Wetland Delineation Report

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Section 1 – Executive Summary

The Federal Aviation Administration issued a Record of Decision on July 12, 2002 which approved the Tier 1 Environmental Impact Statement (Tier 1-EIS) for the proposed South Suburban Airport site (Inaugural Site) in Will County, Illinois (see **Exhibit 1: Site Location Map**). As part of the overall effort to prepare a Master Plan and Airport Layout Plan (ALP) for the Illinois Department of Transportation (IDOT), AECOM was tasked to update the wetland delineation report for the Inaugural Site in support of tiered Federal actions being prepared by the FAA and to comply with federal regulations set forth in Section 404 of the Clean Water Act of 1977 (CWA) and subsequent amendments. The regulatory requirements of the Illinois Interagency Wetland Policy Act are also addressed within this report. A previous wetland study was conducted in 1996 as part of the IDOT South Suburban Airport Environmental Assessment dated February 27, 1998 (EA).[1] This EA was prepared for the Ultimate South Suburban Airport site (Ultimate Site) comprising 23,845 acres.[2] Because of the time elapsed since that study and due to the change in the site boundaries of the ongoing Master Plan, an updated wetland delineation was needed in order to document current conditions. The Chicago District Office of the US Army Corps of Engineers (USACE Chicago District), the primary regulatory authority of the CWA, Section 404, stipulated that a full field delineation would be required for all areas within the study boundary.

The new wetland delineation took place in the Summer/Fall of 2008 and spring of 2009. The wetland study surveyed approximately 5,261 acres, which includes the entire 4,200 acres of the Inaugural Site and additional areas necessary for aeronautical development (see **Exhibit 2: 2008 Boundary, Tier 1-EIS Inaugural Airport Site Boundary and Ultimate Boundary**). Nearly 370 acres were visited during the investigation. Over 200 wetlands were identified, comprising more than 280 wetland acres.

This 2009 Draft Wetland Delineation Report is divided into five sections. **Section 1: Executive Summary**. **Section 2: Introduction** describes the purpose of the study and the site location. **Section 3: Background Information** provides historic and geographic information used as support material for the 2008-2009 field work. **Section 4: Methods** discusses the National Resource Conservation Service (NRCS) and USACE methodologies used for the remote-sensing review and field delineation. **Section 5: Results** details the final results of the field investigation. **Section 6: List of References** lists the references for the field work and this report. **Appendix A: Acronyms** is a list of acronyms and their definitions. **Appendix B: Historical Wetland Studies** includes historic mapping from previous site studies. **Appendix C: Soils Information** is a collection of relevant soil data and soil mapping used for the field delineation. **Appendix D: Methodology** includes documentation of NRCS, USACE and other methodologies used during the study. **Appendix E: Field Results** contains the results of field investigations organized by map Section and includes a summary table, wetland determination data forms, floristic quality assessment results, and comprehensive field mapping. **Appendix F: Field Investigation Photographs** contains representative photos of the field investigation. **Appendix G: Parcel Map** contains **Exhibit G-1: Property Parcels Within the Inaugural Boundary** that displays the parcel boundaries. **Appendix H: Comprehensive Species List** compiles the results of all floristic quality assessment reports in a comprehensive plant species list.

[1] *South Suburban Airport, Phase I Engineering Study and Environmental Assessment, Wetland Delineation Report.* Illinois Department of Transportation. Chicago, Illinois: TAMS Consultants, Inc, January, 1996.

[2] *South Suburban Airport Environmental Assessment, A New Supplemental Air Carrier Airport to Serve the Chicago Region*. Volume 2, Sections 9 through 11. Chicago, Illinois: Illinois Department of Transportation, 1998.

Section 2 – Introduction

2.1 Purpose of Study

The purpose of this study is to determine the location and extent of wetlands and waters of the U.S. within the study area, as mandated in Section 404 of the CWA and subsequent updates to the CWA. This report presents the information necessary for compliance with the regulatory requirements of both the CWA and the Illinois Interagency Wetland Policy Act. The results of this study will provide the basis for assessing impacts to wetlands and other waters in support of tiered Federal actions and the USACE Section 404 wetland permit application and mitigation plan.

2.2 Identification of Site

The proposed airport site is located in eastern Will County, Illinois, between the towns of Beecher to the east, Peotone to the southwest, and Monee to the northwest (see **Exhibit 1: Site Location Map**). The area is located west of Illinois Route 1 and east of I-57 in Monee Township T34N, R13E Section 31; Will Township T33N, R13E, Sections 1-6 and 8-12; and Washington Township T33N, R14E Sections 6-8. The center of the site is approximately 35 miles south-southwest of the Chicago Loop.

The wetland study described in this report encompasses 5,261 acres which includes the Inaugural Site area of 4,200 acres approved under the FAA's Tier 1 Record of Decision (Tier 1-ROD), as well as additional areas necessary for aeronautical development (see **Exhibit 2: 2008 Study Boundary, Tier 1-EIS Inaugural Airport Site Boundary and Ultimate Boundary**). The existing land uses within the proposed airport boundary are predominantly agricultural crop production and some single-family residential.

Section 3 – Background Information

3.1 Previous Studies

Since the early 1990s, three separate environmental studies have included surveys of wetlands within areas that comprise much of the current Inaugural Site boundary. These studies, discussed below, each identified wetland areas using methodologies such as remote-sensing and field reconnaissance. **Appendix B: Historical Wetland Studies** contains historical investigation results in **Exhibit B-1: 1996 Wetland Investigation Map-All Investigated Areas**; **Exhibit B-2: 1996 Wetland Delineation Map-Wetland Areas Only**; **Exhibit B-3: 2002 NRCS Review Results** and **Exhibit B-4: Identified Wetland Areas 1996, 2002 and 2008-09**.

Illinois - Indiana Regional Airport Study (IRAP), 1991.
A 1991 wetlands inventory report *Illinois – Indiana Regional Airport Site Selection Report-Abstract, Working Paper No. 20A, Appendix E, Volume I* provided a preliminary, comparative estimate of wetland impacts between the five alternative sites being considered for the proposed airport during the site selection process.[3] This effort was based on National Wetland Inventory (NWI) mapping, aerial photography interpretation, and field reconnaissance of the sites. The boundaries of this study did not take in Section 31 of Monee Township; Section 5 and 6 of Will Township; and Sections 7 and 8 of Washington Township. Approximately 102 acres of wetlands were identified within the area that now is now included in the 2008-2009 study boundary.

South Suburban Airport Environmental Assessment, February 1998.
A delineation of wetlands within the Ultimate Site (23,845 acres) was completed in 1996 and the findings were included as part of the EA submitted in 1998.[4] The wetlands identified during the 1996 study were mapped using 0.25 meter contour interval maps created from aerial photography flown especially for the study in May, 1993. The study also used existing NRCS aerial wetland maps and field reconnaissance. This study focused on the NRCS slide review methodology for determining wetlands on agricultural land and formal field delineation for areas in question. This investigation did not include portions of Section 31 in Monee Township and the west half of Section 6 of Will Township. Over 190 acres of wetlands were identified within the area now included in the Inaugural Site.

Tier I-EIS: FAA Site Approval and Land Acquisition by the State of Illinois, April 2002.
As part of the Tier I EIS completed by the FAA in 2002, AECOM (then Earth Tech) updated land use and land cover mapping, including wetland and stream features, within the Ultimate and Inaugural sites.[5] The Inaugural Site boundary limits in this study did not include portions of Section 31 of Monee Township, Sections 5, 6, and 11 of Will Township; Sections 7 and 8 of Washington Township; and all of Section 6 of Washington Township. Wetland features were verified using a combination of existing mapping resources and windshield surveys. Additionally, an NRCS wetland aerial slide review was conducted for cultivated areas within the Ultimate Site, which added approximately 42 acres of wetlands to the study area.

[3] *Illinois-Indiana Regional Airport Site Selection Environmental Assessment, Wetlands Inventory*. Working Paper No. 20A. Peotone Sections. Chicago, Illinois: TAMS Consultants, Inc., October, 1991.
[4] *South Suburban Airport Environmental Assessment, A New Supplemental Air Carrier Airport to Serve the Chicago Region*. Volume 2, Sections 9 through 11. Chicago, Illinois: Illinois Department of Transportation, 1998.
[5] *Final Environmental Impact Statement, Tier 1: FAA Site Approval and Land Acquisition by the State of Illinois, Proposed South Suburban Airport*. Des Plaines, Illinois: U.S. Department of Transportation, Federal Aviation Administration. April, 2002. http://www.southsuburbanairport.com/Environmental/pdf/Misc/Cover.pdf.

3.2 Topographic, Soil and Wetland Mapping

3.2.1 U.S. Geological Survey Topographic Maps for Eastern Will County[6]

The U.S. Geological Survey (USGS) topographic 7.5 minute quadrangle maps for Beecher East, Beecher West, Dyer, Frankfort, Peotone, and Steger take in the study area which extends over an area eight miles by two miles within 15 sections in Monee, Will and Washington Townships. **Exhibit 3: Topographic Map** is a composite of these six topographic maps.

The study area is characterized by a series of gently rolling hills between four stream valleys. Black Walnut Creek bisects the site from northeast to southwest; Rock Creek flows to the southwest in the western corner of the site; the South Branch of Rock Creek flows south from its headwaters north of Eagle Lake Road; and Plum Creek flows northeast from the western edge of Washington Township. The highest elevations within the study boundary are over 780 ft. and are found in the center of Will Township Section 5, north of Bult Field in Will Township Section 1, and west of I-57. The lowest elevations occur in the center of the site along the channel of Black Walnut Creek in Will Township, Sections 4 and 9, where elevations are 700 to 705 ft.

3.2.2 Soil Survey of Will County, Illinois[7]

Sixteen soils series are found throughout the study area as shown on the Will County Soil Survey map (**Exhibit C-1: Soil Units Map** in **Appendix C: Soils Information**).[8] The Jasper, Beecher, Markham, Ozaukee and Symerton series have multiple map units designating differences in slope and soil condition. A total of 27 different map unit codes are used within the study area (**Table C-1: Soils Mapped within the 2008 Study Area** in **Appendix C: Soils Information**). Detailed soil descriptions are also found in **Appendix C: Soils Information**.

The NRCS has prepared lists of hydric soil units—soils that, because of their landscape position and geologic history are associated with the formation and location of wetlands—and those soil units that consist primarily of non-hydric soils but are likely to contain a small proportion of hydric soils as mapping inclusions. These two groups of soil units can indicate where wetlands are most likely to occur. Other soil units are not likely to include any extensive areas of hydric soils, and therefore are unlikely to contain wetlands. As shown in **Exhibit 4: Will County Soil Survey-Hydric and Partially Hydric Soil**, hydric soils or soils with hydric inclusions comprise most of the soils in the study area.

3.2.3 National Wetland Inventory Maps

The NWI maps were used to provide information on the general location and extent of wetlands within the study boundary. The maps were created by the U.S. Fish and Wildlife Service (USFWS) and the USGS to show the approximate configuration, location, and type of wetlands present in a given area using high altitude aerial photography. The NWI maps are based on the 7.5 minute USGS topographic quadrangle mapping. Since 2008, the USFWS and the USGS provide digital mapping via the internet-based Wetland Mapper.[9] NWI wetland mapping shown in **Exhibit 5: NWI Wetlands** is compiled from this digital source. Within the study boundary, there are a total 28 wetland polygons equaling 33.9 acres. The wetland type designations are based on the Cowardin wetland classification system discussed in detail in **Section 5.3: Vegetation** and found in **Appendix D: Methodology**.[10]

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[6] *Download 1:24,000 USGS DRG Files: Beecher East, IL-IND (1990), Beecher West, IL (1990), Dyer, IL-IND (1990) Frankfort, IL (1990), Peotone, IL (1990) and Steger, IL (1990).* Illinois State Geological Survey. Illinois Natural Resources Geospatial Data Clearinghouse. Urbana-Champaign, Illinois: University of Illinois, July 1, 1997. Accessed July 2009. http://www.isgs.uiuc.edu/nsdihome/webdocs/drgs/drgorder24bymap.html.

[7] *Soil Survey of Will County, Illinois.* Hanson, Karla D. Natural Resource Conservation Service. Lincoln, NE: National Cooperative Soil Survey, 2004. http://soildatamart.nrcs.usda.gov/Manuscripts/IL197/0/will_IL.pdf

[8] *Web Soil Survey*. USDA, Natural Resource Conservation Service. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

[9] *Wetland Mapper*. National Wetland Inventory. U.S. Fish and Wildlife Service, Branch of Resource and Mapping Support, Madison, WI: National Standards and Support Team, May 2010 http://www.fws.gov/wetlands/Data/Mapper.html.

[10] *Classification of Wetlands and Deep Water Habitats of the United States.* FWS/OBS-79/31. U.S. Department of the Interior. Fish and Wildlife Service. December 1979. Reprinted 1992. http://www.fws.gov/wetlands/_documents/gNSDI/ClassificationWetlandsDeepwaterHabitatsUS.pdf.

Section 4 – Methods

4.1 Field Methodology

Global Positioning System (GPS) technology was used to survey the location and boundaries of each wetland, stream and upland feature and the location of data observation points and photo positions. The GPS is a space-based Global Navigation Satellite System (GNSS) that consists of 24 satellites—four satellites in six orbital planes---that orbit the earth every 12 hours.[11] Each satellite continuously transmits radio signals marking its position and time and these data can be acquired using a GPS receiver and used to calculate a position on the earth.[12] AECOM delineation teams employed Trimble® Geo XH and GeoXT GPS receiver units capable of sub-meter accuracy.[13] The units had a recording frequency of one second and were set to the NAD 1983 State Plane Illinois East FIPS 1201(Feet) coordinate system.

The accuracy of each GPS survey point is dependent on the number and distribution of satellites available at the survey location at the moment the point is recorded. At least four satellites must be available in order for the GPS receiver to calculate a three-dimensional position.[14] [15] The greater the number of satellites available and the more widely distributed they are across the sky at the time the position is recorded, the greater the accuracy of the recorded position. This relationship is represented by a numerical value known as Position Dilution of Precision (PDOP). PDOP is measure of satellite geometry and indicates when the most accurate results are being provided. When the PDOP value is low, i.e. less than 6, it indicates that the distribution of satellites will result in a more accurate calculation of position.[16] Higher PDOP values indicate that available satellites are clustered close together and the position calculation will be less accurate. The Trimble unit settings can be adjusted to improve accuracy by compensating for limiting field conditions or satellite configurations and can be set to record data only when conditions are right for highly accurate results.[17] The accuracy of data is further improved during post-processing to correct for atmospheric interference and timing errors.[18] The specifications of the Trimble® GPS units and TerraSync™ data collection software are located in **Appendix D: Global Positioning System: Trimble® GPS Specifications and AECOM Dataset Examples** A further discussion of post-processing and the results of GPS data collection are found in **Section 5.2: GPS Post-Processing and Differential Corrections**.

4.2 NRCS Mapping Conventions for Wetland Determination

In June 2008, AECOM wetland scientists conducted an aerial photo review of the study area using the NRCS Wetland Mapping Conventions to search for potential wetlands in cultivated fields.[19] Often, wetlands on agricultural lands are difficult to identify using the USACE routine wetland determination methodology because agricultural practices can obscure or eliminate some wetland features during the growing season. The NRCS mapping conventions follow the methodology of the National Food Security Act Manual (NFSAM) that addresses

[11] *Global Positioning System Directorate*. U.S. Air Force Fact Sheet. Los Angeles Air Force Base. U.S. Air Force. Current as of November 2010. http://www.losangeles.af.mil/library/factsheets/factsheet.asp?id=5311

[12] *All About GPS: What is GPS?.* GPS Tutorial. Trimble Navigation Limited. 2011.

[13] *GeoExplorer 3000 Series GeoXH and GeoXT Handheld Computers Datasheets. Mapping & GIS: Handheld Computers with GNSS. Trimble Navigation Limited. 2011. http://www.trimble.com/mappingGIS/Handheld-Computers-GNSS.aspx.*

[14] *All About GPS: How GPS Works: Triangulating*. GPS Tutorial. Trimble Navigation Limited. 2011

[15] *Number of Visible Satellites*. GPS Pathfinder® System User's Guide: Version 2.00. Revision A, Part Number 40889-10-ENG, Trimble Navigation Limited. April 2004, 21.

[16] *PDOP.* GPS Pathfinder® System User's Guide: Version 2.00. Revision A, Part Number 40889-10-ENG, Trimble Navigation Limited. April 2004.

[17] GeoExplorer 3000 Series GeoXH and GeoXT Handheld Computers Datasheets. Mapping & GIS: Handheld Computers with GNSS. Trimble Navigation Limited. 2011. http://www.trimble.com/mappingGIS/Handheld-Computers-GNSS.aspx.

[18] *All About GPS: How does GPS work?: Error Correction*. GPS Tutorial. Trimble Navigation Limited. 2011. http://www.trimble.com/gps/howgps-error.shtml.

[19] *Illinois Wetland Mapping Conventions: Illinois Bulletin NO. IL 190-8-4.* Champaign, Illinois: Natural Resource Conservation Service, December 18, 1997. http://www.lrc.usace.army.mil/co-r/NRCS%20Wetland%20Mapping%20Conventions.pdf

the special conditions of agricultural wetlands.[20] The USACE Chicago District Regulatory Branch has issued a regulatory bulletin with guidelines for using the NRCS Conventions.[21] The Chicago District Regulatory Bulletin and NRCS Wetland Mapping Conventions are found in **Appendix D: Methodology.**

Every year, low-altitude aerial color photography is flown to record crop history as part of the United States Department of Agriculture (USDA) farm subsidy program compliance. The Mapping Conventions call for a comparison of at least five normal-rainfall years of aerial photos against aerial photos of one wet-rainfall year, which is used as a reference to detect characteristic field signatures that indicate the presence of wetlands. The NFSAM standards require an area to have wetland signatures present in three years out of the five normal years in order to be considered wetland. The aerial wetland signatures for Illinois agricultural lands include the following:

- differences in color from surrounding vegetation in field;
- standing water;
- drowned-out crops;
- isolated areas not farmed with the rest of field;
- greener vegetation in years with below normal precipitation;
- differences in vegetation (height, texture, color) due to different planting dates; and
- stressed crops.

The aerial slide photography used for the review is available on compact discs for purchase from county NRCS offices. The USACE Chicago District website provides a link to the NRCS Wetness Evaluation Tables (WETS) for the Northeastern Illinois region data that shows normal, wet and alternate precipitation years for a given National Weather Service recording station.[22] The summaries of precipitation, temperature, growing season length and dates produced by the WETS Table provide representative climatic information for the station selected. The data for the Peotone station is found in **Appendix D: Methodology**.

The AECOM slide review used slides from the years 1996, 1997, 1998, 2001 and 2003. These were the most recent normal-rainfall years available from the Will County NRCS office. The reviewers used 1993 slides as a reference for the wet-year because the 2000 wet-year slides were not available. A total of 176 suspect wetland polygons were identified during the aerial slide review (see **Exhibit 6: 2008 NRCS Slide Review Results**). The approximated size, shape and location of each identified area were drawn by hand on the aerial base map and were incorporated into field mapping as described below.

4.3 Base Aerial Photography and Mapping

The base aerial photography layer selected for the wetland delineation maps was the IDOT aerial photography flown in April 2001 at an altitude of 3,000 feet. After the NRCS aerial slide review was completed, the results were plotted on the base map along with wetland delineation polygons from the previous 1996 wetland study and aerial wetland review results from the 2002 Tier I-EIS study. All together, the compiled 1996, 2002 and 2008 mapping of suspect wetland areas would become the focus of the 2008-2009 field delineation. Layers of hydric soil mapping and topography were added to the aerial photos to create a mapping tool that could be used in the field to locate wetland features. The compiled wetland polygon map was downloaded to the Trimble® GPS units that were carried by each team, enabling the delineators to locate suspect wetland features on the ground.

[20] *National Food Security Act Manual, Part 527. (*180-V-NFSAM, Third Ed., Amend. 2, Nov. 1996), as amended through 2004. Washington, DC: USDA, Natural Resources Conservation Service, December 23, 2004. http://nrcs.usda.gov/programs/compliance/pdf_files/3rdED-NFSAM_SEC527_v2006.pdf.

[21] *Determination of Wetlands on Agricultural Lands.* U.S Army Corps of Engineers. Chicago District Regulatory Bulletin. January 10, 2006. http://www.lrc.usace.army.mil/co-r/Bulletin10January2006.htm.

[22] *Wetness Evaluation Tables.* Natural Resources Conservation Service. Portland, OR: National Water and Climate Center, 1995. http://www.wcc.nrcs.usda.gov/climate/wets_doc.html.

Wetland mapping from the 1996 wetland delineation study had an intrinsic projection discrepancy that resulted in an offset between features on digitized field maps and the same features on the aerial photography base maps (see **Appendix B: Historical Wetland Studies**). This historic discrepancy was evident on the GPS-based mapping used in the field in 2008-2009 whenever a previously-identified wetland feature from the 1996 study was in view. In general, the affected features appear to be shifted slightly north and east. The shift can be seen most easily in the mapping of stream features. Another discrepancy occasionally appeared when viewing polygons identified during the 2008 NRCS aerial review. In this case, the mismatch between the mapped features and the actual features on the ground was due to the scale at which the aerial slides were reviewed. Delineators were mindful of the offset error of the 1996 features and the potential scale discrepancy of the 2008 polygons when locating features on the ground. Confirmation from topography and surrounding vegetation features were used to verify whether features were present and where they were actually located. When this occurred, delineators would consult unmodified aerials and aerials without soil mapping for a better view of landscape features.

The wetland numbering system employed during the 1996 wetland study was retained for consistency. Each wetland or upland area investigated has an identifying number starting with the Township, Section and quarter Section in which the wetland is located. For example, the location prefix for a wetland located in Will Township, in the northwest quarter of Section 6 would be "W06NW".

- As each wetland or upland polygon was delineated, it was assigned a unique number appended to the end of the location prefix: W06NW-1, W06NW-2 etc.
- Polygons identified as uplands with no associated wetland were numbered similarly, but the location prefix is preceded by the letter "U" e.g. UW06NW-1.
- When a series of similar, proximate wetland areas were narrowly separated by upland areas, lower case letters - a, b, c etc. --were appended at the end of the assigned number, e.g. W06NW-1a, W06NW-1b, and W06NW-1c, to signify their relationship to each other.
- Soil cores were identified with the suffix "S" and numbered sequentially—S1, S2, S3 etc. The suffix was appended to the end to the wetland or upland number: W06NW-1-S1.
- Upland soil cores associated with a wetland were identified with a "U" appended after the unique wetland number e.g. W06NW-1U.

4.4 The Corps of Engineers Wetland Delineation Manual, 1987

During the 2008-2009 field investigation, AECOM delineators evaluated each suspect wetland using the USACE Routine Determination methodology detailed in the 1987 Corps of Engineers Wetland Delineation Manual (1987 Manual).[23] The USACE methodology requires the examination of vegetation, soils and hydrology to determine whether a wetland is present. This is often referred to as the "three parameter method". The development of this methodology is based on the USACE definition of wetlands described as:

> *Those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (33 CFR 328.3(b); 40 CFR 230.3(t))*

The definition emphasizes the interconnectedness of wetland hydrology, hydrophytic vegetation and hydric soils. With the exception of a few special circumstances, all three parameters must be present in order for an area to be considered a wetland. The details of the 1987 Manual technical guidelines are discussed below and detailed in **Appendix D: Methodology**. Field observations and conclusions were recorded on USACE Routine Wetland Determination Data Forms and field plot locations were recorded using a Trimble® Geo XT GPS.

[23] *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, MS: Environmental Laboratory. 1987. http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf.

4.4.1 Hydrophytic Vegetation

During a routine wetland determination, a sample plot is used to evaluate the vegetation in each vegetation layer, or stratum, present i.e., herbs, shrubs/saplings, vines and trees. First, a visual estimate is made of the cover percentage of each species so that dominant species in each stratum can be calculated. Hydrophytic vegetation is present if the majority of the dominant species are determined to be wetland plants. The individual components of this evaluation are discussed below and detailed in **Appendix D: Methodology**.

Vegetation Sampling

According to the 1987 Manual, when selecting the sampling location, it is important to choose an area that is characteristic of the larger plant community that is being sampled. The vegetation should be typical of the community and the slope and elevation should be representative of the area. The plot size and shape should be adjusted so that it does not extend beyond the edges of the target plant community.

The typical vegetation sample plots used during the 2008-2009 delineation were nested circular plots (see **Appendix D: Methodology**). The plots were centered on the soil core location and extended out to include as many of the strata of the vascular vegetation communities as there were present in the wetland area:

- Herbaceous stratum: All non-woody vegetation, shrubs/saplings and woody vines to 3.28 ft. tall, Plot radius=5 ft.
- Shrub/sapling stratum: A woody plants <3 inch diameter at breast height (dbh) and taller than 3.28 feet, Plot radius=15 ft.
- Woody vine stratum: All woody vines <3.28 ft tall, Plot radius=30 ft.
- Tree stratum: All woody plants > 3 inch dbh (regardless of height), Plot radius=30 ft.

Indicator Status

The USFWS created a vegetation rating system for many of the plant species found in the United States based on the likelihood that a plant will occur in a wetland community. This rating system, the *National List of Vascular Plant Species that Occur in Wetlands* was devised by a panel of botany experts using their field experience of each species' ecology by region.[24] The Chicago area is in USFWS Region 3. There are five levels of wetland indicator status:

- Obligate (OBL): Obligate species have a >99% probability of occurring in a wetland community;
- Facultative Wetland (FACW): Facultative wetland species have a 67% to 99% probability of occurring in a wetland community;
- Facultative (FAC): Facultative species have an equal probability (33% to 67%) of occurring in a wetland or a non-wetland community;
- Facultative Upland (FACU): Facultative upland species have a 67% to 99% probability of occurring in a non-wetland community; and
- Upland (UPL): Upland species have a >99% probability of occurring in a non-wetland.

Additionally, a plus or minus symbol may be placed after the FACW, FAC and FACU indicators to signify a wetter (+) or drier (-) tendency for that species.

Vegetation Identification

In order to assign the appropriate wetland indicator status, the dominant species in each stratum must be correctly identified to species. During the field investigation, plants were identified in the field using the local flora reference, *Plants of the Chicago Region*.[25] On rare occasions, identification of one of the

[24] *National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary. Indicator by Region and Subregion.* Washington, DC: National Wetland Inventory, U.S. Fish and Wildlife Service, March 1997. http://library.fws.gov/Pubs9/wetlands_plantlist96.pdf.
[25] *Plants of the Chicago Region*. (4th edition). Swink, F. and G. Wilhelm. Indianapolis, Indiana: Indiana Academy of Sciences Press, 1994.

dominant species was not possible in the field. In such a case, the plant would be listed as "unknown", given a cover percentage, and labeled for later identification. Depending on the outcome, a return visit might be necessary once the identification was made and the wetland indicator was determined.

Dominance Test and the 50/20 Rule

The Dominance Test was the primary tool used to determine whether the hydrophytic vegetation parameter had been met. First, cover percentages for all plant species were tallied for each stratum, based on a visual estimation of each species' areal coverage within the plot. Next, the "50/20" rule was employed for each stratum. Species with an absolute cover of 50% or greater of the total cover were considered dominant. Species with an absolute cover of 20% or greater were sub-dominant. If no species met the 50% cover threshold, the highest percent cover was combined with the next highest, and so on, until 50% was met or exceeded. Often, total cover percentages can be greater than 100% because of vegetation layering. Examples of these calculations are found in **Appendix D: Methodology**.

4.4.2 Hydric Soils

The National Technical Committee on Hydric Soils (NTCHS) defines hydric soils 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*". Anaerobic conditions create telltale physical, chemical, and structural characteristics that have been documented by the NTCHS and used to develop the criteria for defining and identifying hydric soils. These criteria and the techniques used for soil investigations are continuously updated by the NTCHS. The criteria in effect during the 2008 and 2009 wetland investigations can be found in the *Field Indicators of Hydric Soils in the United States: A guide for identifying and delineating Hydric Soils, Version 6.0*.[26] The NTCHS hydric soil criteria are located in **Appendix D: Methodology**. A list of all soils found in the project site and descriptions of each are located in **Appendix C: Soils Information**.

Hydric Soil Indicators

Each hydric soil indicator has a unique number and descriptive name. Each indicator listing includes the specific characteristics of soil color, texture, and depth for that indicator, as well as hints for field identification. The NRCS lists 21 hydric soil indicators that may be used within USDA Land Resource Region M which includes Northeastern Illinois. There are nine indicators applicable to all soils; five for use with sandy soils and seven for use with loamy and clayey soils. Eight indicators describe soils that contain organic material such as muck or peat and the rest apply to soils that show evidence of color or odor changes that occur in the presence of water - a process called reduction/oxidation or redox.

Hydric Soil Indicators and Soil Core Depths

For most indicators, hydric soil features are found within the upper 12 inches of the soil. Five indicators (A1, A2, A11, F2 and F3) apply to features that must begin above 12 inches but may extend to 16 inches or greater. Only one indicator—A12: Thick Dark Surface—by definition begins below 12 inches and may require deeper excavation before a characteristic color change is encountered. The original 1987 Manual soil sampling description requires examination to "below the A-horizon or to 10 inches (whichever is shallower)" and suggests that "16 inches of soil be available for examination." The Supplement states: "the recommended excavation is approximately 20 inches", for most soils, but shallower examinations may suffice. The soil sampling protocols used in the 2008-2009 field investigations are described below.

[26] *Field Indicators of Hydric Soils in the United States, Version 6.0*. ed. G. W. Hurt and L. M. Vasilas. Fort Worth, TX: USDA NRCS in cooperation with the National Technical Committee for Hydric Soils. 2006b.

Soil Sampling Procedures

Soil cores were located at the center of the nested vegetation plots and excavated using a soil probe. Most soil cores were examined to a depth of at least 20 inches. In some plots with a deep, dark uniform upper horizon the soil core was excavated to 30 inches or deeper, to look for any changes in the soil below the dark layer. In other cases, gravel or tight soils caused probe refusal above 20 inches or, where wetland vegetation and wetland hydrology were completely lacking, a shallow examination looked for hydric indicators in the upper 12" of the soil column. All soil cores were laid out for examination in the sequence they were collected (top to bottom) and photographed with an identifying wetland number tag and a tape measure for reference. A second photo was taken of the surrounding vegetation community.

The soil core's characteristics of color and texture were recorded for each soil layer or horizon. A Munsell color chart was used to determine the hue, value and chroma of the soil matrix and any mottles or other features that might result from reduction/oxidation.[27] The examination also noted the presence of any hydrology indicators such as depth of saturation, depth of water table, or oxidized root channels in the upper 12 inches.

According to the 1987 Manual, after all field tests are completed, the delineator usually has enough information to decide whether the hydric soil criteria have been met and whether the sample matches the mapped soil type. If the sampling results are inconclusive or they conflict with the hydrology and vegetation parameters, another soil core location might be chosen and a new sample taken. To determine the wetland/upland boundary, a wetland soil core was paired with an upland soil core located in the adjacent upland community. In larger or more complex wetlands, multiple soil-core pairs were taken to determine the wetland boundary. Where a series of smaller, proximate wetlands occurred within the same soil unit and topographic position, had similar vegetation, but were separated by intervening uplands, a single soil-core pair was taken to characterize the entire series.

4.4.3 Wetland Hydrology

According to the 1987 Manual, "*The term 'wetland hydrology' encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season*". The 1987 Manual also councils that of the three parameters, hydrology is often the least exact and indicators may be difficult to find in the field. However, it is also the most diagnostic parameter of a wetland: All wetlands have an abundance of water, and that characteristic is essential to their nature and to the development of the other parameters. The 1987 Manual provides technical guidelines for determining the local hydrology duration and periodicity that characterize a wetland. For the field investigator, the 1987 Manual also lists field indicators that are of practical use during delineation.

Hydrology Duration

According to the hydrology duration guidelines given in the 1987 Manual, areas inundated or saturated for more than 12.5% of the growing season are considered wetlands; areas flooded or saturated for less than 5% are not wetlands; and areas flooded or saturated for 5 to 12.5% of the growing season are sometimes wetlands and sometimes not, depending upon additional evidence of hydric soils and hydrophytic vegetation.

Field Indicators

There are six primary and five secondary indicators of wetland hydrology that may be observed by the delineator in the field. The primary indictors are:

- inundation;
- saturation in the upper 12" of soil—observed during soil sampling;

[27] *Munsell Soil Color Charts*. Munsell Color. New Windsor, NY: Macbeth Division of Kollmorgen Instruments Corporation, 1994.

- watermarks on trees or other vertical objects, indicating past water depth;
- drift lines seen as lines of debris showing the horizontal extent of past water deposition;
- sediment deposits seen as layers or coatings of silt or organic matter on vegetation and the soil surface;
- drainage patterns in wetlands, indicating past water flows.

Only one primary indicator is required to confirm that wetland hydrology is present, while two secondary indicators are required for confirmation.

The secondary indicators are:

- oxidized root channels in the upper 12" (must be on living roots);
- water-stained leaves covering the ground;
- local Soil Survey data (area is mapped as having hydric soils);
- FAC-neutral test. (for vegetation - after eliminating all FAC species, FACW and OBL would predominate); and
- Other. This allows delineator to describe field conditions or reference material that supports positive wetland hydrology.

4.4.4 Growing Season—Definitions and Calculations

The growing season is that period of the year that is warm enough for plant growth to take place and during which soil microbes are active. For the wetland delineator, the growing season is the time of year when all of the conditions are likely to be present for the correct interpretation of wetland indicators. Knowing the beginning and ending dates of the growing season is especially important when evaluating hydrology indicators such as ponding and saturation or analyzing stream gauges or water table monitoring results. Because indicators may be missing or difficult to interpret, the USACE does not recommend performing delineations outside of this growing season.

The 1987 Manual defined the growing season primarily using soil temperature and, more loosely, based on the period of frost-fee days for a given area, as documented by the USGS.[28] Later, a USACE memorandum clarified this definition by referring to the NRCS data tables published in each county Soil Survey. These tables use long-term records of the median yearly last and first dates of freezing (28° F) air temperatures to calculate the average growing season and were considered more practicable.[29] Using this definition, the Will County records for Joliet, Illinois show that in 5 years out of 10 the growing season is 206 days long, beginning on April 9 and ending on October 31.[30]

4.4.5 Missing or Confusing Indicators

In some special circumstances, the indicators for wetland hydrology, vegetation, or soil may be absent or difficult to assess. The Manual uses the terms "Atypical Situation" and "Problem area", described below, to address these circumstances where additional investigation may be needed to make a wetland determination. The results of field investigations with missing or confusing indicators are discussed in **Section 5.6: Hydrology**.

[28] The definition of "growing season" in the 1987 Manual glossary: "The portion of the year when soil temperatures at 19.7 in. below the soil surface are higher than biologic zero (5°C) (U.S. Department of Agriculture, Soil Conservation Service, 1985). For ease of determination this period can be approximated by the number of frost-free days (U.S Department of the Interior, 1970)." *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, MS: Environmental Laboratory, 1987. http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf.

[29] Growing season starting and ending dates will generally be determined based on the "28 degrees F or lower" temperature threshold at a frequency of "5 years in 10". *Clarification and Interpretation of the 1987 Manual*. Memorandum CECW-OR. Washington, DC: Department of the Army, March 6, 1992. http://www.saw.usace.army.mil/WETLANDS/Policies/clarif_87_man.pdf.

[30] *Soil Survey of Will County, Illinois.* National Cooperative Soil Survey. USDA, Natural Resources Conservation Service. 2004. http://soildatamart.nrcs.usda.gov/Manuscripts/IL197/0/will_IL.pdf.

Atypical Situations

An atypical situation is present when indicators for wetland vegetation, hydrology or soil are absent due to a) recent human activity such as vegetation removal; the placement of dredged or fill material; or the construction of levees, dams or drainage systems; or b) a recent natural occurrence, such a beaver dam or a catastrophic event such as a fire or avalanche.

Problem Areas

The problem area designation addresses naturally occurring wetland types, such as prairie potholes or mudflats that lack indicators of wetland vegetation, hydrology, or soil due to normal seasonal variability. Prairie potholes are shallow depressions that often remain inundated throughout the growing season, but can be cultivated in drier years or during drier portions of the year.

4.5 United States Army Corps of Engineers 2008 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (2008 Supplement).

Ten regional supplements to the 1987 Manual have been under development by the USACE in order to address unique conditions of hydrology, vegetation and soils found within the various regions of the United States. The supplements have undergone periods of field testing and peer review and have now been released for general use. The delineation methodologies of the 2008 Supplement officially took effect in 2009 with the start of the growing season.[31] Because the 2008 Supplement was not yet in effect during the 2008 wetland delineation field work, the USACE stipulated that delineations performed in 2008 would follow the 1987 Manual, but delineations performed in spring 2009 would follow the 2008 Supplement methodology. The differences between the 1987 Manual and the 2008 Supplement methodologies are discussed below.

4.5.1 Hydrophytic Vegetation

The 2008 Supplement has eliminated the use of the plus and minus modifiers that signify a slightly wetter (+) or drier (-) regime. This change will affect the FAC, FACW and FACU wetland indicator status categories only.

The Dominance Test, which uses the "50/20 rule", has been retained as the primary evaluation tool for determining the wetland/upland status of the vegetation community. The Prevalence Index test has been added as a new metric that is to be used only if the Dominance Test does not produce a clear majority of wetland or upland species. The Prevalence Index is a weighted-average that ranges from 1 to 5. An index value of 3.0 or less indicates that hydrophytic vegetation is dominant. To calculate the Prevalence Index, the delineator must:

1) identify as many species as possible (at least 80% of the vegetative cover in the plot must be correctly identified);
2) quantify those species with an absolute percent cover value for each stratum. If any species are found in multiple strata, those species' cover values shall be summed across all strata;
3) assign a wetland indicator status category to each species;
4) tally the cover values for each category and for all categories;
5) multiply the total cover value for each category by the weighted-average value for that category and tally the results;
6) divide the total from Step 5 by the combined total cover values from Step 4 to obtain the Prevalence Index value.

[31] *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region, e*d. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-27. Vicksburg, MS: U.S. Army Engineer Research and Development Center. USACE, September, 2008. http://el.erdc.usace.army.mil/elpubs/pdf/trel08-27.pdf.

An example of the calculations is found in **Appendix D: Methodology**. The new routine wetland determination data forms have a worksheet included for this calculation.

4.5.2 Hydric Soils

The 2008 Supplement uses the NRCS/NTCHS hydric soil indicators discussed above. The new wetland determination data form provides greater precision for the recording of soil sample observations such as the type and location of redox features, the percentage of each color in the matrix and the type and depth of restrictive layers if present.

4.5.3 Wetland Hydrology

The wetland hydrology indicators have been reorganized into four groups and expanded to include 19 primary indicators and eight secondary indicators. The previous hydrology indicators have been retained, with the exception of Local Soil Survey Data. Several indicators that were secondary in the 1987 Manual, such as oxidized rhizospheres and water-stained leaves, have been changed to primary indicators. Many new indicators recognize conditions that had been recorded as "Other" under the 1987 Manual methodology, such as: surface soil cracks, sparsely-vegetated concave surface, aquatic fauna, crayfish burrows, etc. For the new list of hydrology indicators, see **Appendix D: Methodology**.

4.5.4 Growing Season—Definition and Field Indicators

The Supplement provides additional tools and guidance to determine whether the growing season is in progress, by adding indicators for plant growth that are readily observable by the delineator in the field. The measurement of soil temperature as an indicator has been updated, but is considered necessary only where needed for the evaluation of some hydrology indicators and for long-term hydrologic monitoring.[32] The primary indicator that growing season is underway in a given area, is that two or more non-evergreen, vascular species (excluding mosses and other non-vascular plants) exhibit one or more of the following:

- emergence of herbaceous plants from the ground;
- appearance of new growth from vegetative crowns;
- new leaves from seeds;
- bud burst on woody plants;
- emergence or elongation of leaves of woody plants; and
- emergence or opening of flowers.

Indicators for the end of the growing season are leaf drop, for woody, deciduous species; and for herbaceous species, the end of flowering and brown and withered leaves. The 2008 Supplement still recognizes the use of the NRCS growing season data where on-site conditions are unknown and not ascertainable, such as during analysis of past stream-gauge or monitoring-well data.

[32] In the Supplement, the growing season is considered underway when soil temperature, measured at a depth of 30 centimeters (12 inches), is 5°C (41°F) or "biological zero". This is the temperature below which microbial action in the soil becomes too low for reducing conditions to take place in saturated soils. Previously the depth standard for soil temperature measurement was 50 centimeters (20 inches). To correctly interpret hydrology indicators A1 Surface water, A2 High water table and D9 Gauge or well data, the delineator must know whether or not the observations are within the growing season. *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region,* ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-27. Vicksburg, MS: U.S. Army Engineer Research and Development Center. USACE. 2008. http://el.erdc.usace.army.mil/elpubs/pdf/trel08-27.pdf.

4.5.5 Difficult Wetland Situations

The Supplement expands the Manual's designations of "atypical situation" and "problem area" discussed in **Section 5.6: Difficult Wetland Situations – Atypical Situations and Problematic Wetlands in Disturbed Areas** to a more nuanced discussion of a range of problematic situations in which wetland indicators for vegetation, soil and hydrology may be missing or difficult to determine. These situations include the following:

- Agricultural Lands—the presence of agricultural drainage systems;
- Problematic Hydrophytic Vegetation—seasonal vegetation changes, vegetation in riparian areas, areas affected by grazing, managed plant communities, and natural events;
- Problematic Hydric Soils—fluvial sediments, recently developed wetlands, relict hydric soils, and naturally-problematic soil types;
- Wetlands that Periodically Lack Indicators of Wetland Hydrology—investigations during dry season and drought years; and
- Wetland/Non-Wetland Mosaics—communities with a close interspersion of numerous wetland and upland areas e.g. dune and swale communities.

4.6. The Illinois Interagency Wetland Policy Act of 1989

During field investigations in 2008-2009, additional data were collected to comply with the habitat evaluation requirements of the Illinois Interagency Wetland Policy Act of 1989 (Act).[33] The Act was created to support the State's goal "that there be no overall net loss of the State's existing wetland acres or their functional value due to State supported activities." If a State-funded or supported project will have an adverse impact on any State jurisdictional wetlands, the responsible agency must submit a wetland compensation plan. This plan is reviewed by the Illinois Department of Natural Resources (IDNR) which sets the ratio for wetland mitigation compensation from 1.0:1 up to 5.5:1 depending on the wetland quality, function and type; the degree of adverse impact; and the location of the compensation site.

There are four special conditions that would require the IDNR to set the wetland mitigation compensation to the highest ratio of 5.5:1:

1. The presence of a state or federally-listed (endangered or threatened) species.
2. The presence of the essential habitat of a state or federally-listed species.
3. The presence of an Illinois Natural Area Inventory Site (INAI).
4. The presence of a high-quality vegetation community such that an inventory of the plant species present receives a Floristic Quality Index (FQI) score of 20 or more and/or and a native mean coefficient of conservativism of 4.0 or greater using the Floristic Quality Assessment (FQA) procedure described in *Plants of the Chicago Region.*[34]

A detailed description of these four special conditions is discussed below. The results of the field investigations are found in **Section 5.7: The Illinois Interagency Policy Wetland Act of 1989**.

4.6.1 Endangered and Threatened Species

Under both federal and state law an endangered species is one that is danger of extinction throughout all or part of its range, and a threatened species is likely to become endangered within the foreseeable future. The Endangered Species Act of 1973 (ESA) was established to protect species with declining populations.

[33] *Interagency Wetland Policy Act of 1989*. [20 ILCS 830] Springfield, Illinois: Illinois Department of Natural Resources, 1989. http://dnr.state.il.us/Wetlands/ch6f.htm

[34] *Plants of the Chicago Region*. (4th edition). Swink, F. and G. Wilhelm. Indianapolis, Indiana: Indiana Academy of Sciences Press, 1994.

The law is administered by the USFWS, which selects species for listing and designates critical habitat. The Illinois Endangered Species Protection Act of 1972 (IESPA) established the Illinois Endangered Species Protection Board (IESPB) and made it responsible for the listing of species endangered and threatened within the state.[35] The IESPB, with assistance from the IDNR, publishes the Illinois Endangered and Threatened Species list every five years and nominates species for listing or de-listing. The term "species of concern" (formerly "species at risk") refers to federal candidate species that are not currently protected, but have been proposed for federal listing. The IDNR also maintains a Watchlist of species that are not yet protected, but due to declining population trends in the state, are likely to become candidates for future listing. The USFWS and the IDNR encourage environmental planning efforts to take these candidate species, into consideration.

Previous environmental studies within the study boundary included field investigations and agency consultations for the presence of federal-listed and state-listed species and Illinois Watchlist species, as well as appropriate habitat for any listed species in the vicinity of the present study area. During the 1990-1991 baseline biological inventories conducted for the IRAP study, field surveys for plants, birds, mammals, reptiles, amphibians, fish and benthic invertebrates were conducted at Beecher Marsh in Washington Township, Section 7 and near Black Walnut Creek in Will Township, Section 4.[36] During 1994 wetland studies, random sightings of listed species were recorded.[37] No federally endangered or threatened species were found. In August 1995, the USFWS sent a letter to IDOT stating that no federally threatened or endangered species would be harmed as a result of the proposed supplemental airport.

Table 1: Endangered and Threatened Species List contains a list of current federal- and state-listed species and Illinois Watchlisted species that have been observed within the study area. For sightings recorded during the breeding season, observers employed the Illinois Natural History Survey (INHS) Breeding Bird Atlas breeding status classification terms—Possible, Probable, and Confirmed—based on the observed behavior/condition of the birds. See **Table D-1: Illinois Breeding Bird Atlas-Breeding Status Classification** in **Appendix D: Methodology**.[38] At Beecher Marsh, the state-endangered King Rail and American Bittern were present during migration. Five Watchlist species—Virginia Rail, Sora, Upland Sandpiper, Wilson's Snipe and Bobolink—were observed to be probably nesting on this site. The state-threatened Northern Harrier was thought to be possibly nesting, and was observed hunting there. The state-threatened Black-billed Cuckoo was observed foraging and the state-endangered and federal species-of-concern Loggerhead Shrike was observed in January in the adjacent fields. At the Black Walnut Creek site, four state-endangered species—Black-crowned Night-heron, Northern Harrier, Upland Sandpiper and Short-eared Owl—and one state-threatened species, the Black-billed Cuckoo, were present during migration or as a fly-over. Also at Black Walnut Creek, three Watchlist species—Sora, Wilson's Snipe, and Bobolink—were observed; the Bobolink was thought to be probably nesting.

[35] *Check List of Illinois Endangered and Threatened Species by County*. Illinois Natural Heritage Database. Springfield, Illinois: Illinois Endangered Species Protection Board. November 1, 2009. http://dnr.state.il.us/conservation/naturalheritage/pdfs/et_list_by_co_aug2009.pdf.
[36] *Illinois-Indiana Regional Airport Site Selection Report—Appendix E, Volume II: Biotic Communities*. Technical Paper No. 7. Chicago, Illinois: TAMS Consultants, Inc. November, 1991.
[37] *South Suburban Airport, Environmental Assessment: A New Supplemental Air Carrier Airport to Serve the Chicago Region*. Volume 2, Sections 9 through 11. Chicago, Illinois: Illinois Department of Transportation, 1998.
[38] *The Illinois Breeding Bird Atlas Project: Handbook for Surveyors, 1986-1990*. Kleen, V. Springfield, Illinois: Illinois Department of Conservation, revised 1990.

Table 1: Endangered and Threatened Species List

Species	Scientific Name	Listing Status		Beecher Marsh	Black Walnut Creek	Breeding Status
		1991	2009			
American Bittern	*Botaurus lentiginosus*	SE	SE	X		
Black-crowned Night-Heron	*Nycticorax nycticorax*	SE	SE	--	X	
Northern Harrier	*Circus cyaneus*	SE	SE	X	X	Possible
King Rail	***Rallus elegans***	**--**	**SE**	**X**	**--**	
Virginia Rail	***Rallus limicola***	**--**	**WL**	**X**	**--**	Probable
Sora	***Porzana carolina***	**--**	**WL**	**X**	**X**	Probable
Upland Sandpiper	*Bartramia longicauda*	SE	SE	X	X	Probable
Wilson's Snipe*	***Gallinago delicata***	**--**	**WL**	**X**	**X**	Probable
Black-billed Cuckoo	***Coccyzus erythropthalmus***	**--**	**ST**	**X**	**X**	Probable
Short-eared Owl	*Asio flammeus*	SE	SE	--	X	
Loggerhead Shrike	*Lanius ludovicianus*	C2,ST	FSOC,SE	X	--	
Bobolink	***Dolichonyx oryzivorus***	**--**	**WL**	**X**	**X**	Probable

Bolded entries indicate listing since 1991.
*Name changed from Common Snipe (Gallinago gallinago) since 1994.[39]

4.6.2 Critical and Essential Habitat for Endangered and Threatened Species

The ESA defines essential habitat as "the physical and biological environment that is required to maintain viable populations of a listed species in order to ensure the survival and recovery of that species". In 1978 the ESA was amended to include the definition of critical habitat as:

> "…the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time it is listed that are determined by the Secretary to be essential for the conservation of the species."

Critical habitat is a legal designation that is made by the USFWS after a species is listed. There is no designated critical habitat or essential habitat for any federally-listed species within the study area. The IESPA defines essential habitat as "the specific ecological conditions required by an endangered or threatened species for its survival and propagation, or physical examples of these conditions." Essential habitat for some state-listed species is present within the study area and is discussed in **Section 5.7.2: Critical and Essential Habitat for Endangered and Threatened Species**.

4.6.3 Illinois Natural Area Inventory Sites

The INAI is maintained and updated by the IDNR following the criteria and methodology described in the *Technical Report: Illinois Natural Area Inventory.*[40] The INAI is a statewide inventory of outstanding examples of the relatively undisturbed natural landscape features remaining in Illinois. These include high quality natural communities; suitable habitat for endangered and threatened species; state-dedicated nature preserves, land and water reserves, or natural heritage landmarks; outstanding geological features;

[39] Illinois Watchlist species identified on website *Birds of Illinois*. October 8, 2009. Illinois Natural History Survey. Accessed March 2010. http://www.inhs.illinois.edu/animals_plants/birds/ilbirds.html.
[40] *The Illinois Natural Area Inventory: Technical Report, Vol.* 1, *Survey Methods and Results*. White, John. Urbana-Champaign, IL: University of Illinois, Department of Landscape Architecture, and Natural Land Institute, 1978. http://www.ideals.illinois.edu/bitstream/handle/2142/9362/illinoisnaturala03univ.pdf?sequence=1.

and unusual concentrations of flora and/or fauna. Over 1,100 INAI areas were identified during the initial investigation in 1975-1978. Forty-three sites are currently listed in Will County, Illinois. Three INAI sites, including Raccoon Grove, Goodenow Grove and the Peotone Railroad Prairie, occur within several miles of the study area. There are no INAI sites found within the boundaries of the study area.

4.6.4 The Floristic Quality Assessment

The FQA is a method developed by Chicago-area botanists Floyd Swink and Gerould Wilhelm to measure natural area quality by measuring the degree of disturbance in a vegetation community, represented by a FQI value. The FQA methodology is one of the evaluation criterion used by the IDNR to determine wetland quality. Therefore, wetland delineation results for activities subject to the ACT must include an inventory of plants in each wetland in order to calculate the FQI. The USACE Chicago District also requires an FQI value for wetland delineations submitted for Section 404 permit applications. The FQA methodology is described in detail in *Plants of the Chicago Region*.[41]

The FQI calculation relies on the Coefficient of Conservatism (C Value), represented by a number from 0 to 10 that has been assigned to each plant species in the Chicago region. The value reflects a species degree of fidelity to a high-quality natural community. For example, a very conservative species, found in habitats with little disturbance, would have a high C Value such as 9 or 10, while a very weedy species that is found in highly disturbed areas, would have a low C Value such as 0 or 1. Non-native species are not given a rating because they are not originally part of any natural community. During the 2008-2009 wetland investigation, a floristic inventory was compiled for each wetland area and an analysis was conducted of each inventory list using the FQA computer program.[42] The results of the analysis---the calculation of a C Value and FQI value for each wetland are discussed in **Section 5.7.4: The Floristic Quality Assessment**.

4.7 Site Access

There are 125 property parcels within the study area boundary (**Exhibit G-1: Property Parcels Within The Inaugural Boundary** in **Appendix G: Parcel Map**). At the time of the 2008-2009 wetland field investigation, 71 parcels or about 56 % of the study area had been acquired by the State of Illinois. When field work began in August 2008, field investigations were focused on wetland areas located on State-owned properties. Letters were sent out by IDOT to private property-owners to notify each one of the up-coming wetland and stream surveys being conducted as part of the EIS process. The property owners were advised that surveyors would need access to all areas within the site and therefore might need access to their property. Several owners requested that field investigations be postponed until after crops were harvested. Wetland investigations on these parcels were conducted at the very end of the growing season. One owner could not be reached; another refused access. The investigations on these owners' properties were postponed until the start of the growing season in spring 2009, and were completed then. An example of the IDOT notification letter is found in **Appendix D: Methodology**.

[41] *Plants of the Chicago Region*. (4th edition). Swink, F. and G. Wilhelm. Indianapolis, Indiana: Indiana Academy of Sciences Press, 1994.
[42] *Floristic Quality Assessment Program, Version 1.0*. Conservation Research Institute. Elmhurst, Illinois: Conservation Design Forum. December 1999.

Section 5 – Results

5.1 Delineated Areas

A total of 368 areas were visited during the 2008-2009 wetland investigation, resulting in a total of 209 wetlands delineated, equaling nearly 282 acres. **Table 5: Wetlands Delineated within the Study Area 2008-2009** lists all delineated wetland areas including wetland type, FQI and acreage. A complete list of all areas investigated by Township and Section, including non-wetlands, can be found in **Appendix E: Field Results** and **Table E-1: Comprehensive Wetland Table**. The field mapping and wetland investigation results are shown in **Exhibit 7: 2008 and 2009 All Investigated Areas; Exhibit 8: Upland Areas Investigated;** and **Exhibit 9: 2008 and 2009 Wetlands Identified**. The following Exhibits 7A through 9D display the same information as the main Exhibits, but at a larger scale showing greater detail.

- **Exhibit 7A: Will Township Sections 5, 6 and 8; Monee Township Section 31; 2008 and 2009 All Investigated Areas;**
- **Exhibit 7B: Will Township Sections 3, 4, 9 and 10; 2008 and 2009 All Investigated Areas**;
- **Exhibit 7C: Will Township Sections 1, 2, 11 and 12; 2008 and 2009 All Investigated Areas**;
- **Exhibit 7D: Washington Township Sections 6, 7 and 8; 2008 and 2009 All Investigated Areas;**
- **Exhibit 9A: Will Township Sections 5, 6 and 8; Monee Township Section 31; 2008 and 2009, Wetlands Identified;**
- **Exhibit 9B: Will Township Sections 3, 4, 9 and 10; 2008 and 2009 Wetlands Identified;**
- **Exhibit 9C: Will Township Sections 1, 2, 11 and 12; 2008 and 2009 Wetlands Identified;** and
- **Exhibit 9D: Washington Township Sections 6, 7 and 8; 2008 and 2009 Wetlands Identified.**

NRCS Aerial Slide Review Results

As a result of the NRCS slide review, 176 suspect wetland areas were flagged for investigation because they appeared to have field signatures that indicated the presence of standing water, crop failure, or the growth of wetland vegetation, as described in the NRCS wetland mapping conventions. During the 2008-2009 field investigation, 58 NRCS areas, equaling 16 acres, were identified as wetlands. Typically, these areas were cultivated, but contained sparse or failed crops along with wetland vegetation. Some tiled areas were grassed waterways with open channels or tile blow outs where wetland functions were returning.

The remaining 118 NRCS areas which had appeared in the aerial review were found to contain uplands or prior-converted wetlands. Most of these areas were grassed waterways that, due to the presence of functioning tile systems, lacked wetland hydrology and were dominated by upland vegetation, such as smooth brome and wild carrot. Other areas were cultivated and completely indistinguishable from the rest of the cropped field. Some areas were actually uplands on side slopes and the tops of hills that had appeared to be lighter than the surrounding field because of light-colored or eroded soils. A few areas that appeared as dark spots at the edge of a field were found to have been shadows from adjacent hedgerow tree lines. In order to document the investigations of these sites, a wetland data form was completed for each NRCS upland area, including an inventory of plant species present and notes on the features and conditions of the site. Typically no soil core was excavated and no vegetation cover percentages were recorded, since hydrophytic vegetation and wetland hydrology were absent.

5.2 GPS Post-Processing and Differential Corrections

GPS post-processing refers to mathematical corrections called “differential” corrections that are applied to the raw survey data to improve positional accuracy. Differential corrections are calculated based on the difference between the satellite measured position from the mobile receiver (GPS unit or rover) and an actual position at a

ground-based reference station with a known coordinate.[43] Data received from the satellite system must undergo correction processing due to natural distortions and degradations in the signal from atmospheric interference and timing errors.[44]

AECOM used Trimble® Pathfinder® software to differentially correct the recorded data downloaded from the Trimble® GPS units. The most commonly used reference position was from the base station in Orland Hills, Illinois, approximately 16 miles northwest of the study area. Position data from other base stations such as Wolcott, Indiana and Chicago, Illinois, were occasionally used to differentially correct a position to increase the quality of available base station data.[45] A sample of the post-processed data from four randomly selected dates shows that the average PDOP values during the study ranged from 2.8 to 3.2 (see **Table 2: GPS Post-Processed Data Results**). Between 85 to 95 percent of the recorded positions were accurate to less than one meter. These data can be found in **Appendix D: Methodology**. After the correction processing was complete, Pathfinder® was used to convert the data to a GIS mapping format called a "shapefile". The shapefiles were used to create the final GIS wetland maps in ESRI ArcMap®. Mapping results can be found in **Exhibit 7: 2008 and 2009 All Investigated Areas; Exhibit 8: Upland Areas Investigated**; **Exhibit 9: 2008 and 2009 Wetlands Identified** and in **Appendix E: Field Results**.

Table 2: GPS Post-Processed Data Results (from a random sample of four data sets)

Sample Data Set		Number of Positions Corrected	Average PDOP	68% Precision**				
Date Corrected	Dates Recorded			15-30 cm	30-50 cm	0.5-1 m	1-2 m	2-5 m
August 31, 2008	August 26-29, 2008	2315	2.84661	-	4.0	83.0	11.4	1.6
September 19, 2008	September 9-11, 2008	2252	2.80983	-	16.3	79.4	4.0	0.4
September 26, 2008	September 22-26, 2008	5479	3.22326	8.0	26.5	50.1	13.9	1.2
October 13, 2008*	October 6-10, 2008	6758	2.87581	-	18.5	72.0	8.9	0.5
October 13, 2008	October 6-10, 2008	384	-	-	15.1	75.5	8.6	0.8
		Average	**2.9388**					

*PDOP data was derived from a combined correction file for 2 downloads.
**This is a statistical term referring to values that fall closest to the mean within a normal distribution.

5.3 Vegetation

Wetland Community Types

Eight different wetland community types were found within the study area. These wetland types are based on the system of wetland community classification found in *Classification of Wetlands and Deepwater Habitats of the United States.*[46] The communities are classified according to their location in the landscape and the dominant vegetation structure present. A summary of this classification system can be found in **Appendix D: Methodology.**

Most wetlands within the study area are classified as "palustrine" or inland wetlands. Wetlands found along streams are classified as "riverine". There were six wetland structure types identified within the study area including:

[43] *All About GPS: How does Differential GPS work*?. GPS Tutorial. Trimble Navigation Limited. 2011. http://www.trimble.com/gps/dgps-how.shtml.

[44] *All About GPS: How does GPS work?: Error Correction*. GPS Tutorial. Trimble Navigation Limited. 2011. http://www.trimble.com/gps/howgps-error.shtml.

[45] The quality of a particular base station's data relative to the quality of data from other available sources is called the Integrity Index. The Index is consulted when selecting a base station during differential correction to avoid poor data that would result in an inferior result. *Accuracy of the reference station position*.GPS Pathfinder® System User's Guide:. Version 2.00. Revision A, Part Number 40889-10-ENG, Trimble Navigation Limited. April 2004, 24.

[46] *Classification of Wetlands and Deep Water Habitats of the United States.* FWS/OBS-79/31. Cowardin, Lewis M. *et al*. Washington, DC: U.S. Fish and Wildlife Service, December 1979. Reprinted 1992. http://www.fws.gov/wetlands/_documents/gNSDI/ClassificationWetlandsDeepwaterHabitatsUS.pdf.

- emergent: characterized by herbaceous (non-woody) species such as grasses and sedges;
- scrub-shrub: dominated by sapling trees and by shrubs, especially willows and dogwoods;
- forest: dominated by trees;
- open water: both natural and man-made ponds;
- streams: linear water features; and
- wetland complex: a combination of three or more wetland types.

The most abundant community types within the study area are wetland complexes and palustrine emergent wetlands. **Table 3: Wetland Community Types** summarizes the wetland types and acreages delineated during the 2008/-2009 study. **Table 4: Wetlands Delineated within the Study Area 2008-2009** lists all the wetlands delineated during this study, along with wetland type, acreage, and FQI score.

Palustrine Emergent (PEM) wetlands include both cultivated and uncultivated wetlands dominated by herbaceous, hydrophytic vegetation. Farmed wetlands in cultivated fields are plowed and planted, when possible during dry years. Often the crop is sparse or stunted, and mixed with wetland weeds such as barnyard grass (*Echinochloa crusgalli*), yellow foxtail (*Setaria glauca*) witch grass (*Panicum dichotomiflorum*), knotweeds (*Polygonum sp*.) and nut sedges (*Cyperus sp*.). Many cultivated wetlands have had drainage tiles installed to hasten drainage; most of these "prior-converted" areas have lost wetland functions and are indistinguishable from surrounding areas. Where drainage tiles are not maintained or are damaged, these areas may regain full or partial wetland functions.

Table 3: Wetland Community Types

Community Types	Area (acres)
Palustrine Emergent (PEM)	65.4
Palustrine Emergent–Scrub-Shrub Complex (PEM/PSS)	4.2
Palustrine Forested (PFO)	6.5
Palustrine Open Water (POW)	15.0
Palustrine Open Water-Emergent Complex (POW/PEM)	3.0
Palustrine Scrub-Shrub (PSS)	1.3
Wetland Complex	158.7
Riverine (R2OWHx)	27.8
Total Acres	**281.9**

Typically, field tiles are installed in "grassed waterways", which are natural drainageways with hydric soils, left uncultivated, to reduce erosion and tile damage from plows. When the tile drainage is functioning, these areas lose wetland functions and are dominated by upland vegetation such as smooth brome (*Bromus inermis*), tall fescue (*Festuca elatior*), tall goldenrod (*Solidago altissima*), Canada thistle (*Cirsium arvense*) and wild carrot (*Daucus carota*). Many of the NRCS slide review locations turned out to be grassed waterways with functioning tiles and upland vegetation.

When the tile system is not maintained properly and tiles collapse or becomes blocked, tile blowouts from a build-up of pressure result in gaps in the drainage system where surface water pools or open channels occur. In these areas, typically in the middle of grassed waterways, wetland functions are regained in part and wetland vegetation becomes dominant where hydrology has returned. These areas are typically vegetated by reed canary grass (*Phalaris arundinacea*), redtop (*Agrostis alba*), crested oval sedge (*Carex cristatella*), giant ragweed (*Ambrosia trifida*), and sawtooth sunflower (*Helianthus grosseserratus*).

Palustrine Forested (PFO) wetlands are dominated by trees. Dominant species include cottonwood (*Populus deltoides*) and silver maple (*Acer saccharinum*). Forested wetlands within the study area are often found along the

banks of streams and ditches. This wetland type, as well as scrub-shrub wetlands, is often found in a low spot in a cultivated field where the area remains unplowed due to wetness during successive growing seasons, allowing woody species to become established. Wetland complexes often include forested wetlands as a significant component.

Palustrine Scrub-Shrub (PSS) wetlands are dominated by low-growing woody vegetation such as sandbar willow (*Salix interior*) and red osier dogwood (*Cornus stolonifera*). Scrub-shrub wetlands within the study area are generally associated with emergent wetlands (designated as PEM/PSS), or are part of wetland complexes.

Palustrine Open Water (POW) wetlands in the study area include all open water areas, both man-made and naturally-occurring. Man-made ponds are usually either a residential landscape feature or an agricultural impoundment used to water livestock. Typically, residential pond borders are mowed, and livestock pond borders are grazed, although emergent and scrub-shrub vegetation are often found along the edges of both. In general, ponds are found in association with emergent wetlands (designated as POW/PEM) or adjoined by scrub-shrub and forested wetland types and thus their acreage is included within the wetland complex category.

Palustrine wetland complexes include a combination of at least three wetland types, where interspersion is too great to allow mapping at a practical scale. For example, wetland complexes may consist of emergent and scrub-shrub wetlands around a pond, forested wetlands with emergent openings and a scrub-shrub fringe; or expansive areas with a mosaic of several water/land cover categories.

Riverine wetland (R2OWH) is the designation for creeks and ditches. This category includes natural and constructed drainage channels. Many of the natural streams within the study area have been straightened or channelized to improve drainage, often resulting in steep-sided channels with well-drained spoil berms along the tops of bank. In these instances, wetland hydrology is often confined to the width of the stream channel. These communities are frequently dominated by reed canary grass (*Phalaris arundinacea*) with sawtooth sunflower and other wetland forbs growing in the channel where the water is shallow or where the banks have slumped. The tops of banks are frequently dominated by Hungarian brome (*Bromus inermis*) and tall fescue (*Festuca elatior*). Where woody vegetation has become established on the streambank, predominant species include cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*) and sandbar willow (*Salix interior*).

Table 4: Wetlands Delineated within the Study Area 2008-2009					
Wetland ID	**Wetland Type**	**NWI**	**Mapped Hydric**	**Native FQI**	**Acreage**
M31NE-3	Wetland Complex	PEMC	Y	NA	0.56
M31NE-5	PEM	No	Y	2.0	0.08
M31NE-6	PEM	No	Y	0.0	0.58
M31NE-7	PEM	No	Y	3.6	0.40
M31NE-12a	PEM	No	In part	5.4*	0.18
M31NE-12b	PEM; Stream	No	In part		0.30
M31SW-1a	PEM; Stream	No	Y	9.0*	0.07
M31SW-1b	PEM; Stream	No	Y		0.33
M31SW-1d	PEM; Stream	No	Y		0.02
M31SW-1e	PEM; Stream	No	Y		0.01
M31SW-1f	PEM; Stream	No	Y		0.01
M31SW-1g	PEM; Stream	No	Y		0.03
M31SW-1h	PEM; Stream	No	Y		0.03
M31SW-1k	PSS; PEM	No	Y		0.19
W01NE-1a	PFO	PFO1A	Y	8.1*	0.41
W01NE-1b	PEM/FW	No	Y		1.52
W01NE-2	PEM/FW	No	Y	0.0	2.54
W01NE-4	PEM/FW	No	Y	2.4	0.59
W01NE-6a	PEM/FW	No	Y	1.9*	0.43
W01NE-6b	PEM/FW	No	Y		0.04
W01NE-7	PEM/Ditch	No	Y	6.1	0.14
W01NE-9a	PEM	No	Y	10.4*	1.03
W01NE-9b	PEM/FW	No	In part		0.01
W01NE-9c	PEM/FW	No	In part		0.05
W01NE-9d	PEM	No	Y		0.03
W01NW-2a	PEM	No	In part	10.1*	0.78
W01NW-2b	PEM	No	In part		0.05
W01NW-3a	PEM	No	In part	7.2*	0.69
W01NW-3b	PEM	No	In part		0.03
W01NW-6a	PEM	No	Y	8.7	0.35
W01SE-1	POW/PEM	No	Y	14.0	0.28
W01SE-2a	PFO, PSS	No	Y	20.3	0.04
W01SE-2b	PFO, PSS	No	Y	8.1	0.01
W01SE-2c	PFO, PSS	No	Y	16.2*	0.01
W01SE-2d	PFO, PSS	No	Y		0.12
W01SE-2e	PFO, PSS	No	Y		0.06
W01SE-2f	PFO, PSS	No	Y		0.09
W01SE-2g	PFO, PSS	No	Y		0.08
W01SE-2h	Wetland Complex	No	Y		0.27

* Uniform FQI values representing multiple wetland areas based on close proximity with one another.

Wetland ID	Wetland Type	NWI	Mapped Hydric	Native FQI	Acreage
W01SE-3	Wetland Complex	PEMC	Y	16.0	1.48
W01SE-4	PEM	No	Y	0.0	0.03
W01SE-5	PFO	No	In part	4.2	0.16
W01SE-6	POW	No	In part	2.0	5.91
W01SE-7	PFO	No	Y	10.3	3.01
W01SE-10	PEM	No	Y	1.7	0.02
W01SE-13	PEM	No	Y	11.1	0.03
W01SE-14	PFO, PSS	No	In part	16.2	0.02
W01SW-1	PEM	No	Y	10.3	2.77
W01SW-4a	PEM	No	Y	10.6	0.91
W01SW-4b	PEM	No	In part	4.6	0.03
W01SW-8	PEM	No	In part	2.0	0.01
W01SW-10	PEM	No	In part	2.5	0.04
W02NE-1	PEM	No	Y	11.4	2.36
W02NE-4a	Wetland Complex	No	In part	9.0*	0.04
W02NE-4b	Wetland Complex	No	In part		0.01
W02NE-4c	Wetland Complex	No	In part		0.02
W02NE-5	PEM/FW	No	Y	5.9	0.38
W02NE-6	PEM	No	Y	7.8	0.06
W02NE-7	Stream; PFO	No	Y	6.9	0.55
W02NW-2	Stream; PEM	PEMCD	Y	13.6	1.12
W02NW-5	PEM/Seep	No	In part	4.9	0.05
W02NW-6	PEM/FW	No	Y	0.0	2.70
W02NW-7	PEM;PSS	No	In part	20.1	0.37
W02NW-9	PEM;PSS	No	Y	6.3	0.15
W02SE-2	POW	PUBG	Y	NA	1.97
W02SE-4	PEM	No	Y	4.1	0.14
W02SE-5	PEM;PSS	No	Y	12.6	1.34
W02SE-7	PEM	No	In part	6.0	0.10
W02SE-8	PEM;PSS	No	In part	9.3	0.48
W02SE-9	PEM	No	In part	6.0	0.01
W02SE-10	PEM/PSS	No	In part	8.0	0.40
W02SE-12a	PSS	No	In part	9.0*	1.00
W02SE-12b	PEM/PFO	No	In part		0.16
W02SW-1	Wetland Complex	PSS1C	Y	6.9	2.68
W02SW-3a	Wetland Complex	No	Y	7.2*	2.41
W02SW-3b	PEM; PFO	No	In part		0.24
W02SW-5	PEM; Seep	No	In part	6.6	0.19
W02SW-6a	PEM; R4SBJ	No	Y	0.0*	0.11
W02SW-6b	PEM; R4SBJ	No	In part		0.07
W02SW-6c	PEM; R4SBJ	No	In part		0.05
W02SW-6d	PEM; R4SBJ	No	In part		0.05
W02SW-7	PEM	No	In part	8.0	0.24
W02SW-9	PEM	No	Y	9.8	0.41

Wetland ID	Wetland Type	NWI	Mapped Hydric	Native FQI	Acreage
BWC-W02	Stream; PFO	R2OWHx	Y	12.8	3.78
W03NW-2	PEM/Ditch	No	Y	5.6	0.37
W03SE-1	PEM	No	In part	6.1	0.12
W03SW-1	PEM	No	In part	6.8	0.11
BWC-W03	Stream; PFO	R2OWHx	Y	13.6	8.11
W04SE-1a	PEM	PEMC	Y	0.0	0.09
W04SE-1b	Wetland Complex	PEMC	Y	13.3	8.60
W04SE-2a	Wetland Complex	PEMC/PEMAf	Y	8.9	1.49
W04SE-2b	PEM	PEMC; PEMAf	Y	0.7*	0.13
W04SE-2c	PEM	PEMC; PEMAf	Y		0.04
W04SE-5	PEM/FW	No	In part	0.0	1.96
W04SE-10	PEM	No	In part	0.0	0.14
W04SE-14	PEM	No	Y	5.3	0.05
W04SE-15	PEM/Seep	No	In part	6.4	0.34
W04SW-1a	Wetland Complex	PEMC	Y	15.7	2.26
W04SW-1b	PEM	No	Y	6.3*	0.03
W04SW-1c	PEM	No	Y		0.01
W04SW-2	Wetland Complex	No	Y	2.3	2.12
W04SW-3a	Wetland Complex	No	Y	20.9	1.67
W04SW-3b	PEM/FW	No	Y	0.0	0.03
W04SW-7	PEM	No	Y	0.0	0.02
W04SW-8	PEM/FW	No	In part	0.0	0.05
W04SW-9	PEM	No	In part	7.8	0.17
W04SW-10	Wetland Complex	No	Y	10.6	1.97
W04SW-12	PEM/FW	No	Y	0.8	0.14
W04SW-14	PEM/FW	No	In part	4.9	0.39
BWC-W04a	Stream; PFO	R2OWHx	Y	12.4	3.97
BWC-W04b	Stream; PFO	No	Y	7.2	0.31
BWC-W04c	Stream; PFO	No	Y	1.5	0.17
W05NW-1	PEM/FW;PSS	PEMC	Y	17.2	2.01
W05NW-2a	Wetland Complex	No	Y	21.1	14.81
W05NW-2b	PEM; PFO	No	In part	6.3	0.09
W05SE-2	PEM/FW	No	In part	0.0	1.14
W05SW-1	Wetland Complex	PEMCd	Y	9.8	0.68
W05SW-3	Wetland Complex	No	In part	12.4	0.74
W05SW-6	PEM	No	In part	0.0	0.16
W05SW-9	PSS; PEM	No	Y	9.0	0.10
W06NE-1	PEM; Drainageway	R2OWHx	Y	7.0	0.45
W06NE-2	PEM	No	Y	0.5	0.85

Wetland ID	Wetland Type	NWI	Mapped Hydric	Native FQI	Acreage
W06NE-3	PEM;	No	In part	10.0	0.07
W06NE-5	PEM/FW	No	Y	4.0	0.19
W06NW-1a	POW	POWGx	Y	NA	2.85
W06NW-1b	POW	POWGx	Y	NA	0.58
W06NW-2	POW	POWGx	Y	NA	0.19
W06NW-3	PFO; Stream	No	Y	12.2	2.44
W06NW-4	PFO; Stream	No	Y	5.0	0.44
W06NW-5a	PEM	No	In part	5.9*	0.21
W06NW-5b	PEM	No	Y		1.15
W06NW-6	PEM	No	Y	5.7	0.11
W06NW-7	PEM; Stream	No	In part	NA	0.32
RC-W06	Stream; PFO	R2OWHx	Y	NA	0.89
W08NE-1	PEM	No	In part	0.0	0.09
W08NE-2	PEM	No	In part	1.6	0.04
W08NE-3	POW/PEM	No	In part	8.3	0.02
W08NE-4	POW/PEM	No	Y	7.8	0.10
W08NE-5	PEM	No	In part	6.4	0.05
W08NE-6	PEM	No	In part	3.5	0.40
W08NE-7	PEM	No	In part	9.9	0.17
W09NE-2	PEM/FW	No	In part	4.0	5.88
W09SW-3	PEM	No	Y	10.7	0.31
BWC-W09a	Stream; PFO	R2OWHx	Y	8.8	0.61
BWC-W09b	Stream; PFO	R2OWHx	Y	8.9	2.84
W10NE-1	POW	POWGx	In part	5.5	0.05
W10NE-2	PEM/FW	No	Y	2.8	0.70
W10NE-3	PEM/FW	No	Y	0.0	1.74
W10NE-4	PEM/FW	No	Y	1.5	3.13
W10NW-1	PEM/FW	PEMAf	Y	0.0	0.18
BWC-W10	Stream; PFO	R2OWHx	Y	16.3	1.72
W11NE-1	POW/PEM	POWGx	Y	10.6	2.10
W11NE-2	POW	No	Y	12.4*	0.54
W11NE-2b	Stream	No	Y		1.56
W11NE-4	PEM/FW	No	Y	4.9	0.41
W11NW-1a	PEM	No	Y	3.0	0.01
W11NW-1b	PEM	No	Y	3.5	0.09
W11NW-2	PEM/FW	No	Y	0.0	0.48
W11NW-10	PEM/FW	No	In part	5.0	0.28
W11SW-2	Stream	No	Y	11.4	1.87

Wetland ID	Wetland Type	NWI	Mapped Hydric	Native FQI	Acreage
W12NE-3	PEM	No	Y	2.1	0.16
W12NE-4	PEM/FW	No	Y	15.4	0.83
W12NE-5	PEM	No	Y	0.9	0.38
W12NE-6a	PEM	No	Y	5.3	0.01
W12NE-6b	PEM	No	Y	8.6	0.09
W12NW-1	PEM/FW	PEMAf	Y	8.1	0.67
W12NW-2	PEM/FW	PEMAf	Y	7.6	0.38
W12NW-3	POW	No	In part	11.5	0.74
W12NW-4	Stream	R2OWHx	Y	5.3	0.41
W12NW-5	POW/PEM	No	Y	9.3	0.49
W12NW-6	POW	No	Y	8.7	0.08
W12NW-7b	PEM	No	In part	5.4*	0.19
W12NW-7c	PEM	No	Y		0.04
W12NW-8	PEM	No	Y	7.0	1.69
W12NW-12	PEM/FW	No	Y	4.0	0.28
WS06NE-2a	PEM	PFO1C/PEMC	Y	2.7	0.00
WS06NE-2b	PEM; PFO	PFO1C/PEMC	Y	9.2	0.01
WS06NE-3	Wetland Complex	PEMC	Y	10.2	2.63
WS06NE-5	PEM/FW	No	Y	0.0	0.70
WS06NW-1	PEM/FW	PEMAf	In part	6.0	1.31
WS06NW-2	Wetland Complex	PEMC	Y	6.8	1.57
WS06NW-3b	PEM/FW	No	Y	0.0	0.08
WS06NW-4a	Wetland Complex	No	Y	7.5*	0.09
WS06NW-4b	PEM/Stream	No	Y		0.38
WS06SW-2b	Wetland Complex	No	Y	3.5	0.40
WS06SW-8	PEM	No	In part	9.3	1.23
WS07NE-9	PEM; PSS	No	Y	1.1	0.29
WS07NW-1	POW	POWHx	Y	7.0	1.79
WS07NW-2	PEM	PEMCf	Y	8.1	6.03
WS07NW-3a	PEM	No	Y	10.8*	2.01
WS07NW-3b	PEM	No	Y		0.05
WS07SE-1	Wetland Complex	PEMAf, PEMCd,	Y	25.5*	111.39
WS07SE-1b	POWHx	No	Y		0.31
WS07SE-7	PEM	No	Y	3.6	0.05
WS07SE-8	PEM	No	Y	2.3	0.08
WS08NE-4	PEM/Stream	No	Y	10.0	0.53
WS08NE-5	PEM/FW	No	Y	2.9	0.71
WS08NE-6	PEM/FW	No	In part	3.5	0.11
WS08NW-1	Wetland Complex	No	Y	3.6	0.22
WS08NW-2	Wetland Complex	PEMAf	Y	7.3	0.61
WS08NW-4	PEM/FW	No	Y	0.0	0.38

Wetland ID	Wetland Type	NWI	Mapped Hydric	Native FQI	Acreage
WS08NW-5	PEM/FW	No	Y	0.0	0.65
WS08NW-9	PEM	No	Y	8.8	0.66
WS08SW-2a	PEM	No	Y	5.4*	0.02
WS08SW-2b	PEM	No	Y		0.00
WS08SW-2c	PEM	No	Y		0.00
WS08SW-2d	PEM	No	Y		0.01
WS08SW-2e	PEM	No	Y		0.00
WS08SW-3	PEM/FW	No	Y	0.0	0.22

NA = Not Available

5.4 Soils

On-site investigations generally supported the mapping and data found in the Soil Survey of Will County, Illinois.[47] The results of soil core examinations are to be found on each wetland data form sorted by Township and Section in **Appendix E: Field Results**.

Some hydric soil samples were difficult to assess because the matrix was undifferentiated throughout; other than the low value/chroma, there were no visible redox features, or other hydric soil indicators. During the first week of combined team-work, a set of soil samples were collected and sent for analysis to determine whether they had a high carbon content and would qualify for the Loamy Mucky Mineral standard. The results showed that the sample soils did qualify and provided an opportunity for the delineators to learn to interpret this indicator in other sampling situations within the study area. During the 2008-2009 study, the most common indicators encountered were A11: Depleted below Dark Surface; A12: Thick Dark Surface; F6: Redox Dark Surface; and F7: Depleted Dark Surface.

5.5 Hydrology

Hydrology indicators could be difficult to assess in the field due to the presence of agricultural drainage systems consisting of field drainage tiles and ditches. Most drainage features had been installed or constructed many decades ago to remove excess water or speed natural drainage for the purposes of cultivation. A further discussion is found in **Section 5.6: Difficult Wetland Situations – Atypical Situations and Problematic Wetlands in Disturbed Areas.**

5.6 Difficult Wetland Situations—Atypical Situations and Problematic Wetlands in Disturbed Areas

Man-made wetland disturbances were encountered frequently throughout the study area, primarily due to agricultural activities and occasionally from development activities. All of the wetland areas within the Inaugural Site have undergone some degree of disturbance, either directly or indirectly, from historical or on-going agricultural practices, and from fill or excavation as a result of residential, commercial and/or transportation development. Often, as a result of such a disturbance, indicators for one of the three parameters – vegetation, soils and hydrology, are missing or difficult to interpret. In the 1987 Manual, such conditions are evaluated as "atypical situations" or "problem areas". In the 2008 Supplement, delineation guidelines for "difficult wetland situations" follow procedures to evaluate wetlands with agricultural drainage alterations as well as natural or man-induced problematic vegetation, hydrology and hydric soil conditions. As these conditions were encountered during the field investigations, delineators resolved each investigation on a case by case basis using best

[47] *Soil Survey of Will County, Illinois.* Hanson, Karla D. Natural Resource Conservation Service. Lincoln, NE: National Cooperative Soil Survey, 2004. http://soildatamart.nrcs.usda.gov/Manuscripts/IL197/0/will_IL.pdf.

professional judgment. A summary of the problematic conditions encountered during the 2008-2009 field survey is found below.

Problematic Hydrophytic Vegetation

In farmed wetlands, naturally-occurring wetland vegetation is regularly removed during cultivation. As previously described, delineators used the NRCS wetland determination methodologies to find these wetland areas with a series of annual aerial photographs. Where drainage tiles had been installed in natural drainageways, wetland functions were absent and the wetland vegetation community had been replaced with an old-field community dominated by European meadow grasses. On some occasions, intentional vegetation clearing has occurred along ditches and streams. In Will Township, Section 4, mature Eastern cottonwood (*Populus deltoides*) and other native trees lining the banks and shading the waters within a half-mile stretch of Black Walnut Creek had been cleared in 2005. The banks of the creek are now dominated by weedy, invasive forbs such as Canada thistle (*Cirsium arvense*) and common burdock (*Arctium minus*).

Pastures in wet meadow communities may have tile drainage but typically maintain wetland hydrology and vegetation; however, the combined effects of compaction, erosion, nutrient enrichment and selective grazing pressure from livestock activities serve to shift the species composition to dominance by weedier and unpalatable or thorny species. Native wetland communities may persist in the wettest areas where artificial drainage is unsuccessful and grazing less intensive. Here, sedges and native grasses such as blue-joint grass (*Calamagrostis canadensis*), cord grass (*Spartina pectinata*) and rice-cut grass (*Leersia oryzoides*) will be found along with unpalatable forbs such as joe-pye weed (*Eupatorium maculatum*). As recommended in the 2008 Supplement, these relatively intact wetland communities were employed by delineators as reference areas when evaluating wetland indicators in adjacent problematic areas having greater disturbance.

Problematic Hydric Soils

Wetland areas that persist adjacent to cultivated areas, such as pastures, stream corridors or woodlots, are subject to siltation from eroding upland areas. After many years of cultivation, the build-up of silt in adjacent areas eventually smothers native wetland plants and favors disturbance-tolerant species such as reed canary grass (*Phalaris arundinacea*), which is the dominant wetland plant in most uncultivated areas in the study area. Some soil cores in low areas adjacent to cultivated uplands had buried hydric horizons with an overburden of up to 12 inches of upland soil sediment.

Agricultural Drainage Systems

Most hydrology alterations have been in place for many decades, however some have occurred within the last three to five years. Historical ditching and dredging, and the installation of agricultural drainage systems over the last 100 years has caused long lasting changes in the hydrology of areas that were once wetlands or streams. Most of these former wetland areas have lost wetland functions, wholly or in part, and appear to function as non-wetlands. Some delineators interpreted the areas with drainage alterations as disturbances under the “atypical situations” description in the 1987 Manual, because the disturbances were man-made. Others felt that because the disturbances had been in place for many decades, the disturbed condition represented the status quo and therefore the “problem area” designation was more appropriate. More recent drainage alterations, such as field tile maintenance in Wetland ID W04SW-1a, could be more clearly interpreted as atypical situations. This was also true of wetlands in the center of Will Township, Section 1, such as Wetland ID W01SW-1 and Wetland ID W01SE-6 that have been altered due to the construction of Bult Field hangars, the extension of the runway, and the excavation of a retention basin.

5.7 The Illinois Interagency Policy Wetland Act of 1989

In addition to performing delineations of suspect wetland areas, the 2008-2009 field investigation gathered data and made observations to support the requirements of the ACT for the documentation of the presence of federal- and state-listed species and/or essential habitat and high-quality natural areas. The results of these investigations are discussed below.

5.7.1 Endangered and Threatened Species

In November 2009, the IESPB listed 61 species of federal- and state-endangered and threatened plants and animals occurring within Will County.[48] The results of an informal information request to the IDNR EcoCAT database made in January 2010 showed no occurrences of any federal-listed or candidate species and one occurrence of a state-listed species, the Barn Owl (*Tyto alba*), within the study area or the immediate vicinity.[49] During the 2008-2009 field investigation, no state or federally-listed plant or animal was observed and no federal species-of-concern and no state Watchlist species of plant or animal was observed within any of the investigated areas. Two state-listed bird species, the state endangered Northern Harrier and the state-threatened Sandhill Crane, were observed flying over the study area during the 2008 fall migration period. The Sandhill Crane was de-listed by the IESPB in February 2009 due to an overall increase in population and the consistent presence of breeding pairs in the state.

5.7.2 Critical and Essential Habitat for Endangered and Threatened Species

Most of the land within the study area has been under continuous cultivation for over 70 years as demonstrated by historical aerial photos.[50] Agricultural practices such as vegetation clearing, tile drainage, stream excavation and channelization, grazing and silviculture have dramatically altered the landscape and degraded or removed any remaining natural area quality that might support sensitive species.

Based on the results of the 2008-2009 field investigation and on past and current agency consultation, there is no designated critical habitat and no essential habitat within the study area for any of the five federally-listed species that occur in Will County. The presence of essential habitat for state-listed species within the study area wetlands has been noted during past and current field work and consultations. Throughout the study area, essential habitat for state-listed species is confined to areas with remnant natural communities or successional grassland/shrubland fields of sufficient size to support breeding populations.

At Beecher Marsh Wetland ID (WS07SE-1), wetland, grassland and shrubland breeding habitat is probably present for the state-endangered Northern Harrier, King Rail and Upland Sandpiper, and for the state Watchlist species Virginia Rail, Sora, and Bobolink, and possibly for the state-threatened Loggerhead Shrike. The area in the vicinity of the IRAP sampling site near Black Walnut creek once had documented habitat for state-listed and Watchlist species, but the site has been altered in the last five years due to wetland drainage and tree clearing, especially along the banks of Black Walnut creek. The area that remains intact may no longer be large enough to provide sufficient essential habitat.

Elsewhere within the study area, essential wetland habitat for state-listed species is confined to areas of sufficient size and quality capable of providing appropriate breeding conditions. Such areas are found primarily within the larger wetland complexes, such as Wetland ID's W01SE-3 W02SW-3a, W04SW-10, and W05NW-2a, and within larger emergent wetlands such as Wetland ID's W01SW-1 and WS07NW-2.

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[48] *Check List of Illinois Endangered and Threatened Species by County*. Illinois Natural Heritage Database. Springfield, Illinois: Illinois Endangered Species Protection Board. November 1, 2009. http://dnr.state.il.us/ESPB/2009%20Checklist%20FINAL%20for%20webpage%20October%2009a.pdf.

[49] *EcoCAT*. Illinois Department of Natural Resources, Division of Ecosystems and Environment. Accessed January 29, 2010. http://www.dnrecocat.state.il.us/ecopublic/

[50] *Access Illinois Historical Aerial Photography by County*. Illinois Natural Resources Geospatial Data Clearinghouse. Illinois State Geological Survey. July 1, 1997. Urbana-Champaign, Illinois: University of Illinois. Accessed July, 2010. http://www.isgs.uiuc.edu/nsdihome/webdocs/ilhap/county/data/indexes/photo/will3_1939.sid

5.7.3 Illinois Natural Area Inventory Sites

While three INAI sites occur within several miles of the Inaugural Site, there are no INAI sites found within the boundaries of the study area.

5.7.4 The Floristic Quality Assessment

The floristic inventory data gathered from each delineated wetland were compiled to create a comprehensive floristic inventory for the entire study area. The combined inventory has a total of 281 plant species, of which 203, or 72%, are native. The FQA analysis calculated the native mean C Value for the entire study area as 3.6 and the native FQI as 51.4. The comprehensive floristic inventory report is found in **Appendix H: Comprehensive Species List**. The results of the individual wetland inventories are discussed below.

Direct and indirect disturbances, primarily from agricultural activities, have altered wetland vegetation communities throughout the study area. Typically, wetlands in cultivated fields had FQI index scores of less than 5. Farmed wetland areas populated by annual wetland weeds typically had scores of 0 to 3. Wetlands within tiled grassed waterways with returning hydrology often had somewhat higher scores. Old pastures and stream corridors function as refugia for native species, and often these areas had FQI scores greater than 10. All of the most diverse areas with the highest FQI scores were large wetland complexes that contained emergent, forested, scrub-shrub and/or stream communities. Five such wetland areas had FQI scores of 20 or greater. These wetlands include Beecher Marsh (WS07SE-1) which has a native FQI of 24.4, as well as W05NW2a (21.1), an extensive wetland area adjoining Rock Creek, as well as, W04SW3a (20.9), W01SE2a (20.3), and W02NW7 (20.1).

5.8 Jurisdictional Determinations

The CWA gave the USACE the permitting authority to regulate the discharge of fill or dredged material into the waters of the U.S. Over the last thirty years, the extent of the USACE regulatory jurisdiction has evolved as the interpretation of "waters of the U.S" has changed. Originally, the interpretation included all navigable waterways and tributaries, as well as most wetland areas. Several Supreme Court decisions since 2001 have restricted the jurisdictional reach of the USACE to exclude areas that are not directly connected to a stream, as well as areas that do not have a "significant nexus", i.e. a demonstrable hydrological/biological/chemical connection, to navigable waters. As a result, the USACE now asserts unquestioned regulatory jurisdiction over the following areas only:

- Traditional Navigable Waters (TNW);
- wetlands adjacent to traditional navigable waters;
- non-navigable tributaries of traditional navigable waters that are Relatively Permanent Waters (RPW) where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g. typically three months); and
- wetlands that directly abut such tributaries.

For all other areas, the USACE must perform an analysis to determine whether a significant nexus with a TNW exists. This analysis applies to wetlands that are near but do not abut TNW or RPW; to streams with ephemeral or intermittent flow ("non-relatively permanent waters"); and to wetlands that abut non-relatively permanent waters or are adjacent but not abutting such waters. See **Appendix D: Methodology** for the current USACE guidelines for the CWA Jurisdiction.[51]

[51] *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States*. U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. Washington, DC: Memorandum published December 2, 2008. http://www.usace.army.mil/CECW/Documents/cecwo/reg/cwa_guide/cwa_juris_2dec08.pdf.

The USACE will decide which of the wetlands and waters of the U.S. within the study area are jurisdictional using the criteria listed above. The nearest TNW to the study area are the Kankakee River and the Calumet River. The four streams within the study area - Rock Creek, Black Walnut Creek, South Branch of Rock Creek, and Plum Creek - are RPW tributaries to one of these TNW. Many of the delineated areas are wetlands abutting non-relatively permanent waters which are tributaries of the RPW-class creeks. In many cases, the non-relatively permanent tributaries flow into RPW via agricultural drainage tiles. Some wetlands that might otherwise be considered isolated are connected to RPW via drain tile connections to smaller, non-relatively permanent tributaries. Whether these areas would be considered jurisdictional would require a significant nexus analysis by the USACE.

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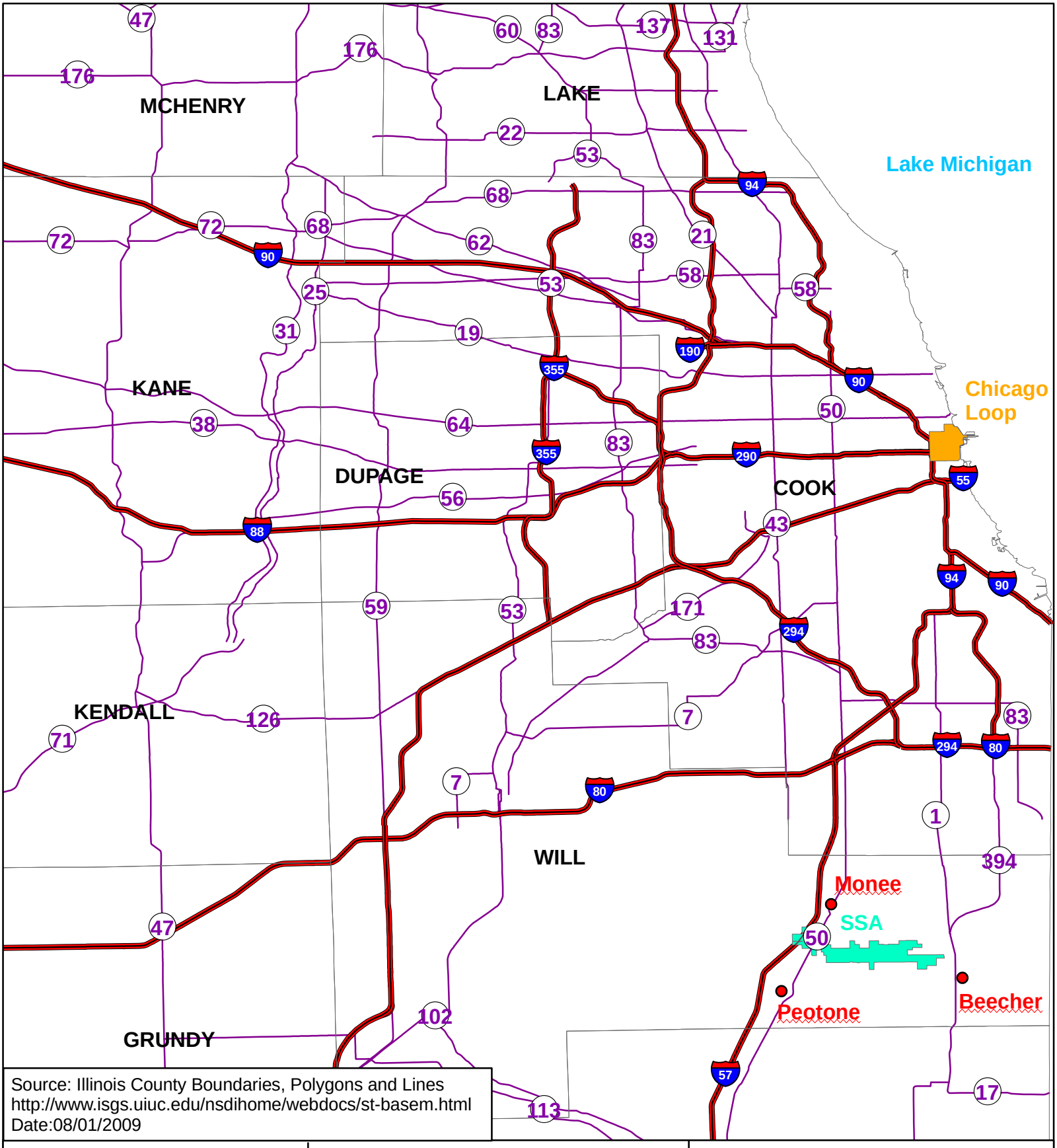


Source: Illinois County Boundaries, Polygons and Lines
http://www.isgs.uiuc.edu/nsdihome/webdocs/st-basem.html
Date:08/01/2009

Legend

- Chicago Loop
- South Suburban Airport
- IL Interstates
- IL State Routes

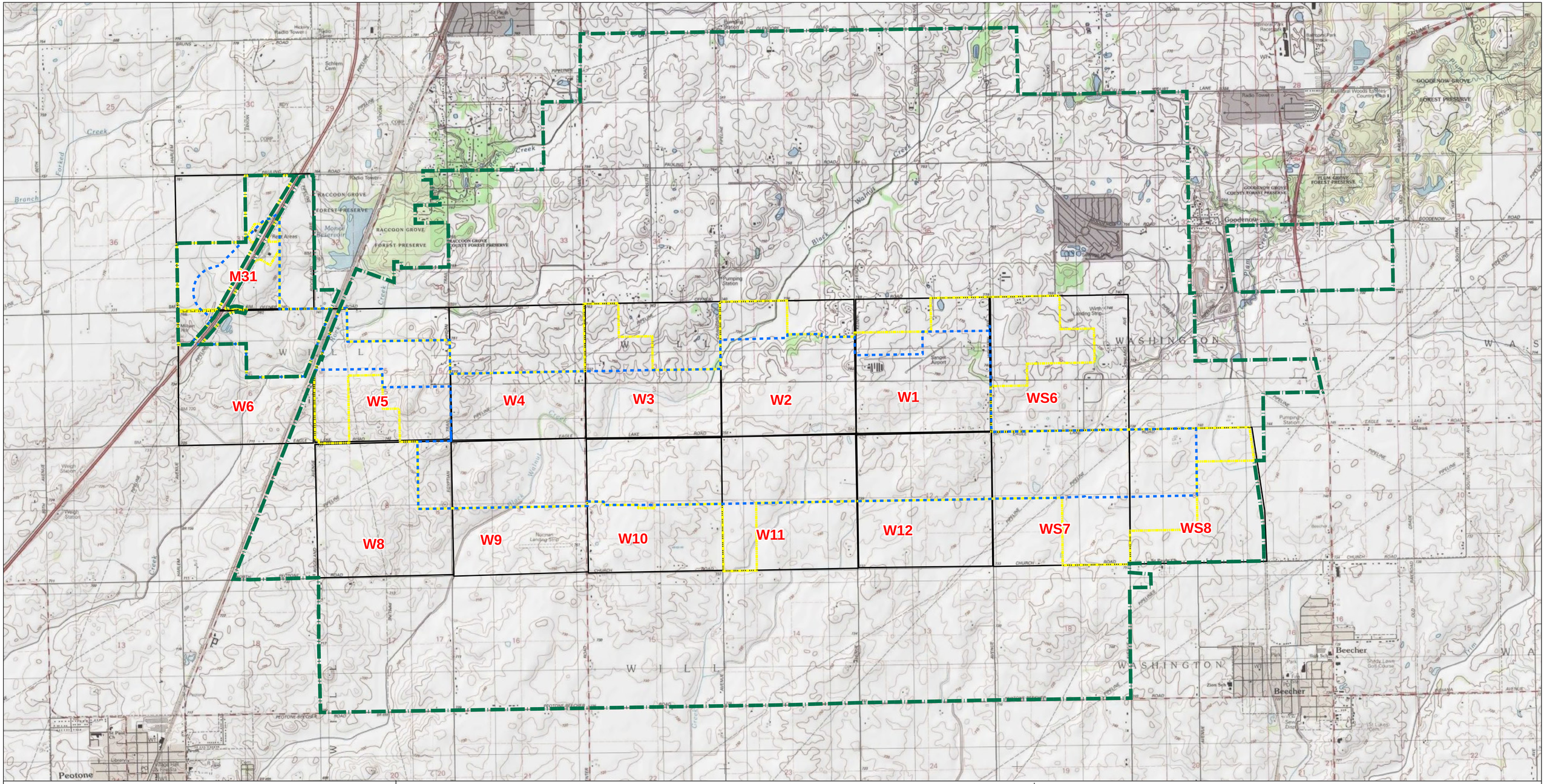
N

EXHIBIT 1
SITE LOCATION MAP
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2.5 5 10 15
Miles



Legend

- Ultimate Boundary
- Tier 1 EIS - Inaugural Airport Site Boundary
- 2008 Study Boundary
- Sections

N

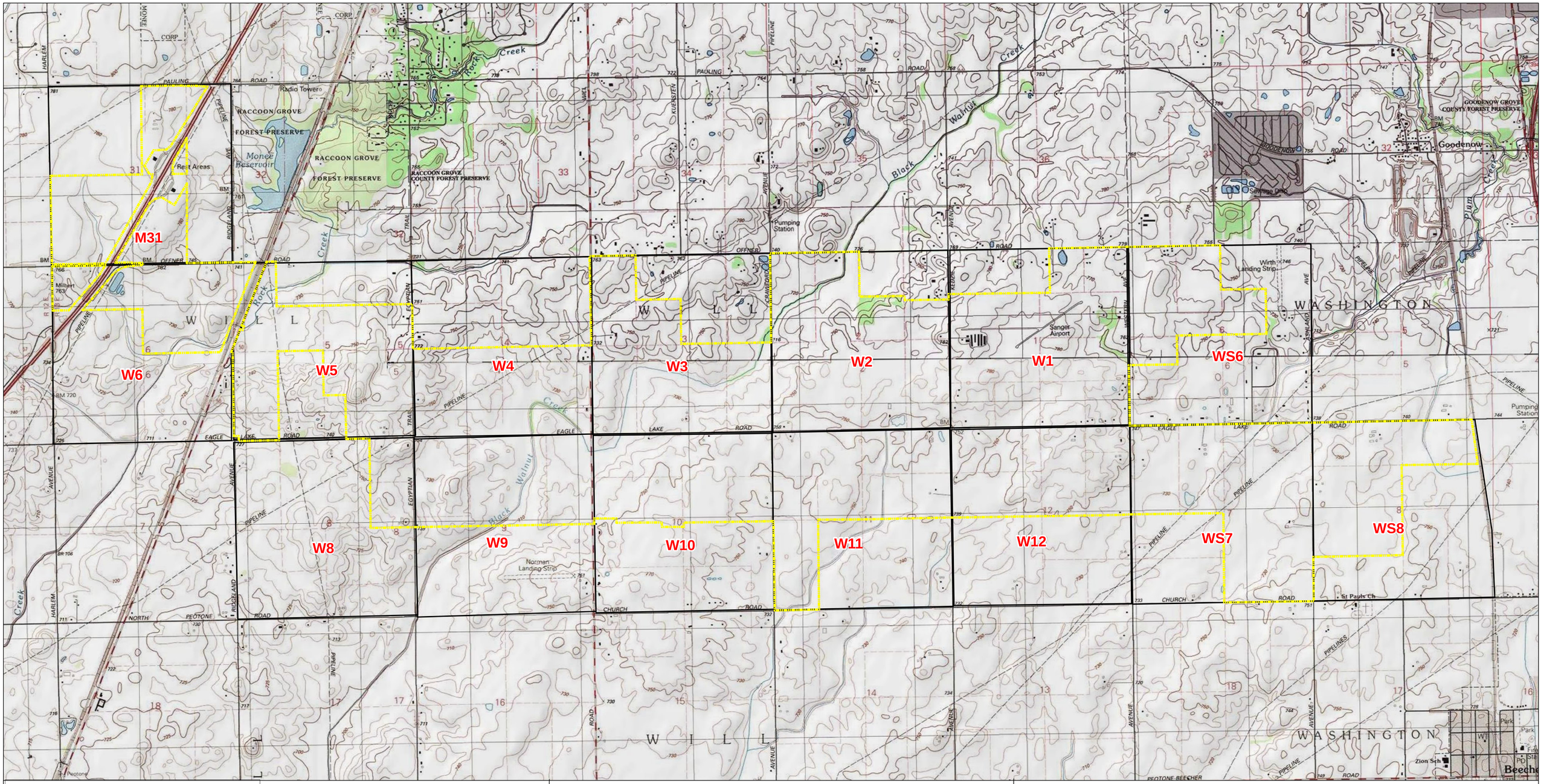
Source: USGS 7.5 - Minute Quadrangle Maps for
Beecher East, Beecher West, Dyer, Frankfurt, Peotone, Steger

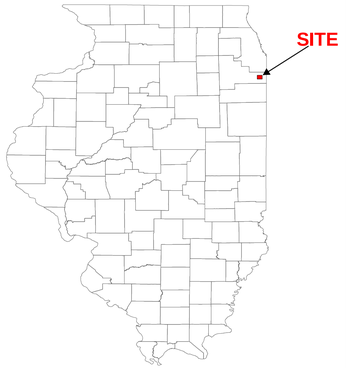
EXHIBIT 2
2008 STUDY BOUNDARY, TIER 1 EIS INAUGURAL AIRPORT SITE BOUNDARY AND ULTIMATE BOUNDARY
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2,500 5,000 10,000 15,000 Feet





Legend

2008 Study Boundary

Sections

N

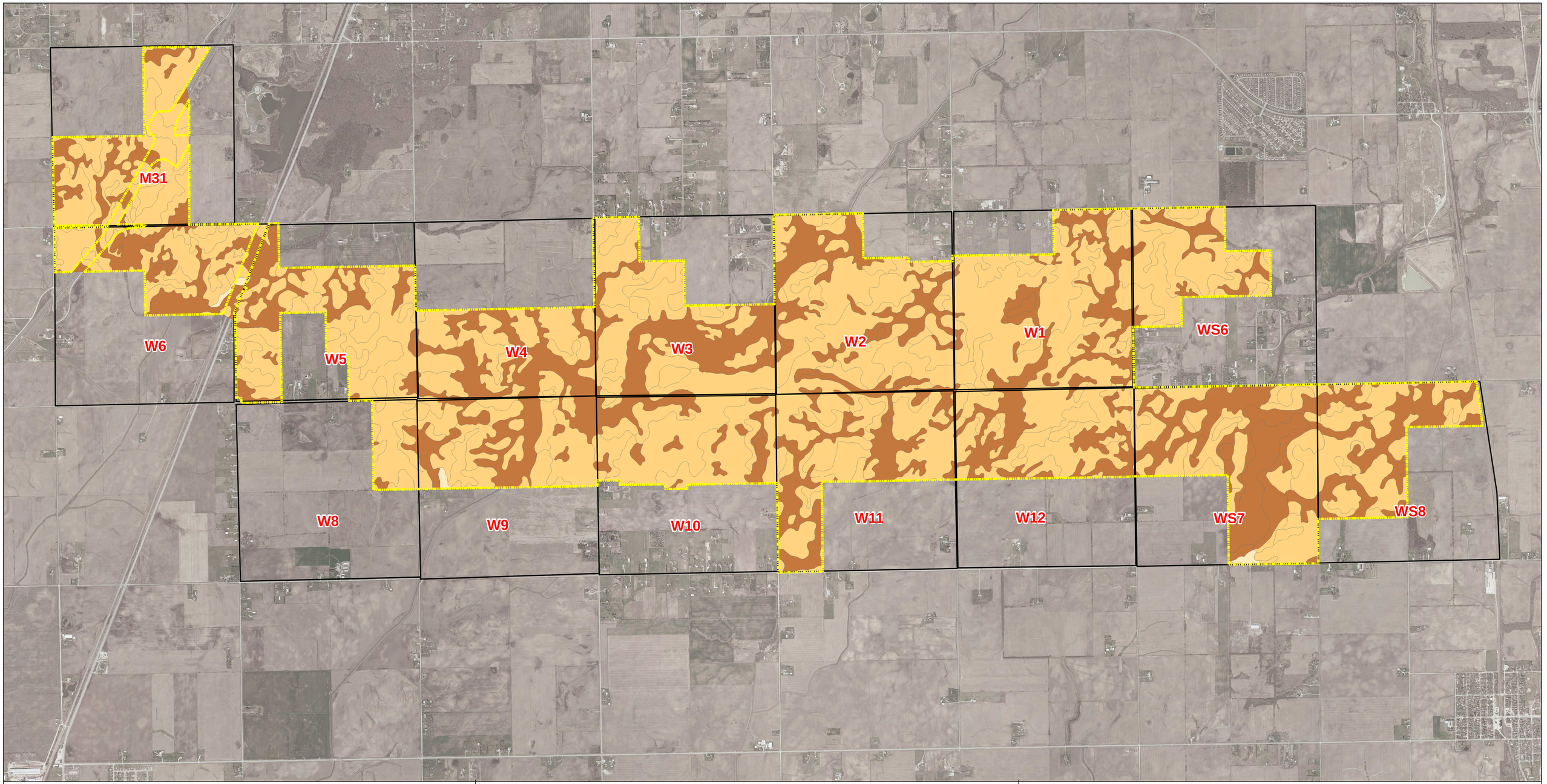
Source: USGS 7.5 - Minute Quadrangle Maps
Beecher East, Beecher West, Dyer,
Frankfurt, Peotone, Steger

EXHIBIT 3
TOPOGRAPHIC MAP
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2,000 4,000 8,000 12,000 Feet



Legend

- 2008 Study Boundary
- Sections
- Hydric Soil
- Partially Hydric Soil
- Not hydric

N

Source: Soil Data - USDA NRCS Soil Data Mart - Will County, IL 1997
Aerial Photograph - IDOT April 2001

EXHIBIT 4
WILL COUNTY SOIL SURVEY
HYDRIC AND PARTIALLY HYDRIC SOIL
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2,000 4,000 8,000 12,000 Feet

M31
W6
W5
W4
W3
W2
W1
WS6
W8
W9
W10
W11
W12
WS7
WS8

Source: USFWS 1992 National Wetland Inventory
Quads - Beecher East, Beecher West, Dyer,
Frankfurt, Peotone, Steger

Legend

- PEM/FO1C
- PEMA
- PEMADF
- PEMAF
- PEMC
- PEMCD
- PEMCDF
- PEMCF
- PEMF
- PFO/SS1C
- PFO1A
- PFO1AD
- PFO1C
- POW/EMF
- POWF
- POWFX
- POWGX
- POWHH
- POWHX
- PSS1/EMC
- PSS1A
- PSS1C
- 2008 Study Boundary
- Sections

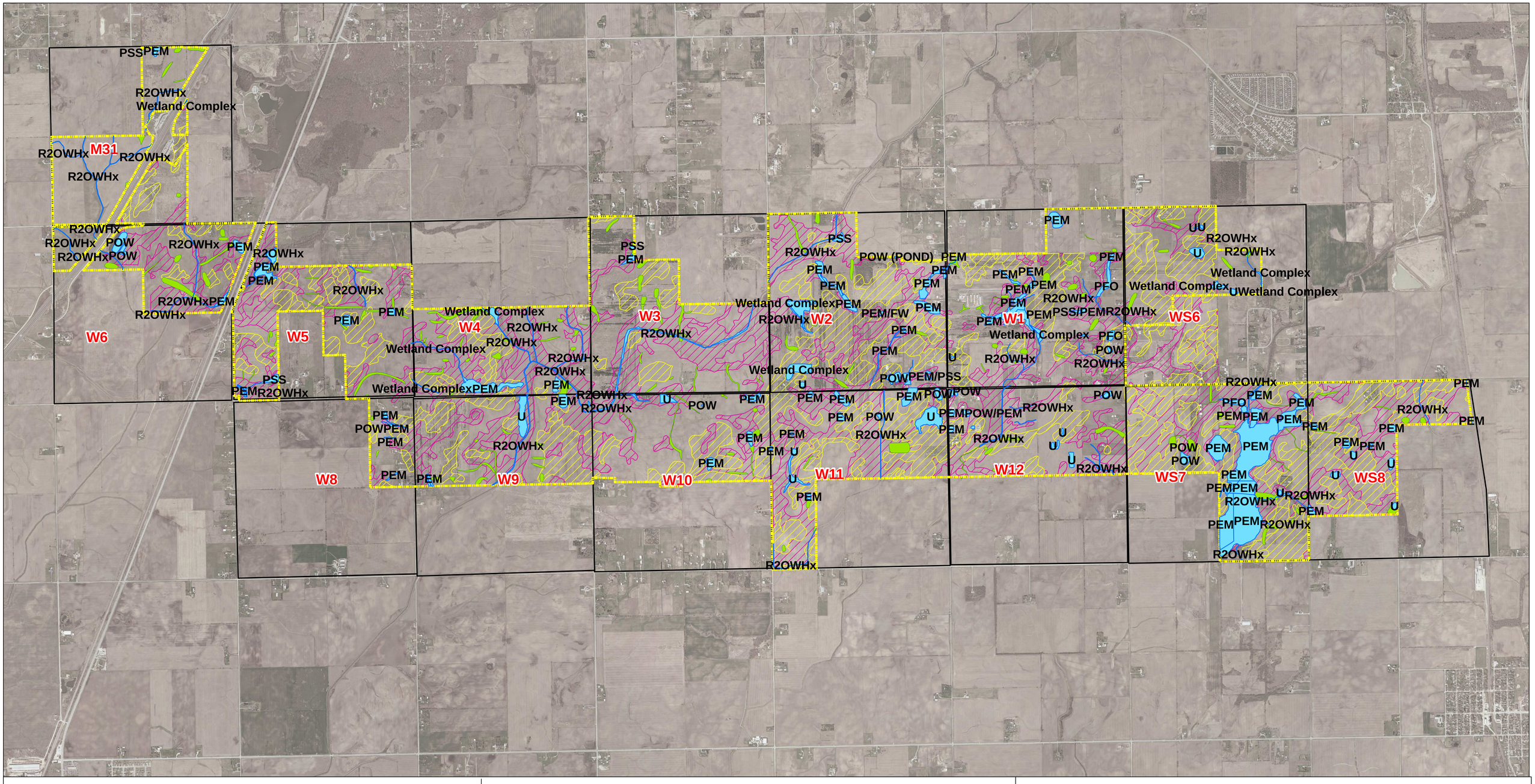
N

EXHIBIT 5
NWI WETLANDS
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2,000 4,000 8,000 12,000 Feet



Legend

- Previous Investigations
- 2008 Study Boundary
- Sections
- 2008 Desktop Wetland Delineation
- Hydric Soil
- Partially Hydric Soil

Note: Information displayed on this map was utilized for field work.
Soil information shown on this map was from previous investigations.
Exhibit 4 shows the updated soil data.

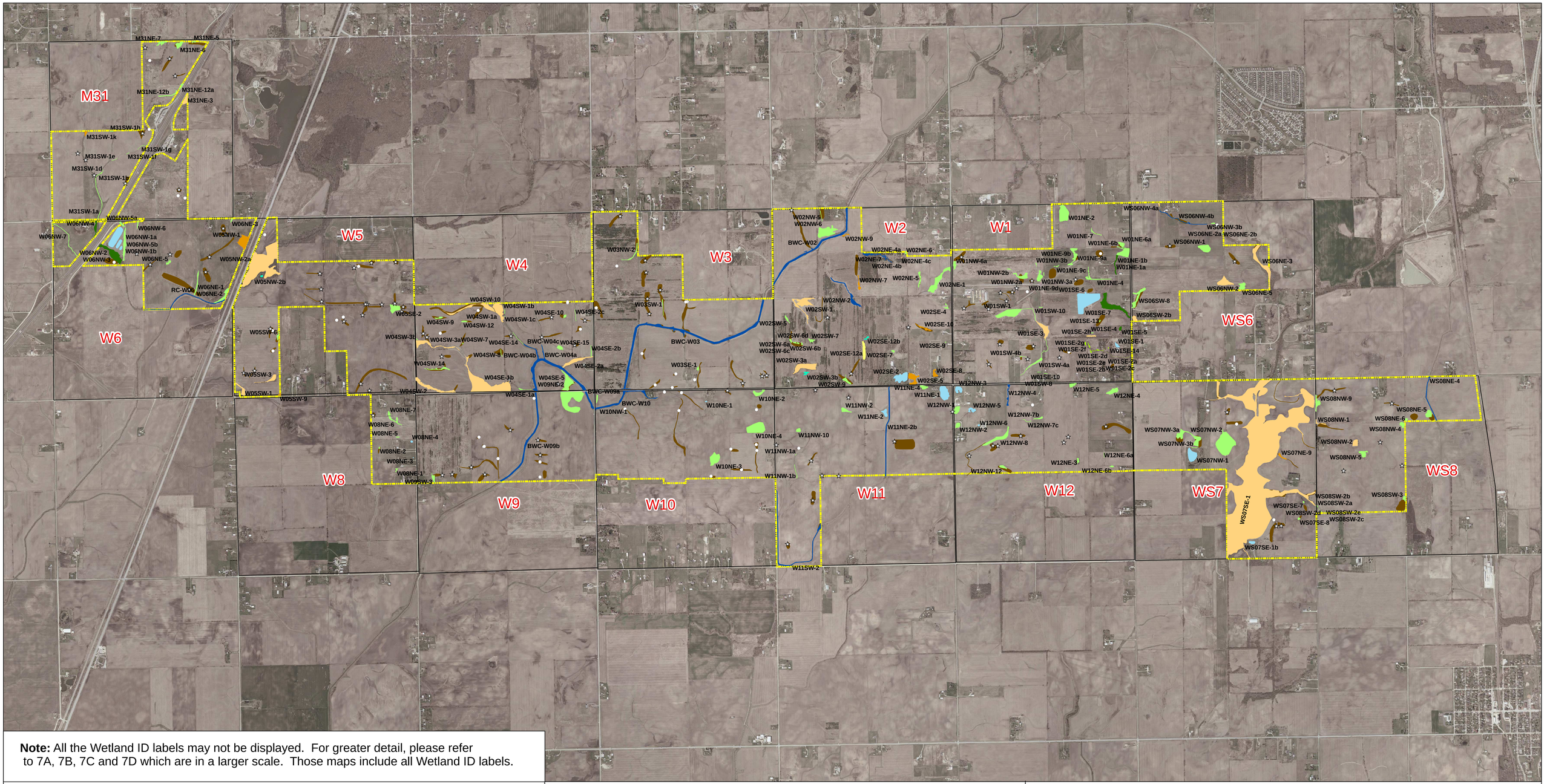
N

EXHIBIT 6
2008 NRCS SLIDE REVIEW RESULTS
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2,000 4,000 8,000 12,000 Feet



Note: All the Wetland ID labels may not be displayed. For greater detail, please refer to 7A, 7B, 7C and 7D which are in a larger scale. Those maps include all Wetland ID labels.

Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex

- 2008 NRCS Slide Review
- 2008 Study Boundary
- Sections
- Upland Soil Cores
- Upland Photo Locations
  For Complete Upland Location ID's See Exhibit 8 and Table 2

N

EXHIBIT 7
2008 AND 2009 ALL INVESTIGATED AREAS
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2,000 4,000 8,000 12,000 Feet

M31

M31NE-7
M31NE-6
M31NE-5
M31NE-12b
M31NE-12a
M31NE-3
M31SW-1h
M31SW-1k
M31SW-1g
M31SW-1e
M31SW-1f
M31SW-1d
M31SW-1b
M31SW-1a

W5

W06NW-4
W06NW-7
W06NW-5a
W06NW-6
W06NW-1b
W06NW-1a
W06NW-5b
W06NW-2
W06NW-3
W06NE-5
W06NE-3
W05NW-1
W05NW-2a
W05NW-2b
W06NE-1
RC-W06
W06NE-2
W05SE-2

W6

W05SW-6
W05SW-3
W05SW-1
W05SW-9

W08NE-7
W08NE-6
W08NE-5
W08NE-4
W08NE-2
W08NE-3
W08NE-1

W8

Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex

- 2008 NRCS Slide Review
- 2008 Study Boundary
- Sections
- Upland Soil Cores
- Upland Photo Locations

For Complete Upland Location ID's
See Exhibit 8 and Table 2

N

EXHIBIT 7A
Will Township Sections 5, 6 and 8
Monee Township Section 31
2008 AND 2009 ALL INVESTIGATED AREAS
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 500 1,000 2,000 3,000 Feet

W4
W3
W9
W10
W03NW-2
W04SW-10
W04SW-1a
W04SW-1b
W04SW-1c
W04SE-2c
W04SE-10
W03SW-1
W04SW-9
W04SW-12
W04SW-3b
W04SW-3a
W04SE-14
BWC-W04c
BWC-W03
W04SW-7
W04SW-8
BWC-W04b
W04SE-15
W04SE-2b
BWC-W04a
W04SW-14
W04SE-2a
W03SE-1
W04SE-1b
W04SE-5
W04SW-2
W04SE-1a
W09NE-2
W10NW-1
W10NE-2
BWC-W10
W10NE-1
BWC-W09a
W10NE-4
BWC-W09b
W10NE-3
W09SW-3

Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex

- 2008 NRCS Slide Review
- 2008 Study Boundary
- Sections
- Upland Soil Cores
- Upland Photo Locations

For Complete Upland Location ID's See Exhibit 8 and Table 2

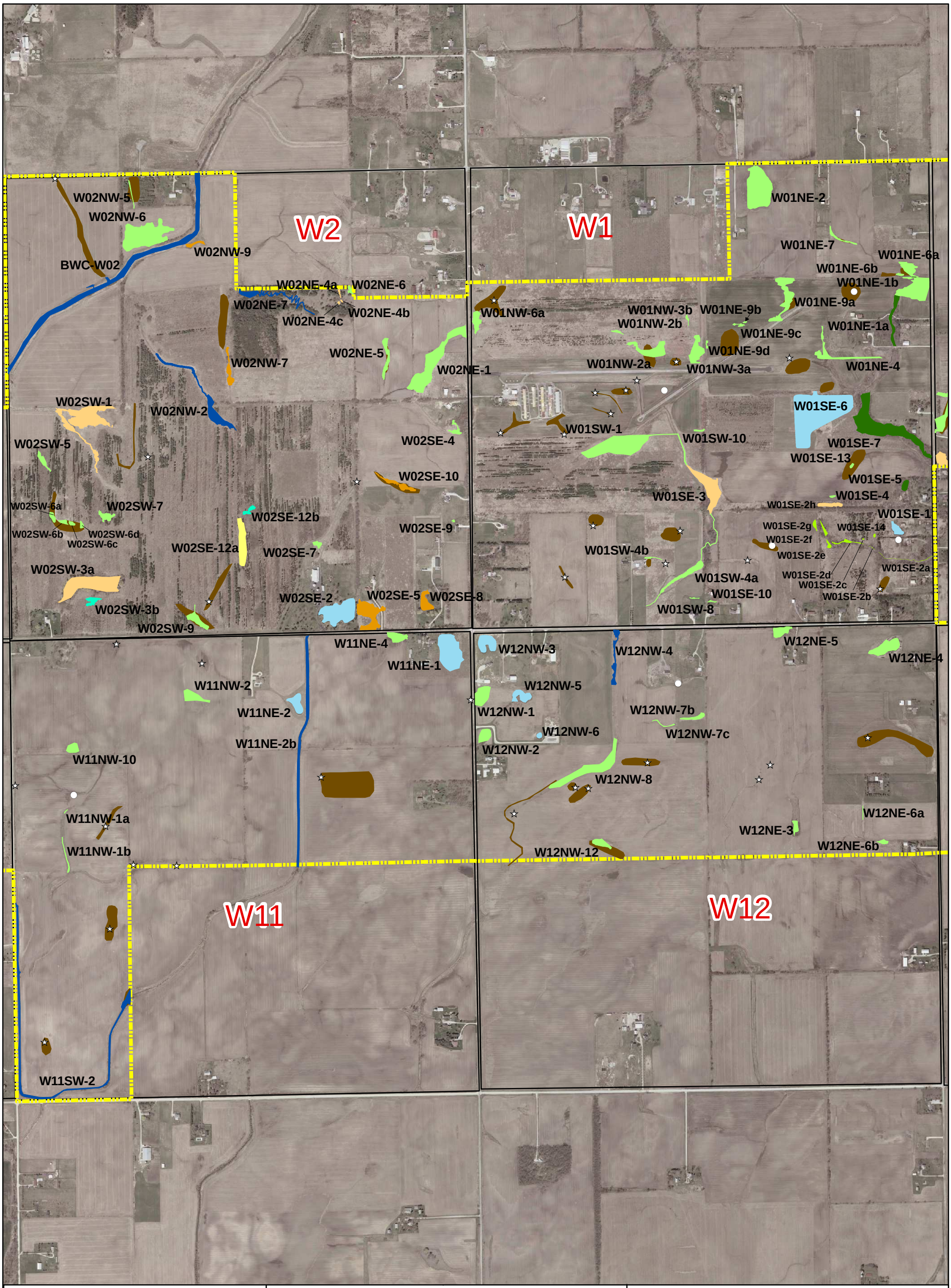
N

EXHIBIT 7B
Will Township Sections 3, 4, 9 and 10
2008 AND 2009 ALL INVESTIGATED AREAS
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 500 1,000 2,000 3,000 Feet



Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex
- 2008 NRCS Slide Review
- 2008 Study Boundary
- Sections
- ○ Upland Soil Cores
- ☆ Upland Photo Locations

For Complete Upland Location ID's See Exhibit 8 and Table 2

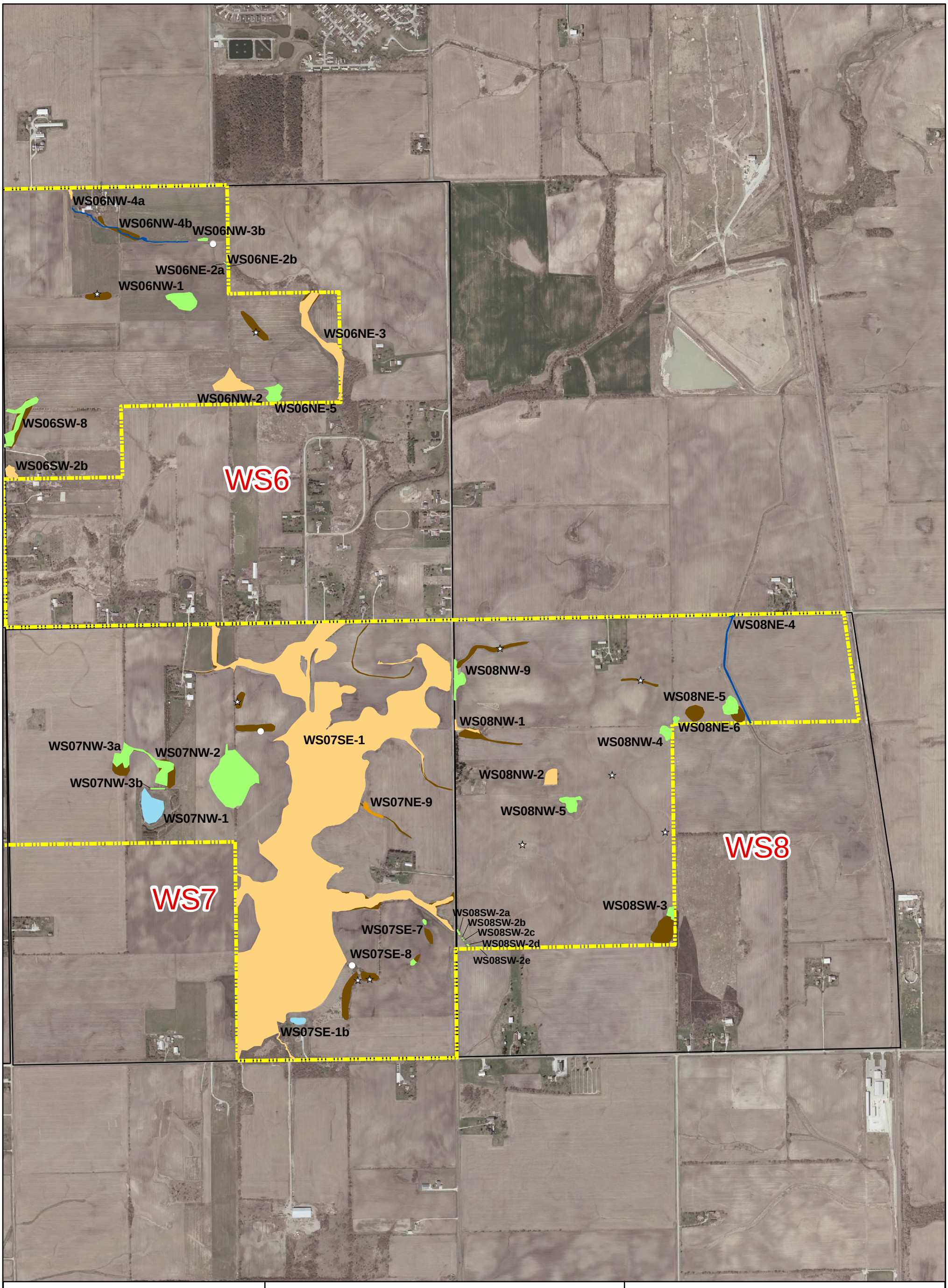
N

EXHIBIT 7C
Will Township Sections 1, 2, 11 and 12
2008 AND 2009 ALL INVESTIGATED AREAS
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 500 1,000 2,000 3,000 Feet



Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex
- 2008 NRCS Slide Review
- 2008 Study Boundary
- Sections
- Upland Soil Cores
- Upland Photo Locations

For Complete Upland Location ID's See Exhibit 8 and Table 2

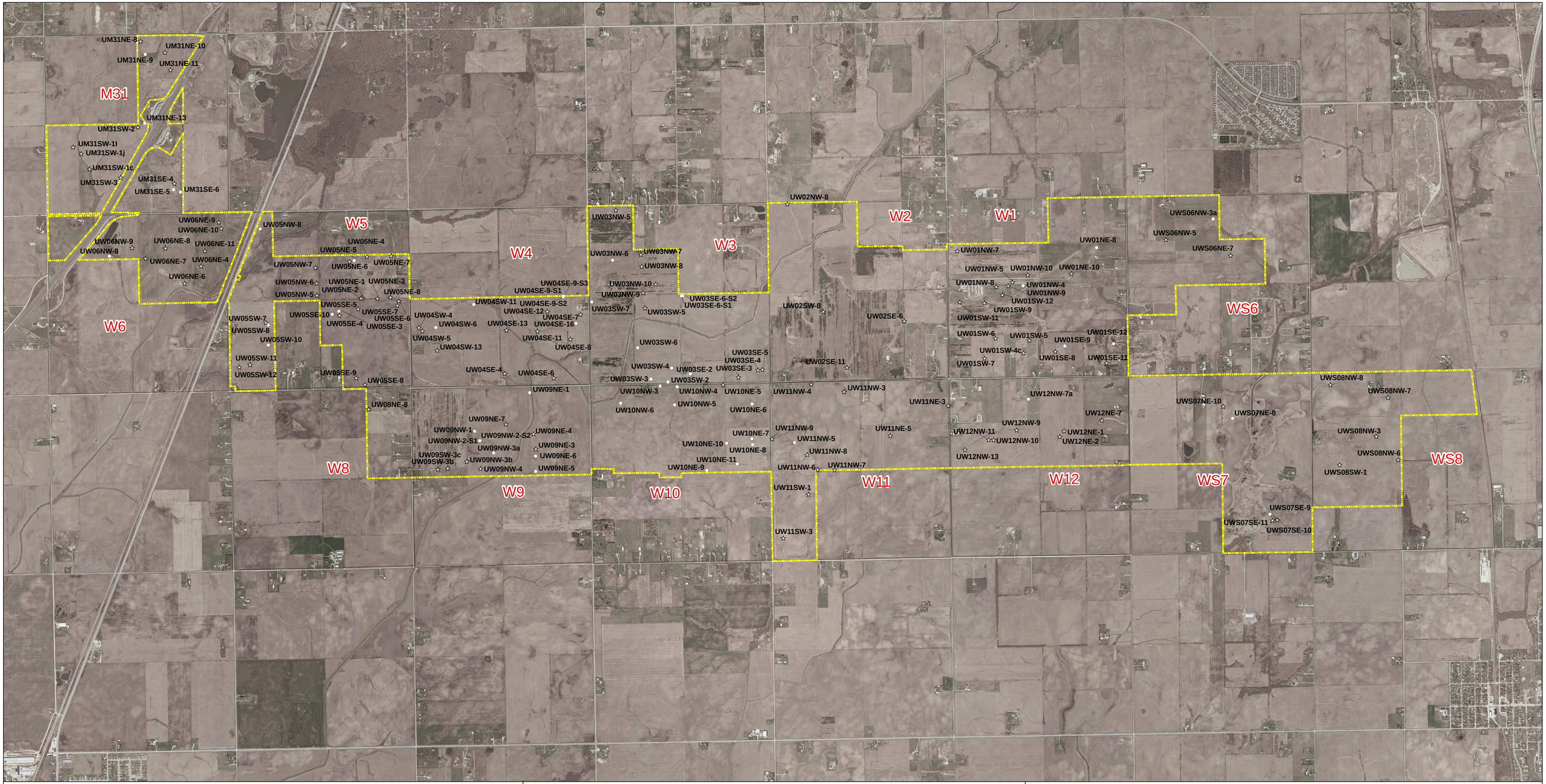
N

EXHIBIT 7D
Washington Township Sections 6, 7 and 8
2008 AND 2009 ALL INVESTIGATED AREAS
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 500 1,000 2,000 3,000 Feet



Legend

- 2008 Study Boundary
- Sections
- ○ Upland Soil Cores
- ☆ Upland Photo Locations

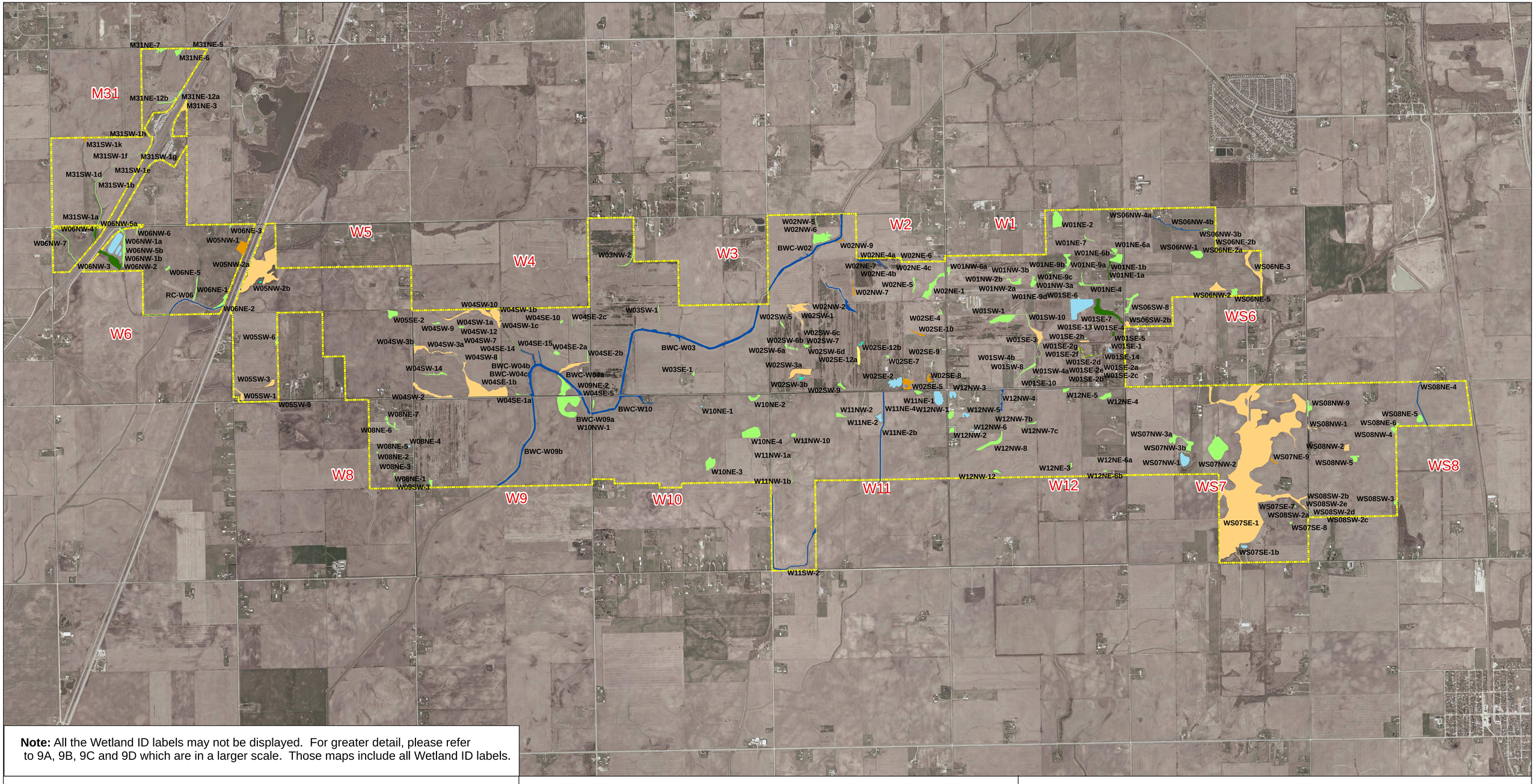
N

EXHIBIT 8
UPLAND AREAS INVESTIGATED
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2,000 4,000 8,000 12,000 Feet



Note: All the Wetland ID labels may not be displayed. For greater detail, please refer to 9A, 9B, 9C and 9D which are in a larger scale. Those maps include all Wetland ID labels.

Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex
- 2008 Study Boundary
- Sections

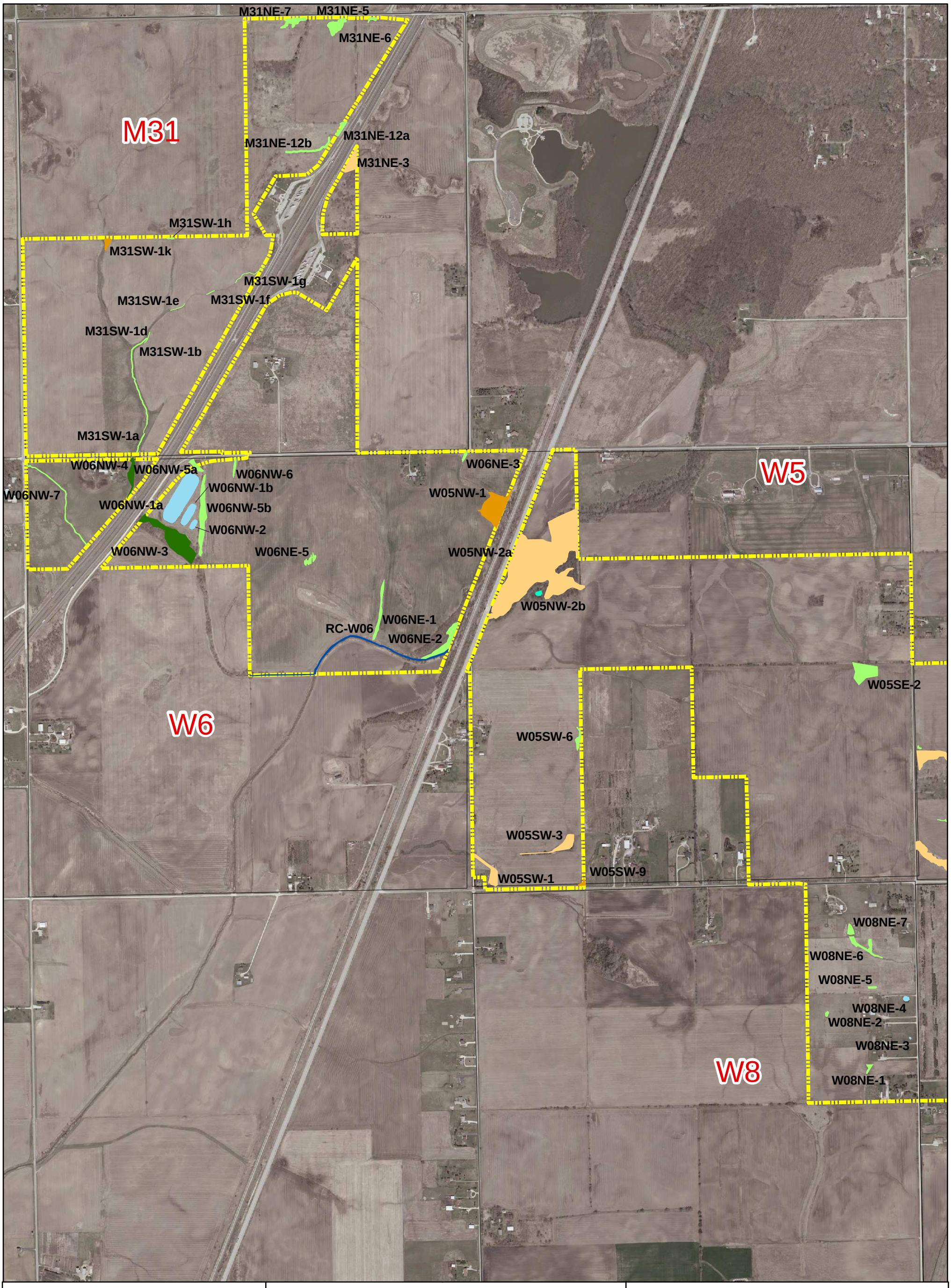
N

EXHIBIT 9
2008 AND 2009 WETLANDS IDENTIFIED
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 2,000 4,000 8,000 12,000 Feet



Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex

- 2008 Study Boundary
- Sections

N

EXHIBIT 9A
Will Township Sections 5, 6, and 8
Monee Township Section 31
2008 AND 2009 WETLANDS IDENTIFIED
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 500 1,000 2,000 3,000 Feet

W4
W3
W03NW-2
W04SW-10
W04SW-9
W04SW-1b
W04SW-1c
W04SW-1a
W04SE-10
W04SE-2c
W04SW-12
W04SW-3b
W04SW-3a
W04SE-14
BWC-W04c
W04SE-15
W04SW-7
W04SE-2b
W04SW-8
BWC-W04b
BWC-W04a
W04SW-14
W04SE-2a
W04SE-1b
W04SE-5
W04SW-2
W04SE-1a
W03SW-1
BWC-W03
W03SE-1
W09NE-2
W10NW-1
BWC-W10
W10NE-2
W10NE-1
BWC-W09a
W10NE-4
W08NE-4
BWC-W09b
W08NE-3
W10NE-3
W09SW-3
W9
W10

Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex

- 2008 Study Boundary
- Sections

N

EXHIBIT 9B
Will Township Sections 3, 4, 9 and 10
2008 AND 2009 WETLANDS IDENTIFIED
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 500 1,000 2,000 3,000 Feet

W2
W1
W11
W12
W02NW-5
W02NW-6
W02NW-9
BWC-W02
W02NE-4a
W02NE-6
W02NE-7
W02NE-4b
W02NE-4c
W02NW-7
W02NE-5
W02SW-1
W02NW-2
W02NE-1
W02SW-5
W02SE-4
W02SE-10
W02SW-6a
W02SW-7
W02SW-6d
W02SW-6b
W02SW-6c
W02SE-12b
W02SE-12a
W02SE-9
W02SE-7
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W02SW-3b
W02SE-2
W02SE-8
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W01NE-1a
W01NE-1b
W01NW-6a
W01NW-3b
W01NE-9b
W01NE-9a
W01NE-9c
W01NW-2b
W01NE-9d
W01NW-2a
W01NW-3a
W01NE-4
W01SE-6
W01SW-1
W01SW-10
W01SE-7
W01SE-13
W01SE-4
W01SE-5
W01SE-3
W01SE-2h
W01SE-1
W01SE-2g
W01SE-2f
W01SE-14
W01SE-2e
W01SW-4b
W01SE-2d
W01SE-2c
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W01SE-2b
W01SW-4a
W01SW-8
W01SE-10
W11NE-4
W11NE-1
W12NW-3
W12NW-4
W12NE-5
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W11NW-2
W12NW-5
W11NE-2
W12NW-1
W12NW-7b
W12NW-6
W12NW-7c
W11NW-10
W11NE-2b
W12NW-2
W12NW-8
W11NW-1a
W12NE-6a
W12NE-3
W11NW-1b
W12NW-12
W12NE-6b
W11SW-2

Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex

- 2008 Study Boundary
- Sections

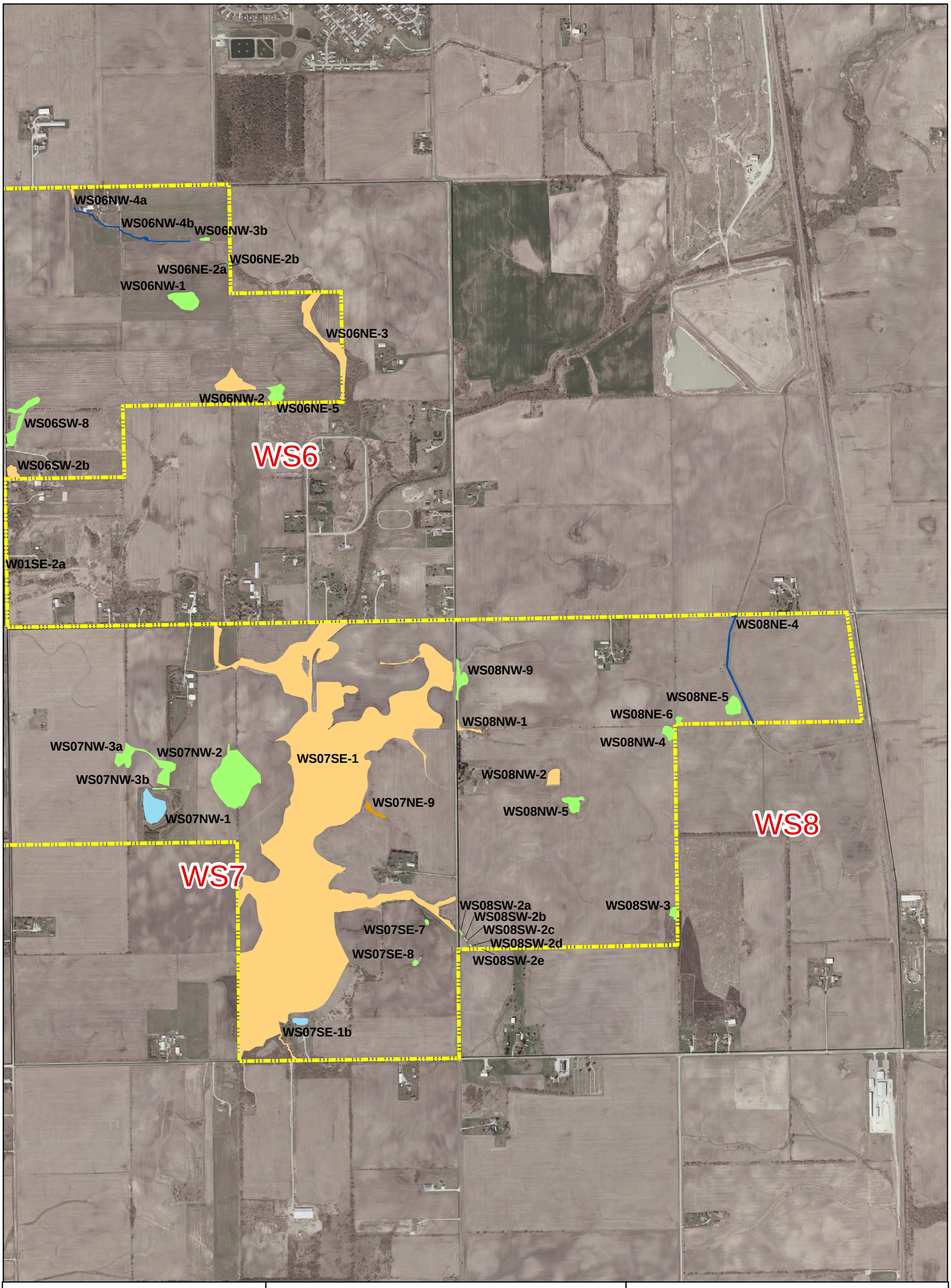
N

EXHIBIT 9C
Will Township Sections 1, 2, 11 and 12
2008 AND 2009 WETLANDS IDENTIFIED
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 500 1,000 2,000 3,000 Feet



Legend

Wetland Type

- PEM
- PSS
- PFO
- PEM/PFO
- PSS/PEM
- PFO/PSS
- POW
- Stream
- Wetland Complex

- 2008 Study Boundary
- Sections

N

EXHIBIT 9D
WashingtonTownship Sections 6, 7, and 8
2008 AND 2009 WETLANDS IDENTIFIED
South Suburban Airport

Illinois Department of Transportation
Division of Aeronautics

AECOM

0 500 1,000 2,000 3,000 Feet

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