 1971 - 2010								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	30.9	17.3	24.1	2.40	1.63	2.86	6	15.4
Feb	34.4	19.0	26.7	2.20	1.38	2.66	5	11.6
Mar	45.9	27.3	36.6	2.75	2.12	3.18	6	8.2
Apr	59.5	37.7	48.6	3.22	2.42	3.77	8	2.5
May	70.9	48.2	59.6	3.31	2.40	3.91	7	0.0
Jun	79.7	57.8	68.7	3.56	2.56	4.20	7	0.0
Jul	83.3	62.1	72.7	3.36	2.18	4.03	7	0.0
Aug	81.4	61.0	71.2	3.53	2.03	4.30	6	0.0
Sep	74.4	53.5	64.0	3.31	2.19	3.97	6	0.0
Oct	61.6	42.4	52.0	2.56	1.70	3.07	6	0.2
Nov	47.9	33.0	40.4	2.97	2.17	3.49	7	3.3
Dec	35.1	22.6	28.9	2.90	2.26	3.35	7	13.4
Annual:					33.24	38.52		
Average	58.8	40.2	49.5	-	-	-	-	-
Total	-	-	-	36.05			80	54.6

GROWING SEASON DATES			
Years with missing data:	24 deg = 0	28 deg = 0	32 deg = 0
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 40	28 deg = 40	32 deg = 40
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	4/5 to 11/13: 222 days	4/16 to 10/29: 196 days	4/28 to 10/15: 170 days
70 percent *	3/31 to 11/18: 232 days	4/12 to 11/2: 204 days	4/24 to 10/19: 178 days
* Percent chance of the growing season occurring between the Beginning and Ending dates.			

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1880	3.20	1.25					7.29	4.22	2.29	3.58	2.08	0.54	24.45
1881			2.25	2.15	1.56	5.68	2.13	2.07	3.24	7.38	4.06	3.01	33.53
1882	1.29	2.29	3.98	1.36	5.06	5.77	2.52	6.81	2.17	2.08	2.14	1.22	36.69
1883	1.00	0.78	1.00	1.60	6.29	4.59	7.29	2.51	1.11	3.37	3.00	0.72	33.26
1884	1.07	0.65	0.56	1.05	3.34	3.77	5.46	1.93	2.91	2.46	1.84	4.04	29.08
1885	2.54	1.41	1.19	3.46	3.72	3.93	2.05	6.02	2.69	3.43	1.74	2.87	35.05
1886	2.42	0.91	1.87	2.00	2.67	0.89	0.71	2.55	5.97	1.40	2.20	0.65	24.24
1887	1.37	6.04	1.52	1.21	1.95	3.86	1.33	1.56	3.93	1.98	2.08	2.76	29.59
1888	1.00	1.66	2.51	1.50	3.03	4.76	1.39	1.73	1.	3.	3.26	1.00	26.

WETS Table

WETS Station: ANN ARBOR U OF MICH, MI								
Requested years: 1971 - 2010								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	30.9	17.3	24.1	2.40	1.63	2.86	6	15.4
Feb	34.4	19.0	26.7	2.20	1.38	2.66	5	11.6
Mar	45.9	27.3	36.6	2.75	2.12	3.18	6	8.2
Apr	59.5	37.7	48.6	3.22	2.42	3.77	8	2.5
May	70.9	48.2	59.6	3.31	2.40	3.91	7	0.0
Jun	79.7	57.8	68.7	3.56	2.56	4.20	7	0.0
Jul	83.3	62.1	72.7	3.36	2.18	4.03	7	0.0
Aug	81.4	61.0	71.2	3.53	2.03	4.30	6	0.0
Sep	74.4	53.5	64.0	3.31	2.19	3.97	6	0.0
Oct	61.6	42.4	52.0	2.56	1.70	3.07	6	0.2
Nov	47.9	33.0	40.4	2.97	2.17	3.49	7	3.3
Dec	35.1	22.6	28.9	2.90	2.26	3.35	7	13.4
Annual:					33.24	38.52		
Average	58.8	40.2	49.5	-	-	-	-	-
Total	-	-	-	36.05			80	54.6

GROWING SEASON DATES			
Years with missing data:	24 deg = 0	28 deg = 0	32 deg = 0
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 40	28 deg = 40	32 deg = 40
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	4/5 to 11/13: 222 days	4/16 to 10/29: 196 days	4/28 to 10/15: 170 days
70 percent *	3/31 to 11/18: 232 days	4/12 to 11/2: 204 days	4/24 to 10/19: 178 days
* Percent chance of the growing season occurring between the Beginning and Ending dates.			

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1880	3.20	1.25					7.29	4.22	2.29	3.58	2.08	0.54	24.45
1881			2.25	2.15	1.56	5.68	2.13	2.07	3.24	7.38	4.06	3.01	33.53
1882	1.29	2.29	3.98	1.36	5.06	5.77	2.52	6.81	2.17	2.08	2.14	1.22	36.69
1883	1.00	0.78	1.00	1.60	6.29	4.59	7.29	2.51	1.11	3.37	3.00	0.72	33.26
1884	1.07	0.65	0.56	1.05	3.34	3.77	5.46	1.93	2.91	2.46	1.84	4.04	29.08
1885	2.54	1.41	1.19	3.46	3.72	3.93	2.05	6.02	2.69	3.43	1.74	2.87	35.05
1886	2.42	0.91	1.87	2.00	2.67	0.89	0.71	2.55	5.97	1.40	2.20	0.65	24.24
1887	1.37	6.04	1.52	1.21	1.95	3.86	1.33	1.56	3.93	1.98	2.08	2.76	29.59
1888	1.00	1.66	2.51	1.50	3.03	4.76	1.39	1.73	1.	3.	3.26	1.00	26.

									18	04			06
1889	1.00	0.37	1.06	0.81	4.56	4.04	2.79	0.34	1.35	0.80	2.60	3.59	23.31
1890	3.11	1.95	1.69	3.90	5.19	3.34	0.93	4.86	1.55	5.26	2.95	0.98	35.71
1891	1.02	3.26	M2.28	1.77	2.00	2.62	2.54	2.54	1.61	M1.88	4.96	3.85	30.33
1892	M1.24	1.90	1.15	1.63	M5.89	M4.69	2.21	1.25	4.72	0.50	M3.30	2.50	30.98
1893	M3.71	M4.25	M2.21	M6.25	M1.62	M4.03	2.47	M0.65	M1.37	M5.29	M3.68	M3.41	38.94
1894	M1.05	M1.27	M2.18	M2.78	M5.88	M1.93	M0.83	T	M3.66	M2.89	M1.76	M1.47	25.70
1895	M2.96	M0.28	M1.76	M0.90	M3.52	M0.56	M2.27	M2.57	0.94	0.34	M3.42	M5.21	24.73
1896	M0.95	1.20	M0.97	M2.26	M2.14	M4.04	M6.45	M2.69	M4.93	M1.51	M1.40	M1.20	29.74
1897	2.79	1.46	3.40	3.07	4.74	2.69	1.66	2.93	1.35	1.78	4.79	2.00	32.66
1898	4.00	2.16	2.95	1.57	2.21	2.82	1.45	1.16	4.03	5.48	3.13	1.94	32.90
1899	1.53	1.54	3.55	0.21	4.35	2.50	1.92	0.51	2.68	3.01	2.99	2.06	26.85
1900	1.06	3.71	2.70	M1.43	4.91	2.30	2.91	2.04	1.10	2.23	3.73	0.43	28.55
1901	1.45	2.22	1.74	1.37	1.72	2.01	3.35	3.14	1.95	2.55	1.28	3.05	25.83
1902	0.60	1.11	1.21	0.77	4.72	7.56	10.78	0.63	6.41	1.95	1.83	2.48	40.05
1903	1.27	3.47	1.79	4.19	M2.23	6.04	M4.65	5.45	2.33	1.47	1.58	2.39	36.86
1904	2.51	2.49	4.80	2.09	M2.31	0.97	1.91	4.55	3.91	0.81	0.10	1.07	27.52
1905	1.64	1.21	1.64	2.80	4.93	4.32	4.76	4.06	2.51	3.45	3.67	1.61	36.60
1906	1.91	0.71	2.96	2.19	4.87	3.05	5.23	2.82	1.62	3.03	1.61	1.58	31.58
1907	4.68	1.22	2.24	2.58	2.82	1.94	3.63	1.06	4.19	1.77	2.34	2.91	31.38
1908	1.06	4.82	2.50	2.77	4.34	3.62	1.27	6.29	0.27	1.53	0.98	1.60	31.05
1909	2.50	1.94	1.22	4.10	2.25	4.21	2.28	1.25	0.92	1.27	4.34	1.81	28.09
1910	2.48	1.43	0.48	3.41	3.63	1.51	1.61	1.93	2.95	1.85	2.34	2.27	25.89
1911	1.30	1.74	1.35	3.51	1.05	3.60	1.15	2.04	3.95	4.95	2.78	1.73	29.15
1912	1.69	0.93	1.25	3.96	4.01	0.91	3.34	3.61	3.56	2.59	2.23	1.02	29.10
1913	3.02	0.95	3.92	2.88	5.34	0.24	1.26	1.07	1.38	3.86	1.82	0.84	26.58
1914	2.23	0.50	1.92	2.88	6.68	3.31	2.63	3.98	2.21	3.09	1.64	1.79	32.86
1915	1.09	0.26	0.80	0.89	3.69	3.66	3.94	4.24	5.39	0.69	2.05	1.46	28.16
1916	4.03	0.97	3.39	1.67	5.06	5.47	1.12	2.22	4.00	1.85	3.29	3.45	36.52
1917	0.92	0.35	3.60	3.82	4.95	7.21	3.90	4.40	3.11	8.26	0.67	0.85	42.04
1918	0.91	6.83	1.21	3.21	3.51	3.01	1.38	2.39	3.43	3.36	2.80	4.70	36.74
1919	1.40	2.90	3.50	5.40	4.17	4.34	1.53	3.06	2.67	2.94	2.95	0.51	35.37
1920	2.16	0.83	1.48	3.45	0.74	6.53	3.06	6.42	0.97	1.55	3.07	4.01	34.27
1921	0.45	1.48	3.93	3.90	2.14	3.16	2.17	4.54	4.36	1.95	3.33	1.63	33.04
1922	1.23	1.70	3.98	3.97	2.93	1.55	1.42	1.81	2.	2.	1.34	1.56	26.

									47	18			14
1923	M1.66	M0.99	2.59	1.66	3.75	2.86	4.93	2.73	4.04	1.39	1.38	3.75	31.73
1924	2.10	2.17	1.62	2.23	3.43	5.14	1.17	1.38	2.94	0.83	0.66	2.86	26.53
1925	0.75	1.92	2.50	1.95	1.31	1.60	3.61	4.31	5.96	3.83	3.87	1.11	32.72
1926	1.66	3.64	2.67	2.90	1.74	2.53	1.01	4.68	6.79	2.67	2.32	1.03	33.64
1927	1.53	1.34	1.63	1.65	3.84	2.60	5.20	0.51	5.02	1.84	4.59	3.60	33.35
1928	1.41	1.33	1.05	1.62	M2.61	4.22	4.75	M1.60	2.11	2.19	2.46	1.23	26.58
1929	3.43	0.78	3.57	4.55	3.09	3.29	1.63	0.62	1.74	4.96	2.95	1.30	31.91
1930	3.08	1.14	1.10	2.85	2.44	3.03	1.42	0.17	3.66	1.09	1.21	0.80	21.99
1931	0.63	0.86	M1.38	1.36	3.32	2.99	1.49	2.49	2.97	1.58	3.49	M1.85	24.41
1932	3.97	1.12	1.38	1.51	5.37	1.83	4.76	3.12	5.04	2.67	1.81	3.17	35.75
1933	0.91	M1.71	1.52	4.02	4.35	2.65	2.25	M0.19	2.40	1.44	1.48	1.35	24.27
1934	0.93	0.41	2.66	M2.71	0.86	1.35	0.64	0.74	3.45	1.59	1.84	M1.75	18.93
1935	M1.67	1.69	2.15	1.67	4.16	2.19	M1.91	3.74	1.50	0.85	2.69	1.57	25.79
1936	1.26	2.29	1.25	2.59	0.47	3.21	0.11	1.27	4.64	4.11	1.26	1.90	24.36
1937	2.78	1.15	0.93	6.66	3.41	4.93	4.30	4.50	1.16	M2.07	1.54	1.86	35.29
1938	1.04	3.88	4.42	1.58	3.68	1.89	M2.54	2.36	1.64	0.98	0.97	2.17	27.15
1939	2.22	4.54	1.93	4.26	0.68	4.22	1.97	0.76	3.49	1.49	0.25	0.72	26.53
1940	1.71	1.24	2.15	2.70	3.28	M4.76	2.16	5.36	1.18	2.82	2.06	3.42	32.84
1941	1.66	0.59	1.54	2.47	2.52	4.01	2.39	2.65	1.83	4.20	3.19	0.84	27.89
1942	2.12	1.72	2.77	1.83	2.65	6.54	4.35	1.75	3.11	3.54	2.71	3.86	36.95
1943	2.40	1.67	2.92	1.79	10.49	3.37	4.15	2.96	2.28	1.39	2.12	0.49	36.03
1944	1.50	1.65	3.16	3.24	3.23	4.57	1.71	2.57	1.23	M0.81	1.79	1.59	27.05
1945	0.52	1.82	4.08	2.88	6.85	3.28	2.77	2.06	5.90	3.13	1.47	1.73	36.49
1946	1.56	1.90	1.33	0.55	4.04	3.22	1.02	3.11	1.57	1.65	1.59	2.13	23.67
1947	1.28	0.19	2.43	2.54	5.56	2.51	1.13	4.10	1.10	1.24	1.71	1.79	25.58
1948	1.25	2.31	3.51	4.15	3.44	3.04	2.48	0.87	2.01	0.53	3.55	2.16	29.30
1949	2.96	3.32	2.73	2.24	2.46	2.20	3.20	3.65	3.24	3.22	1.05	3.43	33.70
1950	M4.44	3.64	3.68	4.44	2.09	3.13	2.92	2.21	2.95	2.87	M3.51	1.12	37.00
1951	1.19	2.88	2.29	2.86	5.01	2.58	3.71	2.36	1.16	4.44	2.67	3.70	34.85
1952	3.68	1.49	M2.42	3.55	3.05	1.57	1.50	1.05	2.19	1.48	3.44	2.12	27.54
1953	1.86	0.89	2.57	3.20	1.86	3.23	4.10	1.80	M2.08	0.65	0.91	1.46	24.61
1954	1.59	4.65	4.02	2.95	0.70	5.86	0.76	2.24	1.50	7.29	1.42	2.17	35.15
1955	1.78	0.79	2.06	1.61	2.91	M0.95	3.38	2.92	1.28	3.55	3.30	0.91	25.44
1956	0.88	2.05	2.47	5.35	4.36	2.41	2.08	3.47	0.	0.	2.06	1.87	28.

									62	46			08
1957	1.74	1.33	1.28	4.13	3.31	3.45	3.48	2.77	2.93	3.64	2.69	3.62	34.37
1958	0.60	0.36	0.26	2.25	M0.78	2.62	3.82	3.59	2.60	2.54	2.64	0.31	22.37
1959	2.77	1.99	2.85	4.10	2.90	1.21	4.77	3.19	M1.44	4.69	3.26	2.26	35.43
1960	2.79	2.26	0.86	1.98	2.24	5.89	4.71	2.59	1.04	2.31	1.29	0.34	28.30
1961	0.18	2.19	2.99	M5.52	2.16	3.73	1.61	4.23	4.75	1.78	2.87	0.84	32.85
1962	1.48	1.92	0.66	0.98	1.71	4.33	3.99	3.04	3.45	2.09	0.95	0.93	25.53
1963	0.48	0.30	2.25	2.91	2.61	1.40	1.56	1.25	1.15	0.59	1.48	0.87	16.85
1964	1.45	0.38	2.20	5.23	2.26	2.96	2.78	3.47	1.19	0.06	0.76	1.61	24.35
1965	3.08	1.96	2.65	2.28	2.00	2.38	1.23	4.12	2.05	2.83	1.30	4.79	30.67
1966	0.41	0.56	2.28	2.86	1.72	2.96	1.54	3.33	2.63	0.99	3.05	4.45	26.78
1967	2.49	1.38	0.87	3.17	1.00	6.20	3.31	1.89	1.99	3.73	2.64	4.94	33.61
1968	1.69	2.03	2.25	M0.78	5.65	8.45	4.51	3.90	3.03	0.87	3.06	3.01	39.23
1969	2.75	0.16	1.47	4.36	3.51	4.47	6.03	1.95	1.02	1.89	2.77	1.42	31.80
1970	1.25	0.86	2.62	2.45	3.58	3.66	4.75	1.75	2.66	2.99	2.93	1.42	30.92
1971	0.83	2.83	1.63	0.74	1.88	1.85	1.41	0.63	5.26	1.74	1.40	3.75	23.95
1972	1.14	0.75	2.22	3.61	3.17	1.68	1.62	2.66	2.89	2.93	3.17	3.04	28.88
1973	1.24	0.97	3.39	2.08	4.31	3.11	6.27	2.82	2.46	1.93	3.79	3.56	35.93
1974	2.37	2.18	4.40	2.48	3.55	1.80	0.43	1.34	2.38	0.54	3.05	3.30	27.82
1975	2.99	2.39	1.77	3.13	2.34	4.64	1.42	8.74	2.69	1.14	2.59	3.25	37.09
1976	1.79	2.78	3.88	3.09	3.88	3.23	1.49	0.27	2.85	2.39	0.82	0.91	27.38
1977	1.10	1.25	3.86	4.41	1.64	4.00	4.84	3.42	3.16	1.62	2.64	3.40	35.34
1978	3.51	0.65	1.92	2.87	3.17	4.40	2.06	0.88	2.95	2.25	2.70	2.67	30.03
1979	2.25	0.65	2.65	5.03	2.73	3.48	2.67	3.21	0.26	1.23	4.60	2.65	31.41
1980	0.94	1.27	4.31	4.04	3.28	3.77	3.71	6.45	4.09	1.75	1.13	2.96	37.70
1981	0.62	3.16	1.01	3.88	3.57	3.51	3.30	3.66	6.04	3.46	1.67	2.14	36.02
1982	2.96	1.81	3.09	1.78	2.72	5.79	5.23	0.80	2.21	1.28	5.86	3.13	36.66
1983	1.23	1.34	2.84	5.52	4.79	2.76	4.51	1.41	2.29	2.74	4.21	3.96	37.60
1984	0.96	1.02	3.57	3.78	3.85	1.52	0.91	2.85	3.56	2.43	3.54	2.51	30.50
1985	2.90	3.53	4.83	2.51	2.45	2.28	4.85	5.53	3.01	3.98	5.32	1.92	43.11
1986	1.25	3.49	2.37	3.18	1.85	3.99	3.39	2.27	7.03	3.00	1.74	2.18	35.74
1987	2.35	0.17	2.29	2.23	1.92	2.80	0.90	8.14	2.56	2.47	3.07	4.79	33.69
1988	1.37	2.51	1.78	2.77	1.01	0.60	5.92	6.28	3.86	3.84	5.38	2.57	37.89
1989	2.11	1.33	2.12	2.93	4.27	5.26	2.78	3.70	4.52	1.80	3.45	1.85	36.12
1990	2.03	6.20	2.19	3.63	3.95	3.14	1.71	7.24	5.	4.	2.86	4.68	47.

									37	19			19
1991	1.74	1.63	2.19	2.92	3.42	1.99	2.46	5.82	1.23	3.55	3.45	2.42	32.82
1992	3.00	1.36	3.44	M4.10	1.24	2.73	5.01	3.54	4.70	3.03	4.36	2.53	39.04
1993	4.37	1.91	2.49	4.21	1.33	4.48	3.03	2.22	5.11	2.26	2.11	1.09	34.61
1994	3.28	1.58	2.46	3.94	1.24	5.06	2.38	3.07	1.61	3.04	3.50	3.15	34.31
1995	3.66	1.19	2.00	4.09	2.94	2.46	4.31	4.02	1.35	3.68	3.81	1.27	34.78
1996	2.34	1.86	2.33	4.42	2.85	3.93	1.33	0.93	4.92	2.67	3.05	3.40	34.03
1997	2.70	4.57	4.14	1.70	5.48	2.73	4.44	3.71	3.48	2.71	1.75	2.32	39.73
1998	3.32	3.35	5.07	3.51	1.95	3.94	1.81	8.63	1.83	2.49	1.52	1.73	39.15
1999	5.01	1.89	1.91	4.80	2.87	3.30	5.58	2.24	2.63	1.63	1.34	3.12	36.32
2000	1.96	1.71	1.30	3.34	5.58	7.30	5.15	4.73	4.94	3.20	1.80	4.85	45.86
2001	1.32	3.51	1.23	2.94	4.70	4.13	1.40	2.98	4.19	7.63	2.15	2.13	38.31
2002	3.41	2.26	2.14	3.61	3.28	1.14	3.66	2.85	2.41	1.61	2.56	1.85	30.78
2003	0.93	1.99	3.12	3.09	4.69	2.27	2.93	3.72	4.28	2.52	3.76	2.51	35.81
2004	2.22	0.74	3.64	0.49	7.77	3.42	4.31	2.92	0.78	2.01	2.98	3.85	35.13
2005	4.46	3.47	1.38	2.04	1.79	3.87	6.72	1.29	2.94	0.16	4.47	2.75	35.34
2006	4.32	3.11	2.46	3.88	5.68	2.96	5.22	3.62	5.16	4.57	2.78	3.79	47.55
2007	4.31	1.32	3.51	2.62	3.17	2.93	3.26	5.78	0.89	2.25	2.31	4.37	36.72
2008	4.26	4.75	3.29	1.79	2.72	6.00	2.57	0.76	6.12	1.59	3.18	4.67	41.70
2009	2.16	2.98	4.04	5.56	2.86	6.71	2.47	3.89	2.01	4.15	0.84	3.56	41.23
2010	1.10	2.49	1.56	2.16	6.61	7.30	6.75	2.18	2.33	1.01	3.89	1.48	38.86
2011	1.99	4.11	3.92	6.25	7.32	1.35	4.73	3.71	6.04	2.86	5.74	3.01	51.03
2012	3.06	1.92	3.39	2.05	1.33	1.40	1.70	2.96	2.00	3.25	0.80	3.11	26.97
2013	3.81	3.16	0.96	6.25	2.14	6.78	2.75	3.85	1.31	3.31	2.19	2.88	39.39
2014	3.48	2.81	1.82	2.75	5.11	5.15	3.80	3.57	4.24	2.18	2.23	1.93	39.07
2015	1.81	2.01	0.96	2.72	5.06	7.03	2.08	3.50	1.99	2.10	2.70	2.98	34.94
2016	1.80	2.57	4.12	2.47	2.73	3.66	2.30	4.69	4.21	3.46	2.08	2.44	36.53
2017	4.00	2.04	5.05	4.61	3.85	1.37	3.58	2.77	1.62	5.19	4.46	2.23	40.77
2018	1.71	4.41	3.35	3.81	6.74	3.26	1.14	3.67	4.07	3.99	3.66	2.39	42.20
2019	2.18	2.73	3.00	4.71	4.66	M2.61							19.89

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

Data missing for all days in a month or year is blank.

Creation date: 2016-07-22

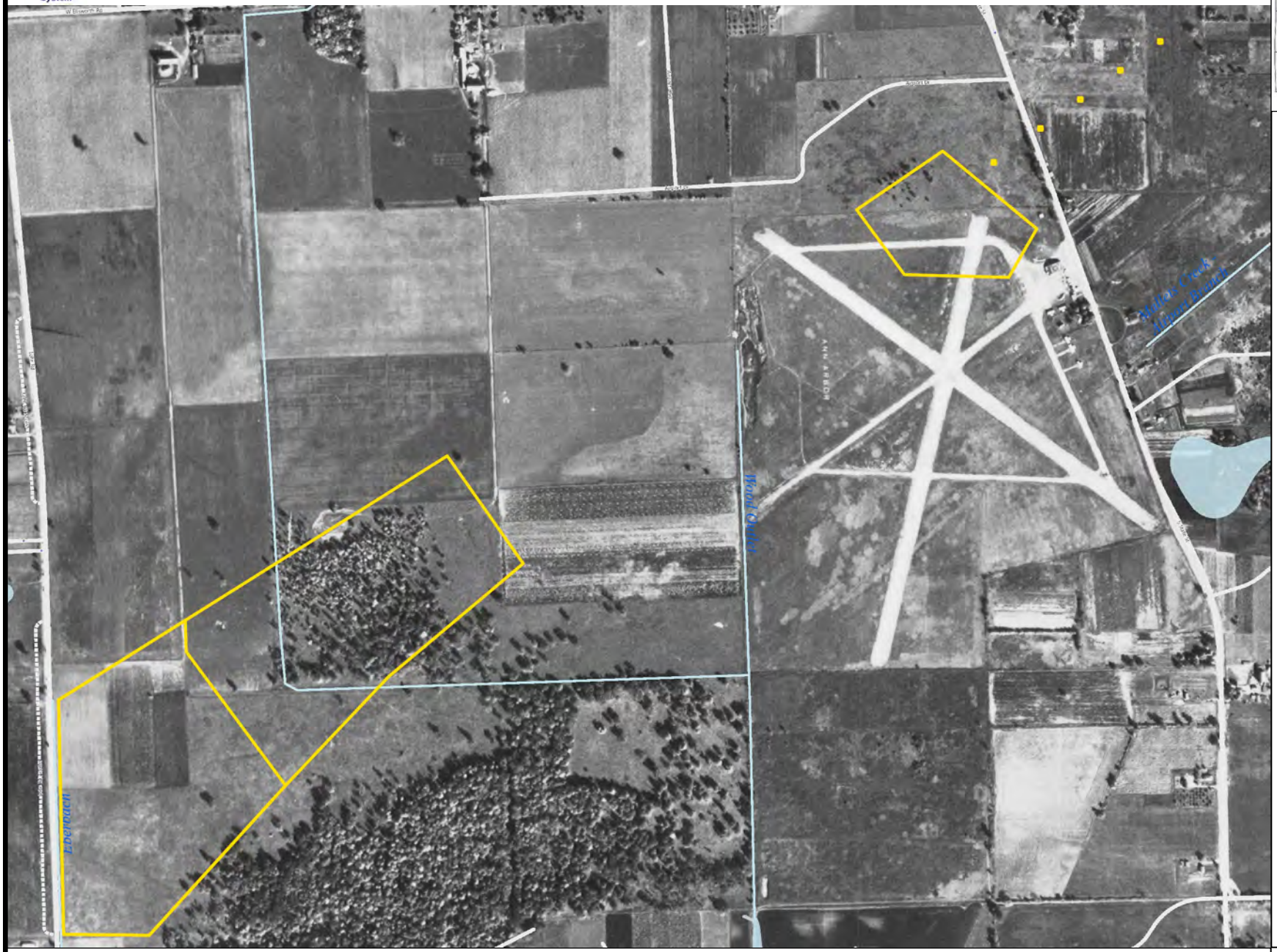
Climatological Data for ANN ARBOR MUNICIPAL AP, MI - June 2019

Date	Max Temperature	Min Temperature	Avg Temperature	GDD Base 40	GDD Base 50	Precipitation	Snowfall	Snow Depth
2019-06-01	76	57	66.5	27	17	0.71	M	M
2019-06-02	70	50	60.0	20	10	0.00	M	M
2019-06-03	66	42	54.0	14	4	0.00	M	M
2019-06-04	72	41	56.5	17	7	T	M	M
2019-06-05	80	58	69.0	29	19	0.21	M	M
2019-06-06	74	53	63.5	24	14	0.00	M	M
2019-06-07	80	48	64.0	24	14	0.00	M	M
2019-06-08	81	51	66.0	26	16	0.00	M	M
2019-06-09	74	66	70.0	30	20	0.55	M	M
2019-06-10	72	46	59.0	19	9	0.91	M	M
2019-06-11	76	39	57.5	18	8	0.00	M	M
2019-06-12	M	M	M	M	M	M	M	M
2019-06-13	M	M	M	M	M	M	M	M
2019-06-14	M	M	M	M	M	M	M	M
2019-06-15	M	M	M	M	M	M	M	M
2019-06-16	M	M	M	M	M	M	M	M
2019-06-17	M	M	M	M	M	M	M	M
2019-06-18	M	M	M	M	M	M	M	M
2019-06-19	M	M	M	M	M	M	M	M
2019-06-20	M	M	M	M	M	M	M	M
2019-06-21	M	M	M	M	M	M	M	M
2019-06-22	M	M	M	M	M	M	M	M
2019-06-23	M	M	M	M	M	M	M	M
2019-06-24	M	M	M	M	M	M	M	M
2019-06-25	M	M	M	M	M	M	M	M
2019-06-26	M	M	M	M	M	M	M	M
2019-06-27	M	M	M	M	M	M	M	M
2019-06-28	M	M	M	M	M	M	M	M
2019-06-29	M	M	M	M	M	M	M	M
2019-06-30	M	M	M	M	M	M	M	M
Average|Sum	74.6	50.1	62.4	248	138	2.38	M	M

Appendix E. Historic Aerial Imagery

Rwy 6/24 Extension EA

Geographic Information System



Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1940

Rwy 6/24 Extension EA

Geographic Information System

Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

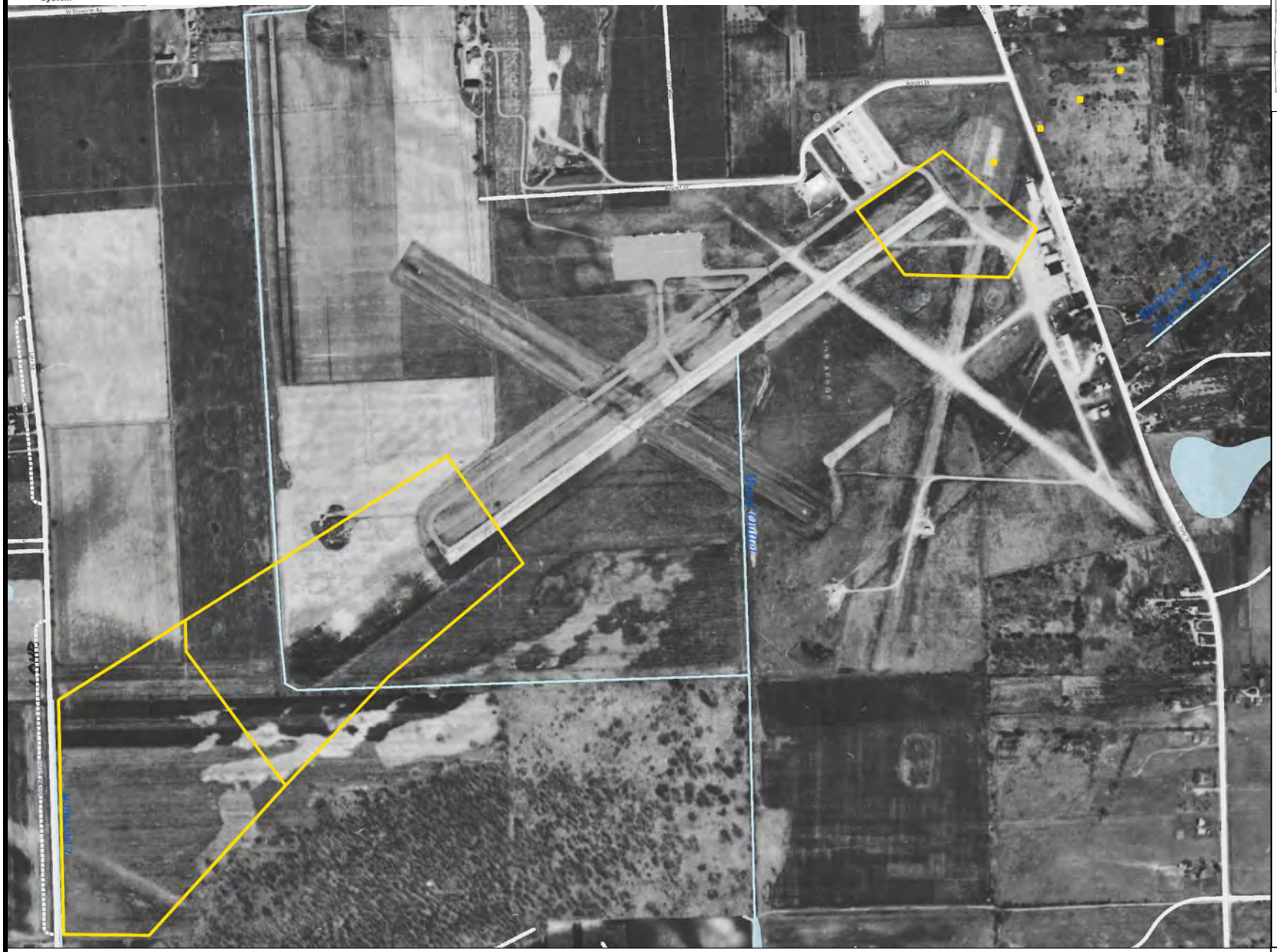
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1960

Rwy 6/24 Extension EA

Geographic Information System



Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

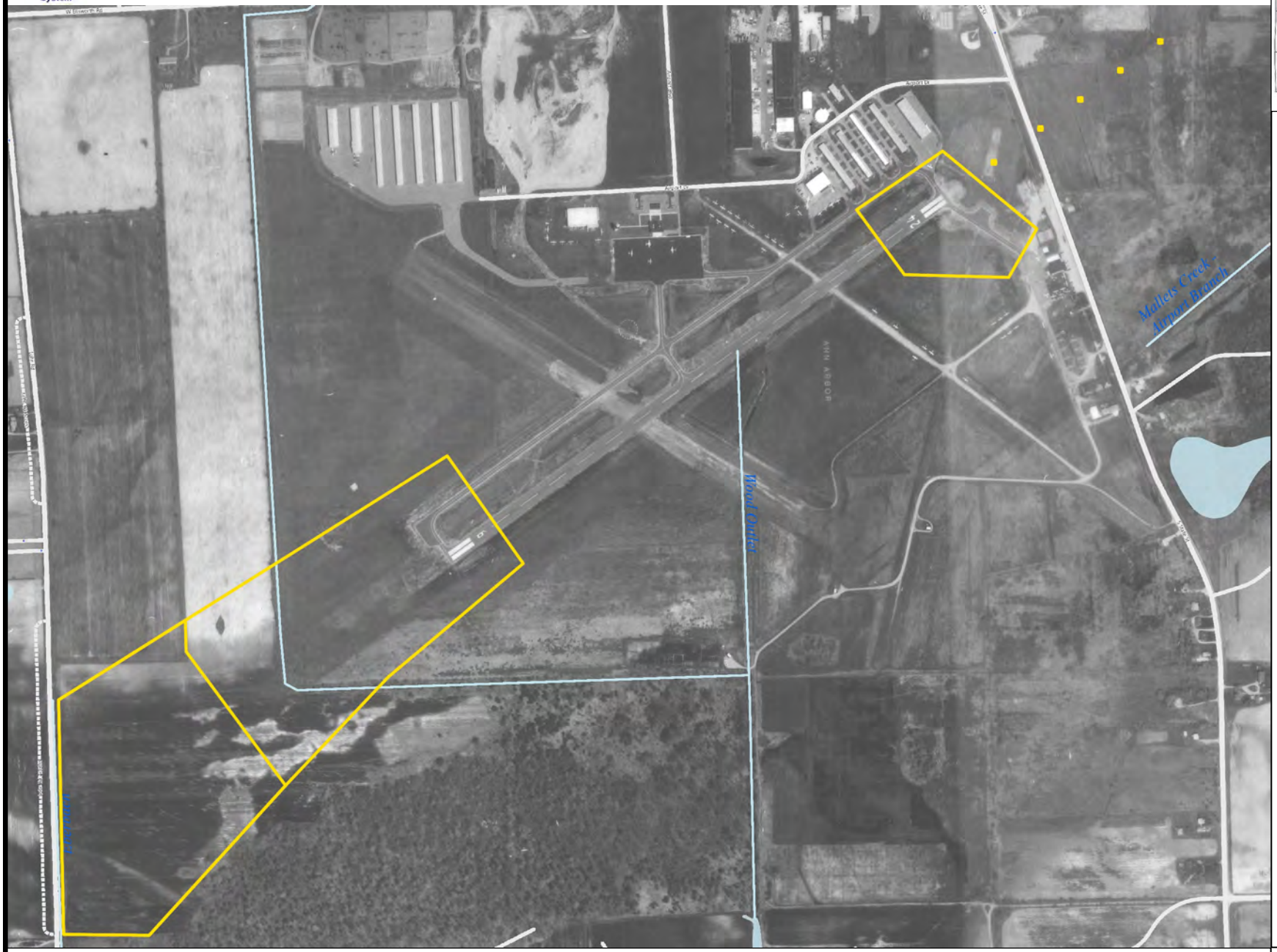
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1966

Rwy 6/24 Extension EA

Geographic Information System



Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1979

Rwy 6/24 Extension EA

Geographic Information System

Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1984

Rwy 6/24 Extension EA

Geographic Information System

Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

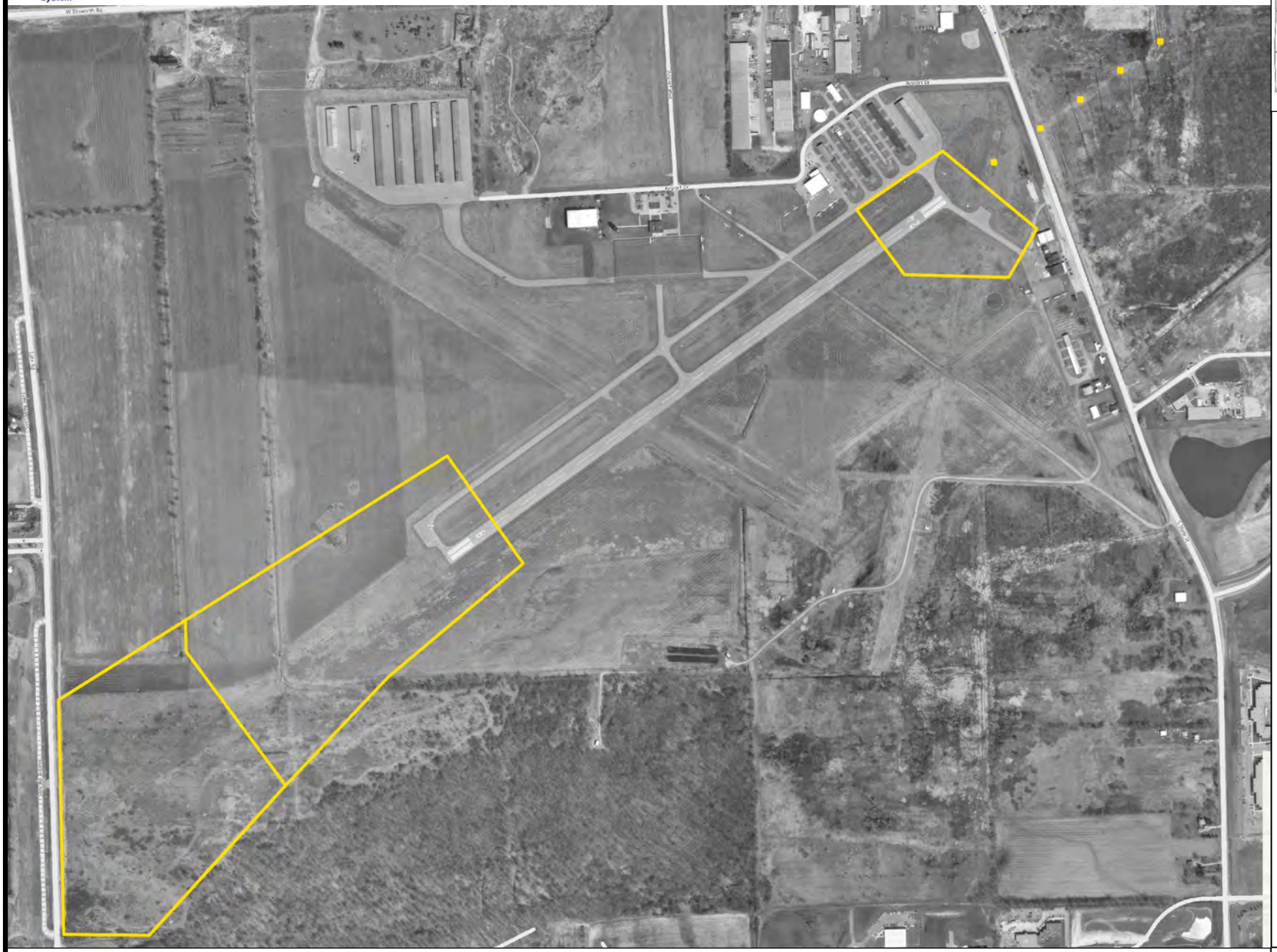
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1990

Rwy 6/24 Extension EA

Geographic Information System



Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

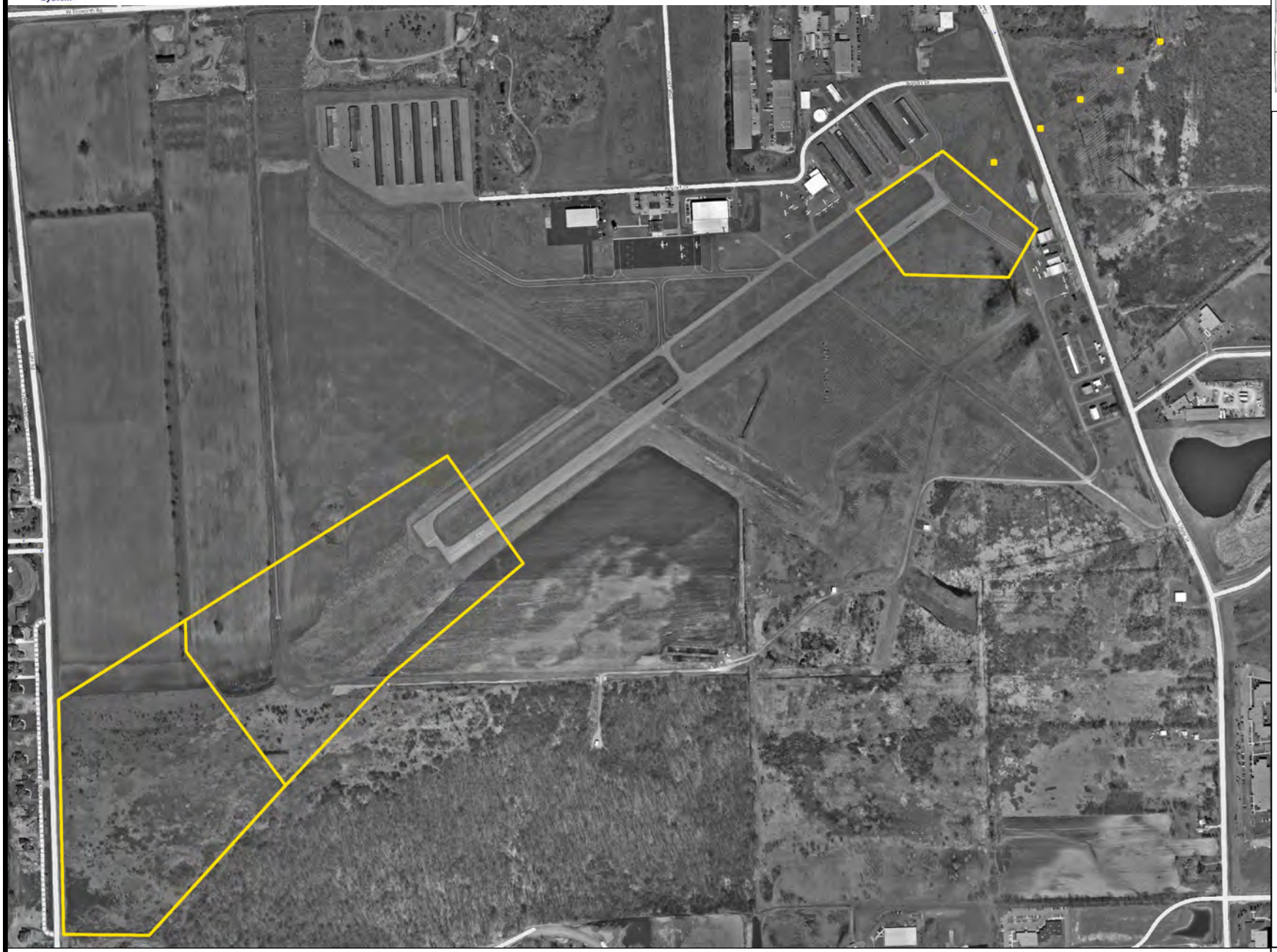
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1993

Rwy 6/24 Extension EA

Geographic Information System



Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1997

Rwy 6/24 Extension EA

Geographic Information System

Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

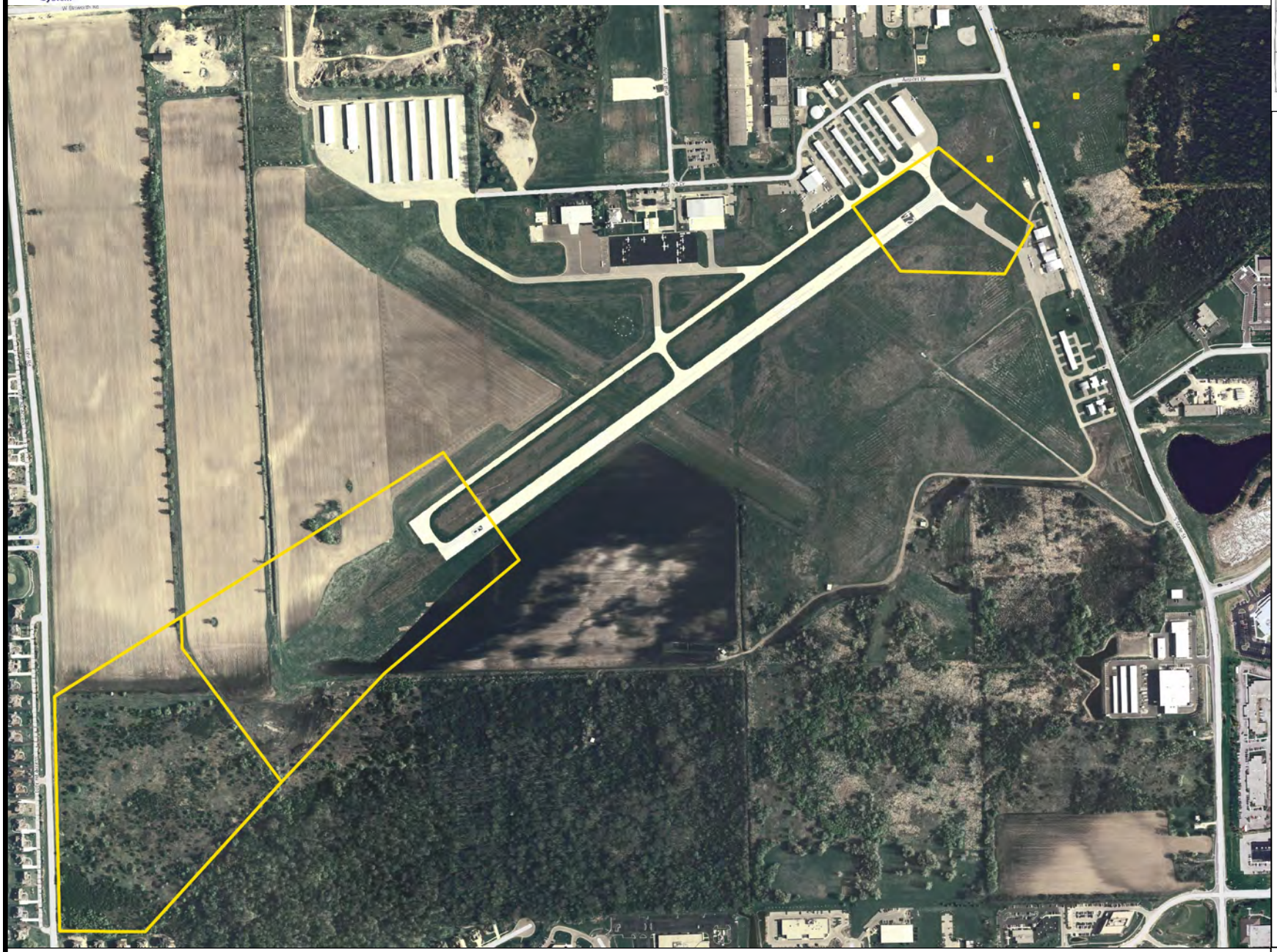
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 1998

Rwy 6/24 Extension EA

Geographic Information System



Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/15/2019

0 800.00 1,600.0 Feet

1: 9,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

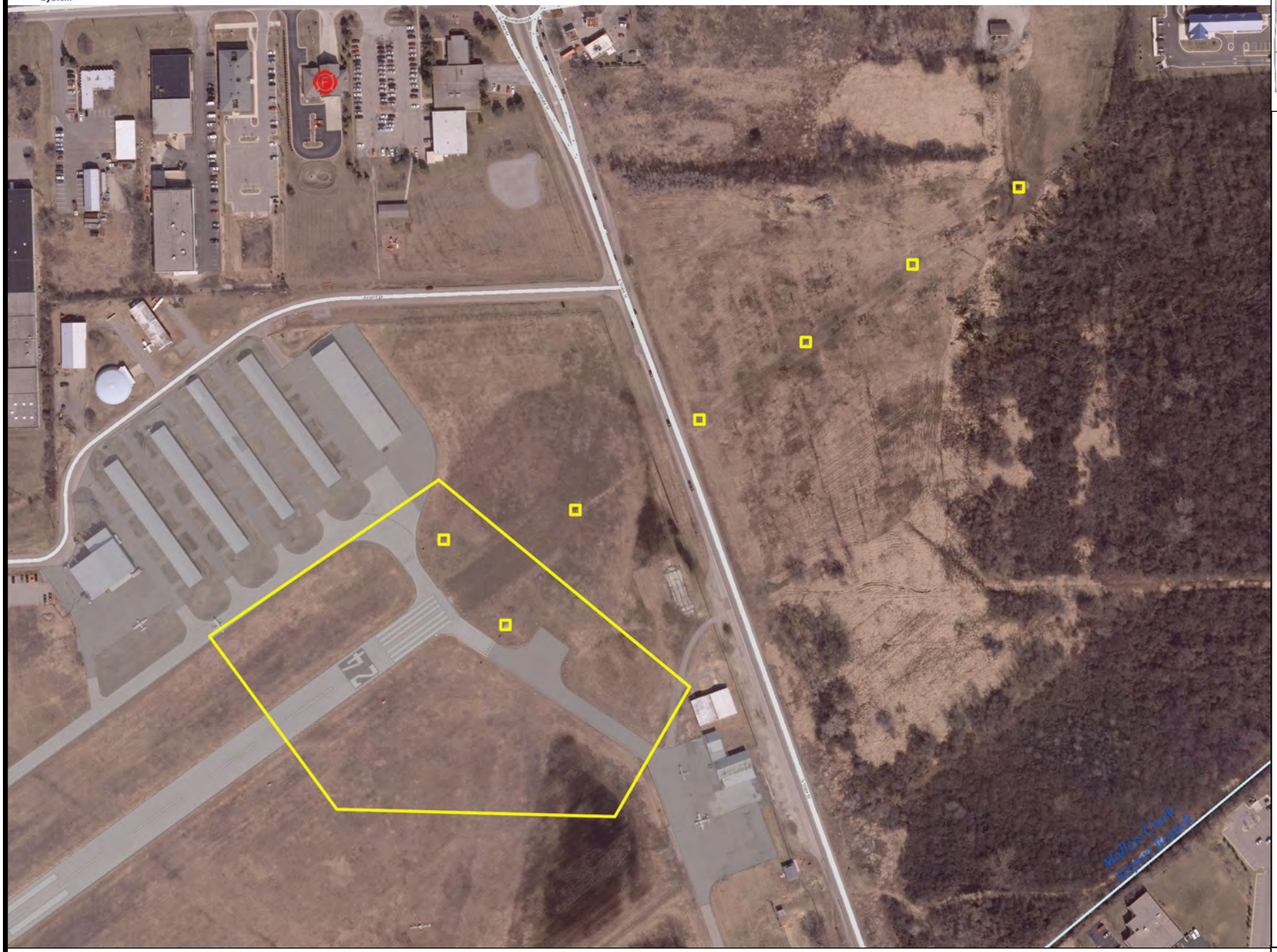
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2005

Rwy 6/24 Extension EA

Geographic Information System



Legend

- University and College
- K12 Schools
- Police Stations
- Fire Stations
- County Buildings
- Local Unit Offices
- Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

2/18/2019

0 300.00 600.0 Feet

1: 3,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

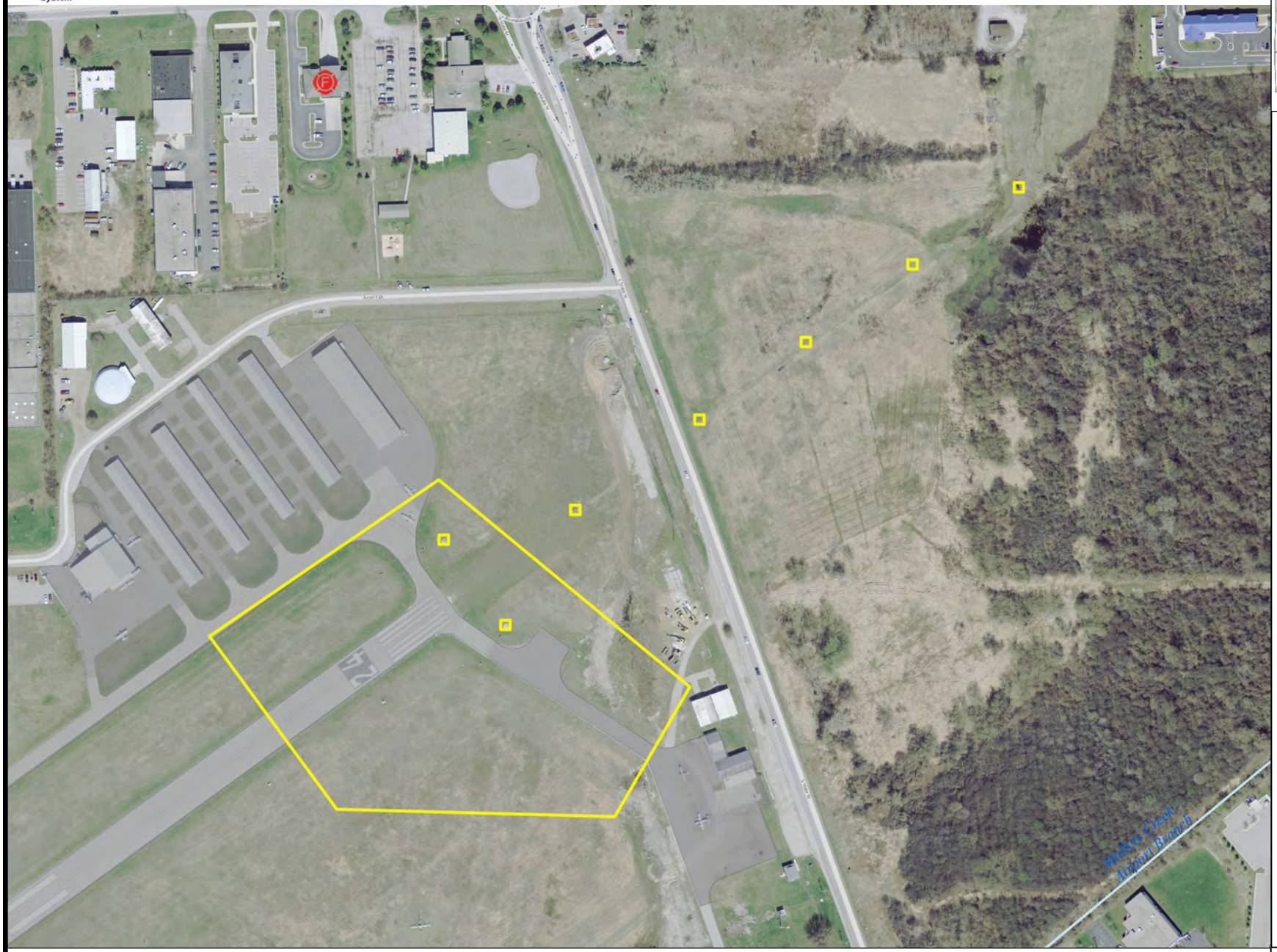
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2009

Rwy 6/24 Extension EA

Geographic Information System



Legend

- University and College
- K12 Schools
- Police Stations
- Fire Stations
- County Buildings
- Local Unit Offices
- Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

2/18/2019

0 300.00 600.0 Feet

1: 3,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2010

Rwy 6/24 Extension EA

Geographic Information System

Legend

- University and College
- K12 Schools
- Police Stations
- Fire Stations
- County Buildings
- Local Unit Offices
- Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

2/18/2019

0 300.00 600.0 Feet

1: 3,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

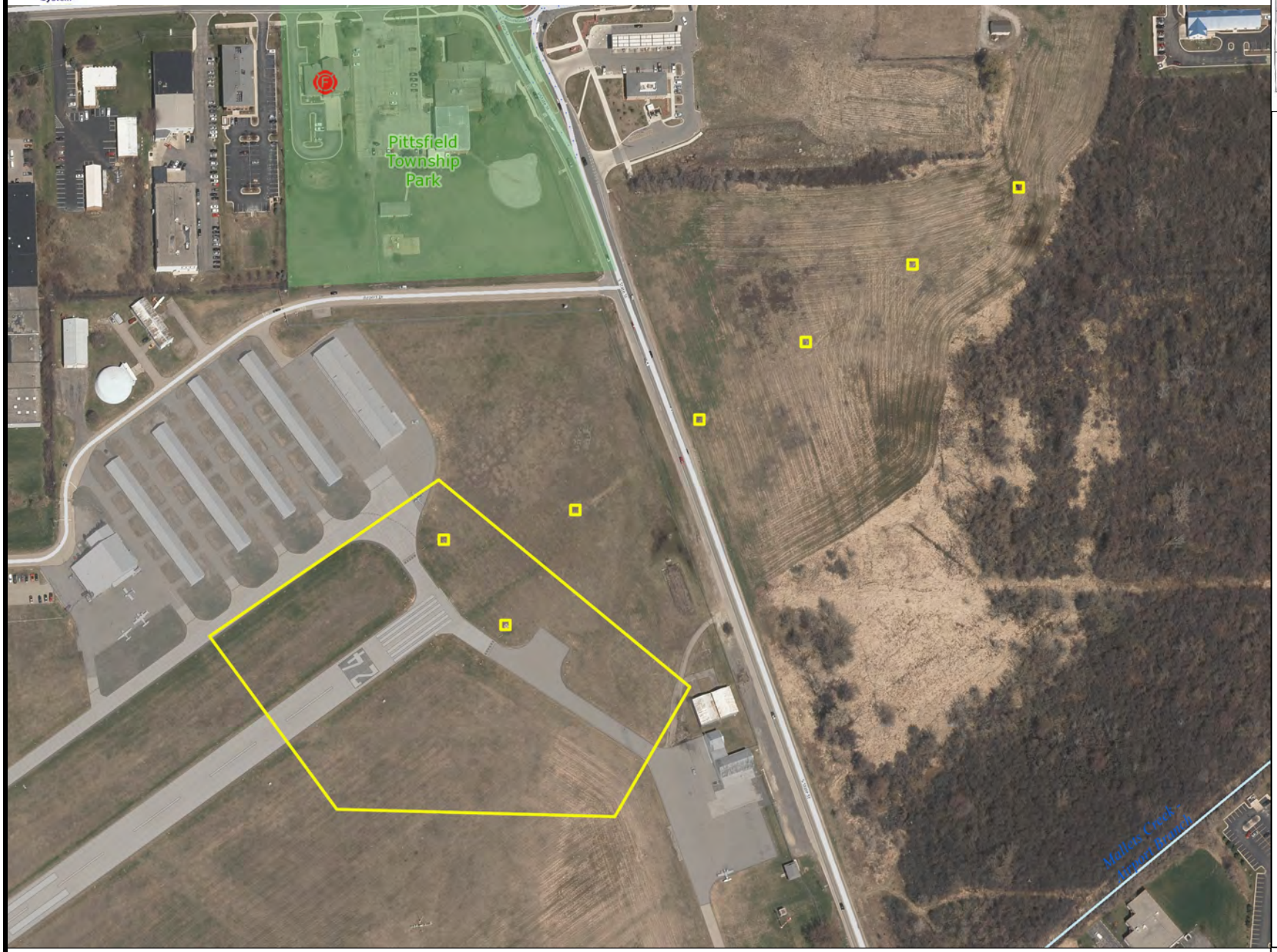
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2012

Rwy 6/24 Extension EA

Geographic Information System



Legend

- University and College
- K12 Schools
- Police Stations
- Fire Stations
- County Buildings
- Local Unit Offices
- Railroad
- O2015_boundary

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

2/18/2019

0 300.00 600.0 Feet

1: 3,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2015

Rwy 6/24 Extension EA

Image date: April 2016

Legend

Airport Dr

Airport Blvd

24

S State St

Concourse Dr

N

800 ft

Google Earth

Rwy 6/24 Extension EA

Image date: April 2017

Legend

Airport Dr

Airport Blvd

24

S State St

Concourse Dr

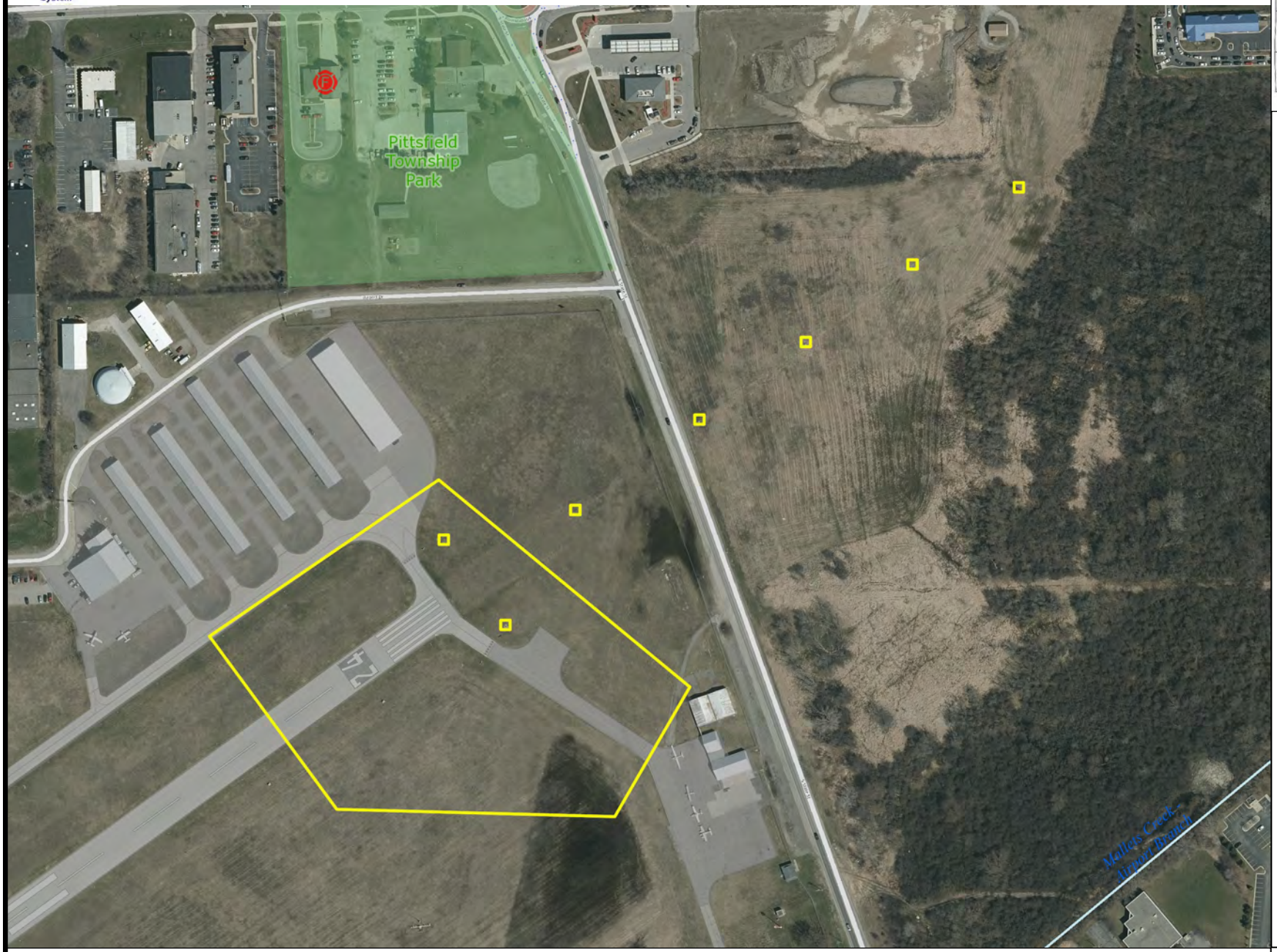
N

800 ft

Google Earth

Rwy 6/24 Extension EA

Geographic Information System



Legend

- University and College
- K12 Schools
- Police Stations
- Fire Stations
- County Buildings
- Local Unit Offices
- Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

2/18/2019

0 300.00 600.0 Feet

1: 3,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2018

Rwy 6/24 Extension EA

Geographic Information System

Legend

Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/13/2019

0 300.00 600.0 Feet

1: 3,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2010

Rwy 6/24 Extension EA

Image date: May 2010

Legend

Stonebridge Blvd E

Lohr Textile Greenway

Lohr Rd

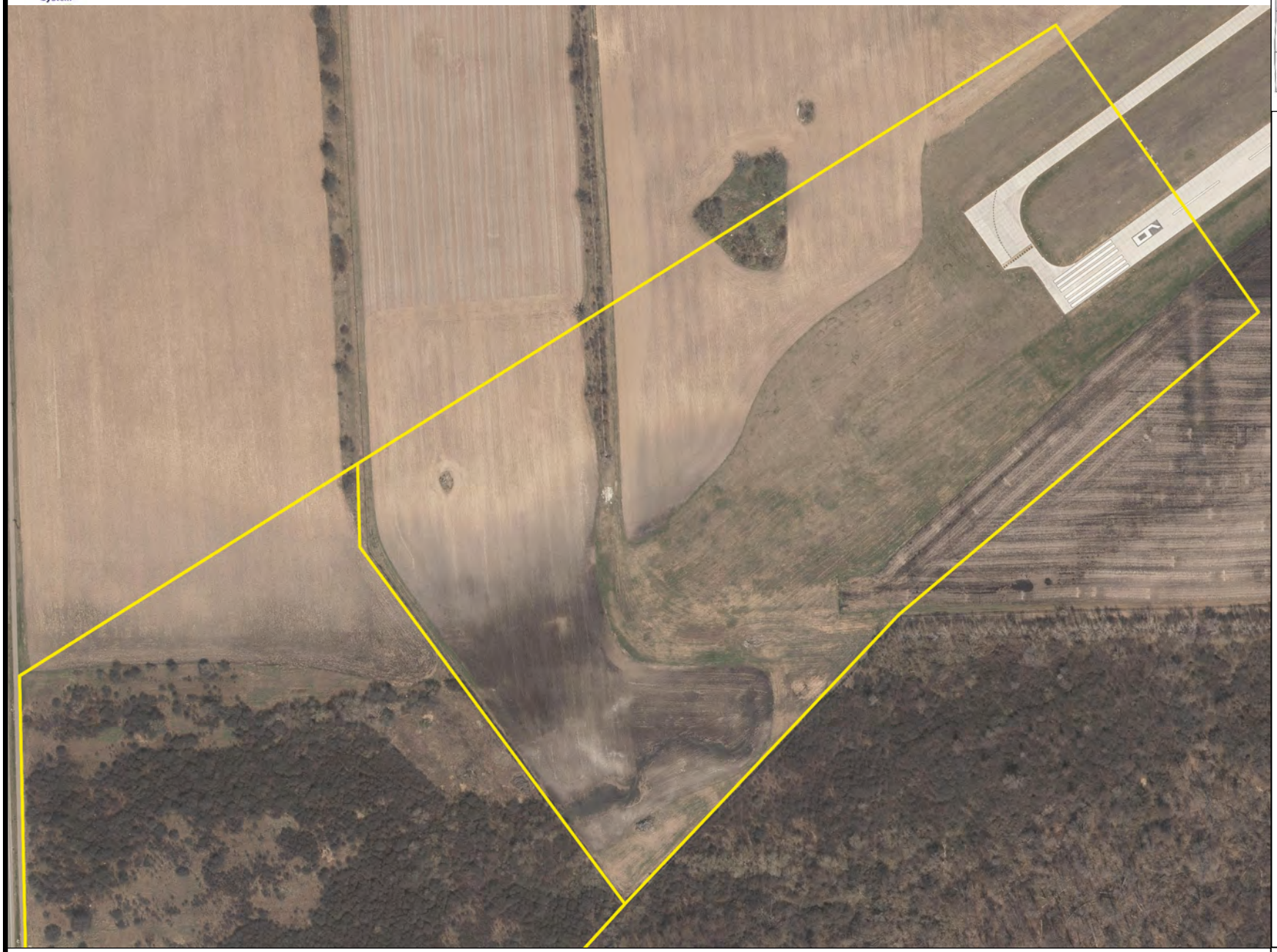
Google Earth

N

1000 ft

Rwy 6/24 Extension EA

Geographic Information System



Legend

- University and College
- K12 Schools
- Police Stations
- Fire Stations
- County Buildings
- Local Unit Offices
- Railroad
- O2015_boundary

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/13/2019

0 300.00 600.0 Feet

1: 3,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2015

Rwy 6/24 Extension EA

Image date: April 2015

Legend

Stonebridge Blvd E

Lohr Textile Greenway

Lohr Rd

Google Earth

N

1000 ft

Rwy 6/24 Extension EA

Image date: April 2016

Legend

Stonebridge Blvd E

Lohr Textile Greenway

Lohr Rd

Google Earth

N

1000 ft

Rwy 6/24 Extension EA

Image date: April 2017

Legend

Stonebridge Blvd E

Lohr Textile Greenway

Lohr Rd

Google Earth

N

1000 ft

Rwy 6/24 Extension EA

Geographic Information System

Legend

- University and College
- K12 Schools
- Police Stations
- Fire Stations
- County Buildings
- Local Unit Offices
- Railroad

THIS MAP REPRESENTS PARCELS ATTHE TIME OF PRINTING. THE OFFICIAL PARCEL TAX MAPS ARE MAINTAINED SOLELY BY THE WASHTENAW COUNTY EQUALIZATION DEPARTMENT AND CAN BE OBTAINED BY CONTACTING THAT OFFICE AT 734-222-6662.

The information contained in this cadastral map is used to locate, identify and inventory parcels of land in Washtenaw County for appraisal and taxing purposes only and is not to be construed as a "survey description". The information is provided with the understanding that the conclusions drawn from such information are solely the responsibility of the user. Any assumption of legal status of this data is hereby disclaimed.

NOTE: Parcels may not be to scale.

11/13/2019

0 300.00 600.0 Feet

1: 3,600

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Image Date: 2018

Rwy 6/24 Extension EA

Image date: July 2018

Legend

Stonebridge Blvd E

Lohr Textile Greenway

Lohr Rd

Google Earth

N

1000 ft

Appendix F. Wetland Boundary Maps

W ELLSWORTH RD
AIRPORT BLVD
AIRPORT DR
MAP 1
Mallets Creek - Airport Branch
WETLAND 1
Ag Field
Ag Field
Ag Field
TAXIWAY
RUNWAY 6/24
LOHR RD
STREAM 1
MAP 2
Wood Outlet
Ag Field
S STATE ST
WETLAND 3
WETLAND 2
Forested Area
(not delineated)
AIRPORT PROPERTY LINE

Path: X:\270880001\72467.01\TECH\GIS\Maps\ARB_WetlandBoundaryOverviewMap_Landscape.mxd

Image Source: FSA-NAIP, July 2018

Wetland Boundary Map Overview

Ann Arbor Municipal Airport

Data Sources:

Streams: Washtenaw County

Legend

- Project Area of Interest (AOI)
- Area not delineated
- Ditch
- Wetland
- Piped Drainage
- Stream
- Wetland Map Sheet
- Airport Property Boundary
- Fence

0 250 500 1,000 1,500 Feet

N

Project Location

T3S, R6E, Sections 16 and 17
Ann Arbor Municipal Airport
Washtenaw County, MI
LRR subregion: M
USACE Regional Supplement: Midwest
Area of Interest = 82.2 acres
Field work conducted: October 10, 2018
and June 3 - 6, 2019

Wetland Boundary Map

Ann Arbor Municipal Airport

Path: X:\2708800\172467.01\TECH\GIS\Maps\ARB_WetlandBoundaryMap_Landscape.mxd

Image Source: City of Ann Arbor, April 2018

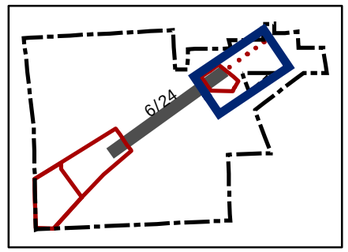
Legend

- Data Point Location
- Stream
- Wetland
- Culvert
- Piped Drainage
- Stream
- Flow Direction
- Photo Location**
- Airport Property Boundary
- Fence
- Project Area of Interest (AOI)

Contour Type*

- Index
- Index Depression
- Intermediate
- Intermediate Depression

* Contour interval is 1 foot
** See Appendix H for Field Photographs



0 50 100 200 Feet

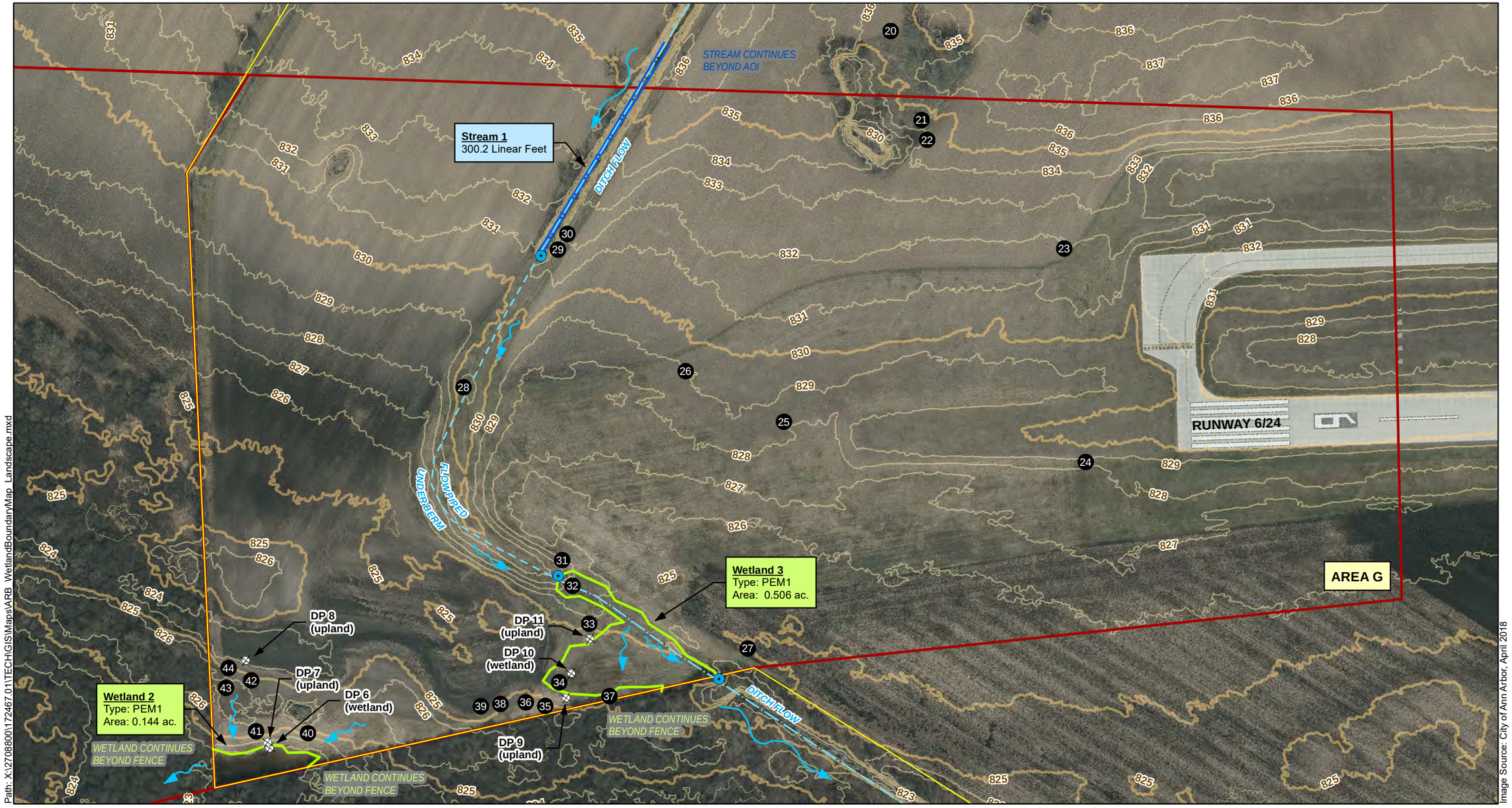
Data Sources:

Elevation data: Washtenaw County from 2017 LiDAR data. The contour elevation interval is 1 foot.
Streams: Washtenaw County

Project Location

T3S, R6E, Sections 16 and 17
Ann Arbor Municipal Airport
Washtenaw County, MI
LRR subregion: M
USACE Regional Supplement: Midwest
Area of Interest = 82.2 acres
Field work conducted: October 10, 2018 and June 3 - 6, 2019

MAP 1 of 2



Path: X:\27088001\72467.011\TECH\GIS\Maps\ARB_WetlandBoundaryMap_Landscape.mxd

Image Source: City of Ann Arbor, April 2018

Wetland Boundary Map

Ann Arbor Municipal Airport

Data Sources:

Elevation data: Washtenaw County from 2017 LiDAR data. The contour elevation interval is 1 foot.
Streams: Washtenaw County

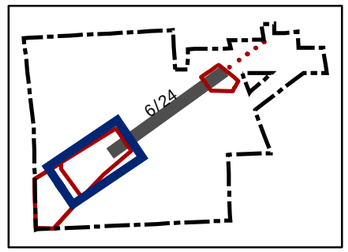
Legend

- Data Point Location
- Stream
- Wetland
- Culvert
- Piped Drainage
- Stream
- Flow Direction
- Photo Location**
- Airport Property Boundary
- Fence
- Project Area of Interest (AOI)

Contour Type*

- Index
- Index Depression
- Intermediate
- Intermediate Depression

* Contour interval is 1 foot
** See Appendix H for Field Photographs



0 50 100 200 Feet

Project Location

T3S, R6E, Sections 16 and 17
Ann Arbor Municipal Airport
Washtenaw County, MI
LRR subregion: M
USACE Regional Supplement: Midwest
Area of Interest = 82.2 acres
Field work conducted: October 10, 2018 and June 3 - 6, 2019

MAP 2 of 2

Appendix G. Data Sheets

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport City/County: Washtenaw Sampling Date: October 10, 2018
Applicant/Owner: Michigan Bureau of Aeronautics State: MI Sample Point: DP1
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 16, T3S, R6E
Landform (hillslope, terrace, etc.): shallow basin Local relief (concave, convex, none): concave
Slope (%): <1% Lat: 42.224728 Long: -83.738671 Datum: WGS 84
Soil Map Unit Name: Palms muck (Pa) (Hydric – 100%) 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 ☐
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: 1

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 about twice a year. Some fill materials from runway/taxiway construction. Dominance of invasives.

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: 5ft)			
1. Phalaris arundinacea	100	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10. 50/20 rule = 50/20			
11.			
	100 = Total Cover		
Wood Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

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 =	____
Colum 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.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is present. Near total dominance by RCG; also, some swamp milkweed (*Asclepias incarnata*) (with monarch caterpillar), purple stem aster (*Symphyotrichum puniceum*), water horehound (*Lycopus* sp.) and Limestone-Meadow Sedge (*Carex granularis*) within wetland.

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
0-6	10YR 2/1	100					silt loam	
6-8	10YR 2/1	40					sandy loam	with many small pebbles; fill material
	10YR 5/2	60					silt loam	
8-22	10YR 2/1	100						

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Very Shallow Dark Surface (TF12)
- ☒ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: layer of fill material above original soil; soils disturbed

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: Layer of fill material above original soil; soils disturbed. Does not meet thickness requirements for Redox Dark Surface likely due to disturbance. Hydric soils are present.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Late season conditions; no late season water table observed. See Photo 1.

Remarks: Wetland hydrology is indicated. Previous wetland determination by DEQ in 2009.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport City/County: Washtenaw Sampling Date: June 5, 2019
Applicant/Owner: Michigan Bureau of Aeronautics State: MI Sample Point: DP2
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 16, T3S, R6E
Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave
Slope (%): <1% Lat: 42.224819 Long: -83.738946 Datum: WGS 84
Soil Map Unit Name: Palms muck (Pa) (Hydric – 100%) 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 ☐
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: 1

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 wetter than normal range at the time of investigation. Fill material over original hydric layer, area mown biannually.

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: 5ft)			
1. Carex granularis	55	X	FACW
2. Cornus alba	15		FACW
3. Rhamnus cathartica	15		FAC
4. Centaurea maculosa	5		UPL
5. Poa pratensis	5		FAC
6. Bromus inermis	5		FACU
7.			
8.			
9.			
10.			
11. 50/20 rule = 50/20			
	100 = Total Cover		
Wood Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

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 =	_____
Colum 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.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is present. Shrubs about 1ft tall; reed canary grass (*Phalaris arundinacea*) patch about 30ft to east. About 25-30ft separates the two paired data points with little elevation change (~0.5ft).

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
0-2	10YR3/1	100					loam	
2-4	10YR4/1	100					sandy loam	Fill material - stony
4-8	10YR4/1	90	7.5YR4/6	10	C	M	sandy loam	Fill material - stony
8-20	2.5/N	100					silt loam	Original hydric layer

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type:

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: Fill layer over original hydric layer. Hydric soils are present. Hydric soil indicator Depleted Matrix (F3) 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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☒ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☒ No ☐ Depth (inches): 7

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 0

Wetland Hydrology Present? Yes ☒ No ☐

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

Previous wetland determination by DEQ in 2009. See Photos 2 -4.

Remarks: Standing water within RCG patch about 30ft to east; Saturation visible on 2018 aerial photo. Morning rainfall prior to data sampling (0.25 inches). Wetland hydrology is present and indicated.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport City/County: Washtenaw Sampling Date: June 5, 2019
Applicant/Owner: Michigan Bureau of Aeronautics State: MI Sample Point: DP3
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 16, T3S, R6E
Landform (hillslope, terrace, etc.): flat/terrace Local relief (concave, convex, none): none
Slope (%): <1% Lat: 42.224853 Long: -83.739029 Datum: WGS 84
Soil Map Unit Name: Palms muck (Pa) (Hydric – 100%) 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 wetter than normal range at the time of investigation. Area mown biannually; fill materials from runway/taxiway construction.

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: 5ft)			
1. Bromus inermis	50	X	FACU
2. Centaurea maculosa	25	X	UPL
3. Rhamnus cathartica	25	X	FAC
4. Poa pratensis	5		FAC
5. Carex pallescens	2		FACW
6. Trifolium pratense	2		FACU
7. Lepidium perfoliatum	1		FAC
8.			
9.			
10.			
11. 50/20 rule = 55/22			
	110	= Total Cover	
Wood Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

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 =	_____
Colum 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.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is not present. Area mown, vegetation about 1 foot in height. Rainfall morning of data point sampling (0.25"). About 25 feet separates the paired wetland data point with little elevation change (~0.5 ft).

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
0-3	10YR 3/1	100					loam	stony
3-8	10YR 4/2	100					loam	Fill material; stony
8-12	10YR 4/2	100					Coarse sand	
12-20	2.5/N	100					Silt loam	Original hydric layer

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type:

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: Hydric soils are not present. Does not meet hydric soils criteria. Fill material above shows no redox features over original hydric 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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 9
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 0

Wetland Hydrology Present? Yes ☒ No ☐

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

See Photos 2-4.

Remarks: Wetland hydrology is present. Heavy rainfall in morning (0.25").

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport | City/County: Washtenaw | Sampling Date: October 10, 2018
Applicant/Owner: Michigan Bureau of Aeronautics | State: MI | Sample Point: DP4 (ODALS 2)
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. | Section, Township, Range: Section 16, T3S, R6E
Landform (hillslope, terrace, etc.): plain/flat | Local relief (concave, convex, none): none
Slope (%): <1% | Lat: 42.227337 | Long: -83.736773 | Datum: WGS 84
Soil Map Unit Name: Palms muck (Pa) (Hydric – 100%) | 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 within normal range at the time of investigation. Platform construction, area mown infrequently (last time in Sept.)

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: 5ft)			
1. Phalaris arundinacea	40	X	FACW
2. Bromus inermis	35	X	FACU
3. Solidago canadensis	10		FACU
4. Taraxacum officinale	7		FACU
5. Rhamnus cathartica	5		FAC
6. Daucus carota	3		FACU
7.			
8.			
9.			
10.			
11. 50/20 rule = 50/20			
12.			
	100	= Total Cover	
Wood Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

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	0	x 1 = 0
FACW species	40	x 2 = 80
FAC species	5	x 3 = 15
FACU species	55	x 4 = 220
UPL species	0	x 5 = 0
Colum Totals:	100 (A)	315 (B)

Prevalence Index = B/A = 3.15

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.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is not present. Around platform for ODALS 2 (3 X 3ft concrete) slightly higher than surrounding terrain. Rhamnus less than 1m tall. Fails P.I. at 3.15

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
0-3	10YR 3/1	100					silt loam	
3-6	10YR 6/2	100					gravel	gravel mix/small pebbles
6-10	10YR 3/1	100					silt loam	
10-22	10YR 4/1	95	10YR 5/6	5	C	M	silt loam	

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type:

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: Fill material above natural soil. Hydric soils are present. Hydric soils indicator F3 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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

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

Wetland Hydrology Present? Yes ☐ No ☒

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

No evidence of dry season water table at 22 inches. See Photos 13 and 14.

Remarks: Wetland hydrology is neither present nor indicated.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport | City/County: Washtenaw | Sampling Date: October 10, 2018
Applicant/Owner: Michigan Bureau of Aeronautics | State: MI | Sample Point: DP5 (ODALS 4)
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. | Section, Township, Range: Section 16, T3S, R6E
Landform (hillslope, terrace, etc.): flat | Local relief (concave, convex, none): none
Slope (%): <1% | Lat: 42.228202 | Long: -83.735064 | Datum: WGS 84
Soil Map Unit Name: Sebewa loam (Sb) disintegration moraine, 0-2% slope (Predominantly hydric (94%)) | 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 ☒

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. ODALS #4 platform construction, area mown infrequently (last time in Sept).

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: 5ft)			
1. Bromus inermis	30	X	FACU
2. Phalaris arundinacea	30	X	FACW
3. Sonchus oleraceus	20	X	FACU
4. Cirsium arvense	10		FACU
5. Daucus carota	5		UPL
6. Taraxacum officinale	5		FACU
7.			
8.			
9.			
10. 50/20 rule = 50/20			
11.			
12.			
	100	= Total Cover	
Wood Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

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	0	x 1 = 0
FACW species	30	x 2 = 60
FAC species	0	x 3 = 0
FACU species	65	x 4 = 260
UPL species	5	x 5 = 25
Colum Totals:	100 (A)	345 (B)

Prevalence Index = B/A = 3.45

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.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is not present. Fails PI at 3.45.

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	10YR 3/1	100					silt loam	with some pea size gravel
5-7	10YR 5/1	97	10YR 5/6	3	C	M	silt loam	
7-12	10YR 2/1	100					silt loam	
12-22	10YR 5/1	90	10YR 5/6	10	C	M	silt loam	

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: Hydric soils are not present. Does not meet hydric soils criteria. Soils disturbed likely due to construction.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

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

Wetland Hydrology Present? Yes ☐ No ☒

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

See Photos 17 – 19.

Remarks: No evidence of dry season water table at 22 inches. Wetland hydrology is neither present nor indicated.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport City/County: Washtenaw Sampling Date: June 5, 2019
Applicant/Owner: Michigan Bureau of Aeronautics State: MI Sample Point: DP6
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 17, T3S, R6E
Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): concave
Slope (%): <1% Lat: 42.216994 Long: -83.753381 Datum: WGS 84
Soil Map Unit Name: Edwards muck (Ee) (Hydric – 100%) 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 ☐
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: 2

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 wetter than normal range at the time of investigation. Soil disturbance due to tractor rutting.

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: 5ft)			
1. Pharlaris arundinacea	60	X	FACW
2. Cirsium arvense	10		FACU
3. Poa pratensis	5		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10. 50/20 rule = 38/15			
11.			
12.			
	75	= Total Cover	
Wood Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

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 =	____
Colum 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.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is present. Some bare soil due to tractor ruts. Also, some small cottonwood saplings (<1m) outside sampling area and Indian-hemp (*Apocynum cannabinum*).

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
0-6	10YR2/1	100					Silt loam	
6-12	10YR3/1	95	5YR4/6	5	C	PL	Silt loam	PL=oxidized rhizospheres
12-14	2.5YR7/1	95	5YR4/6	5	C	M	Clay loam	
14-20	10YR3/6	100					Silt loam	

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ☒ No ☐

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

See Photos 40 and 41.

Remarks: Wetland hydrology is present and indicated. Heavy rainfall (0.25 inches) in morning. Standing water throughout. Wetland continues past fence line into trees. Fence line dominated by mature buckthorn 20-25ft tall.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport City/County: Washtenaw Sampling Date: June 5, 2019
Applicant/Owner: Michigan Bureau of Aeronautics State: MI Sample Point: DP7
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 17, T3S, R6E
Landform (hillslope, terrace, etc.): midslope Local relief (concave, convex, none): convex
Slope (%): ~5% Lat: 42.21701 Long: -83.75341 Datum: WGS 84
Soil Map Unit Name: Edwards muck (Ee) (Hydric – 100%) 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 wetter than normal range at the time of investigation. Wetter than normal; tractor ruts.

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')			
1. Cirsium arvense	50	X	FACU
2. Poa pratensis	25	X	FAC
3. Phalaris arundinacea	3		FACW
4. Dactylis glomerata	2		FACU
5.			
6.			
7.			
8.			
9.			
10. 50/20 rule = 40/16			
11.			
12.			
	80 = Total Cover		
Wood Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

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	____	x 1 = ____
FACW species	3	x 2 = 6
FAC species	25	x 3 = 75
FACU species	52	x 4 = 208
UPL species	____	x 5 = ____
Colum Totals:	80 (A)	289 (B)

Prevalence Index = B/A = 3.61

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.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is not present. Fail PI @ 3.61. About 15ft separates the paired data points with about 1ft in elevation change. Some bare soil due to tractor ruts.

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
0-16	10YR2/1	100					Silt loam	
16-20	2.5YR7/1	100					Clay loam	Chalky feel

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ☒ No ☐

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

See Photos 40 and 41.

Remarks: Wetland hydrology is present and indicated. Water table at 12" in depth. No saturation from water table. Heavy rainfall (0.25 inches) in morning.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport City/County: Washtenaw Sampling Date: June 5, 2019
Applicant/Owner: Michigan Bureau of Aeronautics State: MI Sample Point: DP8 (upl)
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 17, T3S, R6E
Landform (hillslope, terrace, etc.): shallow basin Local relief (concave, convex, none): concave
Slope (%): 1% Lat: 42.217246 Long: -83.753768 Datum: WGS 84
Soil Map Unit Name: Palms muck (Pa) (Hydric – 100%) 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 wetter than normal range at the time of investigation. Ag field, drowned area. Receives flow from blow-out at culvert in berm to the east.

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: 5ft)			
1. Glycine max	2		UPL
2. Apocynum cannabinum	2		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	4	= Total Cover	
Wood Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

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

Prevalence Index worksheet:

Total % Cover of.		Multiply by:	
OBL species	____	x 1 =	____
FACW species	____	x 2 =	____
FAC species	2	x 3 =	6
FACU species	____	x 4 =	____
UPL species	2	x 5 =	10
Colum Totals:	4 (A)		16 (B)

Prevalence Index = B/A = 4.0

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.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is not present. Low spot in farm field inundated by poor drainage conditions from culvert. Mostly unvegetated due to standing water. Data point at edge of inundated area.

SOIL

Sampling Point: 8

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	10YR3/1	100					Silty clay loam	
7-20	10YR2/1	100					Silty clay loam	

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: Soil profile was not saturated, only surface saturation. Bottom layer at 16" dry. 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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 6"
Water Table Present?	Yes ☒	No ☐	Depth (inches): 16"
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches): 0" Surface saturation only

Wetland Hydrology Present? Yes ☒ No ☐

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

See Photos 42 – 44.

Remarks: Wetland hydrology is present and indicated. Water seems to be collecting and unable to drain off. Water continues past fence into woods. Rainfall (0.25 inches) in morning. Surface water present within sampling area.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport City/County: Washtenaw Sampling Date: June 5, 2019
Applicant/Owner: Michigan Bureau of Aeronautics State: MI Sample Point: DP9
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 17, T3S, R6E
Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none
Slope (%): <1% Lat: 42.217862 Long: -83.752138 Datum: WGS 84
Soil Map Unit Name: Palms muck (Pa) (Hydric – 100%) 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 wetter than normal range at the time of investigation. Altered hydrology due to culvert flow redirection from berm blowout.

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: 5ft)			
1. Dactylis glomerata	60	X	FACU
2. Cirsium arvense	25	X	FACU
3. Solidago canadensis	5		FACU
4. Phalaris arundinacea	5		FACW
5. Oxalis stricta	5		FACU
6.			
7.			
8.			
9.			
10. 50/20 rule = 50/20			
11.			
12.			
	100	= Total Cover	
Wood Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

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 =	
Colum 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.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation is not present. On transect through upland-wetland-upland. Also nearby is yarrow (*Achillea millefolium*) and English plantain (Plantago lanceolata).

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
0-6	10YR2/1	100					Silt loam	
6-20	10YR7/1	97	10YR5/8	3	C	M	Silt loam	

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: Hydric soils are present. Hydric soils indicators Depleted Below Dark Surface (A11) and Depleted Matrix (F3) 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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ☐ No ☒

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

See Photos 35 and 36.

Remarks: Wetland hydrology is neither present nor indicated. Rainfall (0.25 inches) in morning.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport City/County: Washtenaw Sampling Date: June 5, 2019

Applicant/Owner: Michigan Bureau of Aeronautics State: MI Sample Point: DP10 wet

Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. Section, Township, Range: Section 17, T3S, R6E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave

Slope (%): <1% Lat: 42.21796 Long: -83.75219 Datum: WGS 84

Soil Map Unit Name: Palms muck (Pa) (Hydric – 100%) 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 ☐
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: 3

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 wetter than normal range at the time of investigation. Altered hydrology due to culvert flow redirection from berm blowout.

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: 5ft)			
1. Typha latifolia	30	X	OBL
2. Phalaris arundinacea	5		FACW
3. Rumex crispus	5		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10. 50/20 rule = 20/8			
11.			
12.			
	40 = Total Cover		
Wood Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

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 =	____
Colum 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.

Hydrophytic Vegetation Present? Yes ☒ No ☐

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

Hydrophytic vegetation is present. Also, purple stemmed aster (*Symphyotrichum puniceum*), *Carex* sp. nearby. Small core area covered by cattails and surrounded by reed canary grass, aster, and curly dock (Rumex crispus). Mostly unvegetated at data point, covered with fine debris materials.

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	10YR2/1	100					Silt loam	
12-18	10YR4/1	97	5YR4/6	3	C	M	Silt loam	

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: Hydric soils are present. Hydric soils indicator Depleted Below Dark Surface (A11) 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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ☒ No ☐

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

See Photos 34 and 36.

Remarks: Wetland hydrology is present and indicated. Rainfall (0.25 inches) in morning. Drainage from culvert to north has diverted through berm blowout. No visible surface water at this time. Fine debris materials indicate that the area likely had standing water earlier in the season.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Ann Arbor Airport | City/County: Washtenaw | Sampling Date: June 5, 2019

Applicant/Owner: Michigan Bureau of Aeronautics | State: MI | Sample Point: DP11

Investigator(s): Brauna Hartzell, Mead & Hunt, Inc. | Section, Township, Range: Section 17, T3S, R6E

Landform (hillslope, terrace, etc.): Flat | Local relief (concave, convex, none): none

Slope (%): <1% | Lat: 42.218124 | Long: -83.752212 | Datum: WGS 84

Soil Map Unit Name: Palms muck (Pa) (Hydric – 100%) | 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 wetter than normal range at the time of investigation. Altered hydrology due to culvert flow redirection from berm blowout.

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: _____)			
1. Bromus inermis	50	X	FACU
2. Poa pratensis	25	X	FAC
3. Cirsium arvense	15		FACU
4. Solidago canadensis	5		FACU
5. Dactylis glomerata	5		FACU
6.			
7.			
8.			
9.			
10. 50/20 rule = 50/20			
11.			
12.			
	100 = Total Cover		
Wood Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

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	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	25	x 3 = 75
FACU species	75	x 4 = 300
UPL species	_____	x 5 = _____
Colum Totals:	100 (A)	375 (B)

Prevalence Index = B/A = 3.75

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.

Hydrophytic Vegetation Present? Yes ☐ No ☒

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

Hydrophytic vegetation is not present. Fails PI @ 3.75. On transect through wetland 4.

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
0-18	10YR2/1	100					Silt loam	

[1]Type: C=Concentration, D=Deletion, 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)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

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)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ☐ No ☒

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

See Photos 33 and 36.

Remarks: Wetland hydrology is neither present nor indicated. Rainfall (0.25 inches) in morning.

Appendix H. Field Photographs

Site Photos

Photo 1. Wetland 1, Data point 1. Soil profile. (10/2018)

Photo 2. Wetland 1, Data points 2 and 3. View to the south. (6/2019)

Photo 3. Wetland 1, Data points 2 and 3. View to the southeast. (6/2019)

Photo 4. Wetland 1, View to the south. (6/2019)

Photo 5. Wetland 1, View to the east. (10/2018)

Photo 6. Wetland 1, View to the south. (10/2018)

Photo 7. Wetland 1, View to the northwest. (6/2019)

Photo 8. Wetland 1, View to the north. (6/2019)

Photo 9. Wetland 1, View to the north. (6/2019)

Photo 10. Wetland 1, View to the east. (6/2019)

Photo 11. ODALS 1, View to the west. (10/2018)

Photo 12. ODALS 1, View to the east. (10/2018)

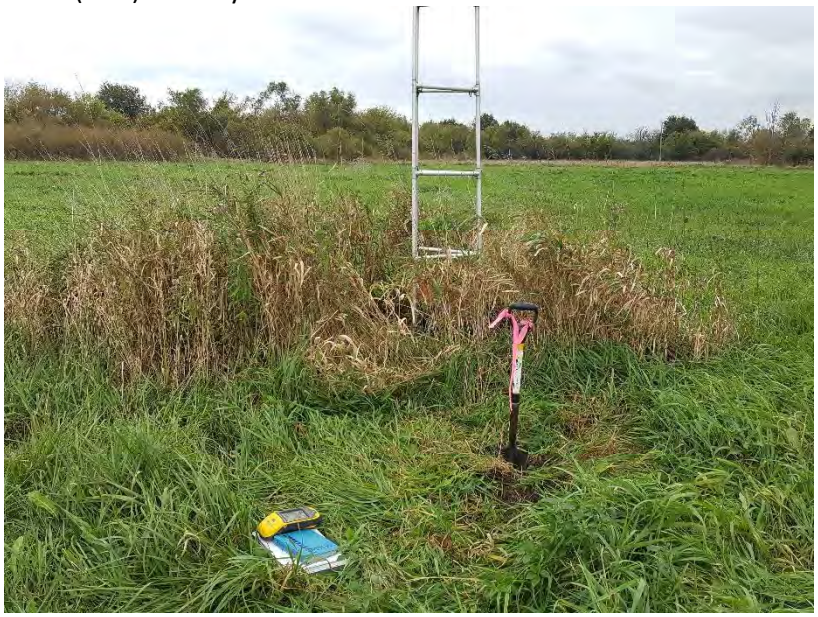


Photo 13. ODALS 2, Data point 4. View to the south. (10/2018)

Photo 14. ODALS 2, View to the north. (10/2018)

Photo 15. ODALS 3, View to the east. (10/2018)

Photo 16. ODALS 3, View to the northwest. (10/2018)

Photo 17. ODALS 4, View to the north. (10/2018)

Photo 18. ODALS 1, Data point 5. View to the north. (10/2018)

Photo 19. ODALS 1, View to the southeast. (10/2018)

Photo 20. WoodedComplex, View to the southeast. (6/2019)

Photo 21. WoodedComplex, View to the north. (6/2019)

Photo 22. WoodedComplex, View to the west. (6/2019)

Photo 23. Wheat Field at Runway 6 End. View to the west. (6/2019)

Photo 24. Runway 6 End. View to the west. (6/2019)

Photo 25. Runway 6 End. View to the north. (6/2019)

Photo 26. Runway 6 End. View to the northeast. (6/2019)

Photo 27. South agricultural field. View to the north. (6/2019)

Photo 28. West agricultural field. View to the west. (6/2019)

Photo 29. Culvert entrance. View to the south. (6/2019)

Photo 30. Drainage ditch. View to the north. (6/2019)

Photo 31. Culvert exit with debris. View to the south. (6/2019)

Photo 32. Culvert exit. View to the west. (6/2019)

Photo 33. Wetland 4, Data point 11. View to the south. (6/2019)

Photo 34. Wetland 4, Data point 10. View to the north. (6/2019)

Photo 35. Wetland 4, Data point 9. View to the east. (6/2019)

Photo 36. Wetland 4, Data points 9, 10, and 11 on transect. View to the north. (6/2019)

Photo 37. Wetland 4, View to the west. (6/2019)

Photo 38. Edge of agricultural field. View to the west. (6/2019)

Photo 39. Edge of agricultural field. View to the west. (6/2019)

Photo 40. Wetland 3, View to the west. (6/2019)

Photo 41. Wetland 3, Data points 6 and 7. View to the south. (6/2019)

Photo 42. Wet area, agricultural field. Data point 8. View to the north. (6/2019)

Photo 43. Wet area, agricultural field. View to the northeast. (6/2019)

Photo 44. Wet area, agricultural field. Data point 8. View to the east. (6/2019)

Appendix I. Delineator Qualifications

BRAUNA HARTZELL, GISP
GEOGRAPHIC INFORMATION SYSTEM (GIS) ANALYST/ WETLANDS SCIENTIST

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
- Waukesha County Airport, Waukesha, Wisconsin, 2017
- I-43 Ozaukee/Milwaukee counties, Wisconsin, 2017
- Crystal Airport, Brooklyn Center, Minnesota, 2018
- STH 164, Waukesha County, Wisconsin, 2018
- STH 173, Juneau and Monroe counties, Wisconsin, 2018
- W. K. Kellogg Airport, Battle Creek, Michigan, 2018

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

Joint Individual Permit – USACE Approval, 2018
Construction of Production and Logistics Facility
Haribo of America
Pleasant Prairie, Wisconsin
The proposed project includes construction of a production and logistics facility with visitor and employee parking, warehousing capability, and other amenities. 0.6 acres of wetland fill will be necessary to achieve project needs. Brauna served as the lead preparer of the individual permit application which included a Practicable Alternatives Analysis.

Wetland Delineation, W.K. Kellogg Airport, 2018
W.K. Kellogg Airport
Battle Creek, Michigan
Brauna served as lead wetland delineator in support of an environmental assessment for proposed grading and site improvements to facilitate hangar development and other support services at the airport. The area of interest is approximately 180 acres is size and resulted in the delineation of six wetlands. Wetland types encountered include emergent seasonally-flooded basins and aquatic bed wetlands.

Wetland Delineation, Crystal Airport, 2018
Metropolitan Airports Commission
Brooklyn Center, Minnesota
Brauna served as lead wetland delineator in support of alternatives analysis for an environmental assessment for proposed airfield improvements. The area of interest is approximately 50 acres is size spread over eight areas and resulted in the delineation of seven wetlands. Wetland delineated consisted of emergent Type 1 seasonally-flooded basins.

Wetland Delineation, STH 73, Juneau and Monroe counties, 2018
Wisconsin Department of Transportation
Madison, Wisconsin
Brauna served as lead wetland delineator in support of bridge replacements and beam guard upgrades along a 19.4 mile stretch of State Trunk Highway (STH) 173 slated for roadway resurfacing improvements in Juneau and Monroe counties. Wetlands were delineated in association with bridge crossings at three stream crossings and areas of beam guard upgrades. Wetland types encountered include: fresh wet meadows and hardwood and shrub swamps.

Wetland Delineation, STH 164 Waukesha County, 2018
Wisconsin Department of Transportation
Madison, Wisconsin
Brauna served as lead wetland delineator managing two delineator teams in support of resurfacing and intersection upgrade alternatives analysis for a 4.6 mile stretch of State Trunk Highway (STH) 164 in Waukesha County. The area of interest is approximately 133 acres is size and resulted in the delineation of 22 wetlands. Wetland types encountered include: fresh wet meadows, hardwood and shrub swamps, and riparian wetlands associated with six major and minor stream crossings.

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.

Wetland Delineation, I-43 Ozaukee/Milwaukee counties, 2017
Wisconsin Department of Transportation
Madison, Wisconsin
Brauna served as lead wetland delineator in support of roadway design alternatives analysis for a 1.4 mile stretch of Interstate highway in Ozaukee and Milwaukee counties. The area of interest is approximately 92 acres is size and resulted in the delineation of 61 wetlands. Wetland types encountered include: fresh wet meadows, and hardwood and shrub swamps.

Wetland Delineation and Re-certification, Waukesha County, 2017
Waukesha County Airport
Waukesha, WI
Brauna served as the lead wetland delineator to update and re-certify previously delineated wetland boundaries more than 5 years old. Airfield projects spanning more than 8 years necessitated multiple delineations. Permitting for the current Runway Safety Area (RSA) improvement project required a reassessment of previous wetland boundaries. The boundaries of 12 previous identified wetlands were investigated during field work using hand-held GPS equipment. Three boundaries were updated based on changed environmental conditions and one new wetland was identified in an area not previously investigated. Sampling points and photographs combined to provide documentation of the re-certification.

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

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.