Final
Threatened and Endangered Species Survey Report for the Site-Specific Environmental Assessment for the Great Lakes National Cemetery – Phase 2 Expansion Holly, Michigan

Prepared for:

US Department of Veterans Affairs
Office of Construction and Facilities Management (003C4B)
425 I Street, NW
Washington, DC 20001

Gordon William H. Gordon Associates, Inc
4501 Daly Drive
Chantilly VA 20151

Prepared by:

Mabbett & Associates, Inc.
5 Alfred Circle
Bedford, MA 01730

June 28, 2019

Contents

1.0 Introduction 1
2.0 Methodology 1
2.1 Background Research 1
2.2 Field Survey 2
2.3 Results 2
2.3.1 Federal and State-Listed Species 2
2.3.2 Bald Eagle and Golden Eagle Protection Act 5
2.3.3 Migratory Bird Treaty Act 5
3.0 Conclusions 6
4.0 Works Cited 6

Table 1. Federal and State-Listed Endangered or Threatened Species with the Potential to Occur within the Survey Area in Holly, Oakland County, MI 2

ATTACHMENTS

Attachment A – Figure 1 and Photograph Log
Attachment B – USFWS IPaC and MNFI Reports

1.0 Introduction

The U.S. Department of Veterans Affairs (VA) Office of Construction and Facilities Management (OCFM) is proposing to construct and operation the Phase 2 expansion at the Great Lakes National Cemetery (GLNC) at 4200 Belford Road, Holly Township, Oakland County, Michigan. GLNC is bounded by Belford Road to the north, Holly Road to the west, Lahring Road to the south, and Fagan Lake and Fagan Road to the east (see **Figure 1**, **Attachment A**). The Phase 2 expansion would occur within an approximately 30-acre area in the central western portion of the existing GLNC property. This portion of GLNC is currently improved with leased agricultural fields under production for soybeans, a gravel-covered roadway, and unimproved forested and wetland areas.

The proposed Phase 2 expansion would provide approximately 9,600 pre-placed double-depth crypts, 6,600 in-ground cremation sites, 12,070 columbarium niches, and 300 over-sized pre-placed double-depth crypts; roadways connecting existing and new burial sections; two additional cortege lanes; additional parking at the assembly area and committal shelters; a new committal service shelter; additions to the public restrooms; maintenance complex improvements; a new materials storage shelter; grading for stormwater management; and associated landscaping, site furnishings, irrigation, and infrastructure improvements. The Proposed Action would extend the longevity of the GLNC for approximately 10 years and accommodate long-term burial needs of future generations of Veterans and their families in the Detroit metropolitan area.

The threatened and endangered species survey was performed by VA contractors to evaluate the proposed Phase 2 expansion area for potential federal and state protected species and their habitat in accordance with the Endangered Species Act (ESA) (16 US Code [USC] 1531 *et seq.*), Bald and Golden Eagle Protection Act (BGEPA;16 USC 668), and Michigan Natural Resources and Environmental Protection Act of 1994. This report was prepared to document the survey methodology, findings, and recommendations to avoid and/or minimize potential adverse impacts to wildlife and their habitat.

2.0 Methodology

2.1 Background Research

Prior to the field visit and survey, AECOM conducted a desktop analysis to ascertain the federal or state-listed species known, or with potential, to occur in Oakland County, Michigan. Geo-spatial data (e.g. state hydrological data) was also obtained from available online sources. These data were then used to target areas of potential suitable habitat for federal or state protected species during the field survey.

Online sources consulted as part of this exercise included:

- US Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) database (see **Attachment B**);
- Michigan Natural Features Inventory (MNFI) (see **Attachment B**);
- USFWS National Wetland Inventory (NWI);
- US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey for Oakland County, Michigan; and
- US Geological Survey (USGS) 7.5-minute topographic quadrangle for Davisburg, Michigan.

2.2 Field Survey

On 10 May 2019, VA's team of qualified biologists conducted a pedestrian survey of the proposed Phase 2 expansion area ("survey area") to identify federal and state protected species and their habitat with the potential to occur in the survey area. Three primary vegetative communities were identified within the survey area during the pedestrian survey: maintained lawn, agricultural field, and lowland deciduous forest (see **Photolog**, **Attachment A**). The results of the survey, organized by potential federal and state protected species, are provided in the following section.

The temperature in the morning (8 A.M. – noon) was approximately 50-degree Fahrenheit (°F), increasing to approximately 55°F by 6 P.M. Wind speeds during this period ranged from 9 to 12 miles per hour (mph) from the northwest. The sky was generally overcast throughout the day, with no precipitation recorded. It is noted that approximately 0.5 inches of rainfall were recorded during between May 7 and 9, 2019. The ground during the survey was mostly dry with small isolated areas of ponded rainwater predominately in the forested wetland and low areas within the agricultural field. IT is also noted that the agricultural fields were fallow during the survey period.

2.3 Results

2.3.1 Federal and State-Listed Species

Species with a federal listing of "endangered" or "threatened" are granted protection pursuant to the Endangered Species Act (ESA) of 1976, as amended (16 U.S.C. 1531 *et seq.*). **Table 1** lists the federally and state protected species with the potential to occur in Holly, Oakland County, Michigan based on the USFWS IPaC report and MNFI report (IPaC, 2019; USFWS, 2019d; MNFI, 2019c).

During the field survey, the biologists looked for suitable habitat within the survey area for each of the listed species. The individual federally listed species are described below in more detail; an "effects determination" is made based on the survey results for each pursuant to ESA Section 7.

Table 1. Federal and State-Listed Endangered or Threatened Species with the Potential to Occur within the Survey Area in Holly, Oakland County, MI

Scientific Name	Common Name	Federal Status	State Status	Habitat Present
Eastern massasauga	*Sistrurus catenatus*	T	SC	No
Indiana bat	*Myotis sodalis*	E	E	Yes, Summer
Northern long-eared bat (NLEB)	*Myotis septentrionalis*	T	SC	Yes, Summer
Poweshiek skipperling	*Oarisma poweshiek*	E	T	No
Prairie white-fringed orchid	*Platanthera leucophaea*	T	E	No
Rayed bean (freshwater mussel)	*Villosa fabalis*	E	E	No
Snuffbox (freshwater mussel)	*Epioblasma triquetra*	E	E	No
White lady slipper	*Cypripedium candidum*	--	T	No

Notes:
E – Endangered
T – Threatened
SC – Special Concern

Eastern massasauga

This species has been federally listed as "threatened" since 2016, but no critical habitat has been designated (USFWS, 2019a), and as "special concern" in the State of Michigan (MNFI, 2019f). Eastern massasaugas are small snakes with thick bodies measuring two feet in length, heart-shaped heads and vertical pupils. Coloring is gray or light brown with large, light-edged brown blotches on the back and smaller blotches on the side. The tail has rings of dark brown and is tipped by a gray-yellow set of horny rattles (IPaC, 2019). Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are known from open wetlands and lowland coniferous forests, such as cedar swamps (USFWS, 2019a). The eastern massasauga was last observed in Oakland County, Michigan in 2018 (MNFI, 2019c).

No suitable habitat was observed within the survey area during pedestrian survey conducted on May 10, 2019. Therefore, the proposed GLNC expansion would have ***no effect*** on the eastern massasauga.

Indiana bat

Indiana bats are federally and state-listed as "endangered." The Indiana bat is a small, dullish-gray, migratory bat with a wingspan of 9 to 11 inches. In Michigan, summering Indiana bats typically roost in trees associated with riparian, bottomland, and upland forests from approximately 1 April 1 to 15 October. Indiana bats hibernate during winter in caves or abandoned mines. For hibernation, they require cool, humid, stable temperatures under 50° F but above freezing. Very few caves within the range of the species have these conditions so they tend to hibernate in large numbers (20,000 to 50,000) (USFWS, 2006). Threats to this species include habitat loss, pesticide usage, and disease (e.g., white-nose syndrome).

No potential winter habitat for Indiana bats exists within the survey area (i.e., caves or mines) during the pedestrian survey conducted on May 10, 2019. Potential summer roosting habitat was identified within the survey area. If tree removal is avoided between 1 April and 15 October, the proposed GLNC expansion ***may affect, but is not likely to adversely affect*** the Indiana bat. If this time of year restriction cannot be met, then the expansion may adversely affect the Indiana bat and a permit may be required from USFWS.

Northern long-eared bat

The NLEB is federally listed as "threatened" (USFWS, 2019f), and as "special concern" in the State of Michigan (MNFI, 2019f). The NLEB is a medium-sized, migratory bat with a wingspan of 9 to 10 inches and long ears (USFWS, 2019e). Behavioral patterns of the NLEB are similar to that of the Indiana bat. After hibernating in caves or abandoned mines during the winter, the NLEB migrates to its summer habitat to roost. It prefers wooded areas and roosting under loose tree bark on dead or dying trees (USFWS, 2015b). Threats to this species include habitat loss, pesticide usage, and disease (e.g., white-nose syndrome).

No potential winter habitat for NLEB exists within the survey area (i.e., caves or mines) during the pedestrian survey conducted on May 10, 2019. However, potential summer roosting habitat was identified during survey. If tree removal is avoided between 1 June and 31 July, the proposed GLNC expansion ***may affect, but is not likely to adversely affect*** the NLEB. If this time of year restriction cannot be met, then the expansion may adversely affect the NLEB and a permit may be required from USFWS.

Prairie white-fringed orchid

This species has been federally listed as "threatened" since 1989 and is state-listed as "endangered" (MNFI, 2019e; USFWS, 2019b). The prairie white-fringed orchid is a rare species of orchid native to North America. Each plant has one single flower spike composed of 5 to 40 creamy white flowers (USFWS, 2005). This species is primarily found in moist prairie remnants, particularly those associated with lake plains, but it can also occur in open or semi-open bogs and peaty lakeshores (MNFI, 2019e). This species is threatened by loss of habitat from the drainage and development of wetlands, succession to woody vegetation, competition from non-native species and over-collection by humans (USFWS, 2019b).

No suitable habitat was observed within the survey area during the pedestrian survey conducted on May 10, 2019. Further, the prairie white-fringed orchid was last observed in Oakland County in 1850 (MNFI, 2019c). Therefore, the proposed GLNC expansion would have ***no effect*** on the prairie white-fringed orchid.

Poweshiek skipperling

Poweshiek skipperling was federally listed as "endangered" in 2014 and critical habitat was designated in 2015, including nine units in Michigan (USFWS, 2019h; USFWS, 2015c); it is state-listed as "threatened" (MNFI, 2019d).They are small butterflies found in sedgy meadows, cinquefoil seeps and open fens found in high quality tall grass prairies (USFWS, 2019h). Adults collect nectar from shrubby cinquefoil, white clover, lobelia, and black-eyed Susan during their short, two-week lifespan (USFWS, 2014). Eggs are laid during this time and hatch into larvae in late summer which pupate the next year into adult butterflies in mid-June and mid-July (USFWS, 2014). The primary threat to this species is habitat loss and modification (MNFI, 2019d; USFWS, 2014). The Poweshiek skipperling was last observed in Oakland County, Michigan in 2018 (MNFI, 2019c).

No suitable habitat was observed within the survey area during the pedestrian survey conducted on May 10, 2019. Therefore, the proposed GLNC expansion would have ***no effect*** on the Poweshiek skipperling.

Rayed bean

While the rayed bean is federally and state-listed as "endangered", no critical habitat has been designated (USFWS, 2019i). The rayed bean mussel is a small green or yellowish-green mussel, usually less than 1.5 inches in length (USFWS, 2019j). This species is often buried deep in sand and/or gravel in small, shallow rivers, in and near riffles and often near aquatic vegetation. The rayed bean depends on fish hosts to move larval individuals to other parts of streams (USFWS, 2010). Threats include dams and reservoirs disrupting natural river flow patterns and conditions; loss of host fish reduces movement of populations; pollution and sedimentation from runoff negatively impact the health of streams and the rayed bean (USFWS, 2010). The rayed bean was last observed in Oakland County, Michigan in 2016 (MNFI, 2019c).

No suitable habitat was observed within the survey area during pedestrian survey conducted on May 10, 2019. Therefore, the proposed GLNC expansion would have ***no effect*** on the rayed bean.

Snuffbox

The snuffbox mussel is federally and state-listed as "endangered" (USFWS, 2019c). The snuffbox mussel is triangular to oblong in shape. Females grow up to nearly 2 inches in diameter, while males grow up to nearly 3 inches in diameter. This species prefers sand, gravel, or cobble substrates in swift-flowing streams and rivers, and is typically found buried in sediment. Snuffbox larvae emerge

from eggs and attach to logperch until they develop shells (USFWS, 2019c). Threats to this species include water diverting structures such as dams, declining logperch populations, erosion and sedimentation, and the invasive zebra mussel. This mussel was last observed in Oakland County, Michigan in 2016 (MNFI, 2019a).

No suitable habitat was identified in the survey area during pedestrian survey conducted on May 10, 2019. Therefore, the proposed GLNC expansion would have ***no effect*** on the snuffbox mussel.

2.3.2 Bald Eagle and Golden Eagle Protection Act

Bald eagles are protected under BGEPA, which prohibits the take, possession, transport, or sale of live or dead eagles and their parts, nests, or eggs unless authorized by permit. Habitat for the bald eagle (*Haliaeetus leucocephalus*) primarily consists of mature forest in proximity to large bodies of open water for foraging. Large, dominant trees are utilized for nesting sites, typically within one mile of open water. A desktop GIS assessment of the study area, as well as the area within one mile of the project limits, was performed on 10 May 2019 using aerial imagery from 2018. Several waterbodies large enough or sufficiently open to be considered potential feeding sources were identified within one mile of the study area, including the nearby Fagan Lake and Round Lake.

During the pedestrian survey conducted on 10 May 2019, one active bald eagle nest was observed in the wooded area adjacent to Round Lake within 300 feet of the survey area near Fagan Road (approximately 42.848484 E, -83.613230 N) (**see Figure 1, Attachment** A).

The proposed project activities may fall under Category B of the National Bald Eagle Management Guidelines, which includes: building construction of one to two story buildings with a greater than 0.5-acre footprint; building construction of three or more story buildings; installation or expansion of marinas with a capacity of 6 or more boars; mining and associated activities; and oil and natural gas drilling, refining, and associated activities. The proposed project would entail construction activities with a greater than 0.5-acre footprint.

The USFWS Midwest Region provides the following recommendations for avoiding the incidental take of bald eagles during construction or development activity, for bald eagle nests that are visible from the project site:

> (1) Maintain a buffer of at least 660 feet (200 meters) between your project activities and the nest (including active and alternate nests). If a similar activity is closer than 660 feet, then you may maintain a distance buffer as close to the nest as the existing tolerated activity.
>
> (2) If you perform your activity closer than 660 feet due to a similar activity existing closer than 660 feet, then restrict all clearing, external construction, and landscaping activities within 660 feet of the nest to outside the nesting season (i.e., outside the nesting season is from August through mid-January in the Midwest).
>
> (3) Maintain established landscape buffers that screen the activity from the nest.

By signing a commitment to adopt these recommendations, the incidental take of bald eagles is unlikely to occur.

2.3.3 Migratory Bird Treaty Act

The MBTA is an international agreement among the United States, Canada, and Mexico that protects designated migratory species. More than 1,000 species are protected under this act. The MBTA controls the take of these birds, their nests, eggs, parts, or products.

Seven migratory species, identified in the IPaC report (**Attachment B**), have the potential to occur within or near the proposed GLNC expansion. The proposed expansion area is located within the Mississippi Flyway, a main migratory route generally following the path of the Mississippi River and its tributaries. Approximately 325 species utilize this flyway to travel from breeding grounds in Canada and the northern United States to wintering grounds along the Gulf of Mexico and in Central and South America (National Audubon Society, 2019). Potentially suitable stopover habitat is present on-site due to the nearby Fagan Lake and Round Lake, as well as different vegetation communities (e.g., maintained lawn, agricultural field, and lowland deciduous forest). These factors combined provide likely sources of food, water, and nesting habitat for migratory species.

Temporary construction-related disturbances, such as vegetation clearing and excess noise, may disturb or displace migratory species. To minimize or avoid impacts, proposed project activities must adhere to seasonal nesting restrictions and take place outside of the nesting season for most migratory birds (mid-May through late August).

3.0 Conclusions

Of the seven federal and state-listed species with the potential to occur in the survey area (Attachment B), only the Indiana bat and NLEB have potentially suitable habitat on-site. The proposed project would have no effect on the eastern massasauga, Poweshiek skipperling, prairie fringed-white orchid, rayed bean, and snuffbox because they are not anticipated to occur within the survey area due to a lack of suitable habitat.

No potential winter habitat for the Indiana bat and NLEB exists within the expansion area (i.e., caves or mines). However, potential summer roosting habitat was identified during survey for both species. The project would meet the final rule 4(d) exemption for the NLEB due to the lack of known maternity roosting trees within the study area or hibernacula within 0.25 miles, and the study area being located outside watersheds within known hibernacula. If tree removal restrictions are adhered to, the proposed GLNC expansion may affect, but is not likely to adversely affect the Indiana bat and NLEB.

In addition, there is suitable habitat on-site for bald eagles and possibly for other migratory birds. To avoid the incidental take of bald eagles or their young, the proposed expansion may adopt USFWS Mdwest Region recommendations for buffers; time of year restrictions on selected activities; and maintaining landscape buffers. To avoid impacts on migratory birds, clearing activities must occur outside of the nesting season for most migratory species.

Informal consultation with the USFWS during the National Environmental Policy Act process should be conducted to confirm the effects determinations identified for the federally protected species described above in accordance with Section 7 of the ESA, BGEPA, and MBTA.

4.0 Works Cited

IPaC. (2019). *Explore Location*. Retrieved 05 22, 2019, from Information for Planning and Consultation: https://ecos.fws.gov/ipac/location/6J3AIFUDLBFLBJMBKKQWZX7NQY/resources

IUCN Redlist. (2019). *Rusty Patched Bumble Bee*. Retrieved 05 22, 2019, from IUCN Red List: https://www.iucnredlist.org/species/44937399/46440196

MNFI. (2019a). *Epioblasma triquetra: Snuffbox*. Retrieved 05 22, 2019, from Plants and Animals: https://mnfi.anr.msu.edu/species/description/12365/Epioblasma-triquetra

MNFI. (2019b). *Nicrophorus americanus American burying beetle*. Retrieved 05 23, 2019, from Plants and Animals: https://mnfi.anr.msu.edu/species/description/11553/Nicrophorus-americanus

MNFI. (2019c). *Oakland County*. Retrieved 05 22, 2019, from County Element Data: https://mnfi.anr.msu.edu/resources/county-element-data

MNFI. (2019c). *Oakland County*. Retrieved 05 22, 2019, from County Element Data: https://mnfi.anr.msu.edu/resources/county-element-data

MNFI. (2019d). *Oarisma poweshiek Poweshiek skipperling*. Retrieved 05 23, 2019, from Plants and Animals: https://mnfi.anr.msu.edu/species/description/11594/Oarisma-poweshiek

MNFI. (2019e). *Platanthera leucophaea Prairie white-fringed orchid*. Retrieved 05 23, 2019, from https://mnfi.anr.msu.edu/species/description/15534/Platanthera-leucophaea

MNFI. (2019f). *Sistrurus catenatus Eastern massasauga*. Retrieved 05 23, 2019, from Plants and Animals: https://mnfi.anr.msu.edu/species/description/11519/Sistrurus-catenatus

USFWS. (2005). *Eastern Prairie Fringed Orchid (Platanthera leucophaea).* Retrieved 05 23, 2019, from https://www.fws.gov/midwest/endangered/plants/pdf/epfo-cifo.pdf

USFWS. (2006). *Indiana Bat Myotis sodalis Fact Sheet.* Retrieved 05 23, 2019, from https://mnfi.anr.msu.edu/resources/county-element-data

USFWS. (2010, 10). *Rayed bean (freshwater mussel) Vilosa fabalis Fact Sheet*. Retrieved 05 23, 2019, from https://www.fws.gov/cookeville/pdfs/Rayed%20Bean%20Fact%20Sheet.pdf

USFWS. (2014). *Poweshiek Skipperling Oarisma poweshiek Fact Sheet.* Retrieved 05 23, 2019, from https://www.fws.gov/midwest/Endangered/insects/posk/pdf/poskFactSheetOct2014.pdf

USFWS. (2015a). *Copperbelly water snake (Nerodia erythrogaster neglecta) Fact Sheet.* Retrieved 05 23, 2019, from https://www.fws.gov/midwest/endangered/reptiles/cws/pdf/NCWSFactSheetMay2015.pdf

USFWS. (2015b). *Northern Long-Eared Bat Myotis septentrionalis.* Retrieved 05 23, 2019, from https://www.fws.gov/midwest/Endangered/mammals/nleb/pdf/NLEBFactSheet01April2015.pdf

USFWS. (2015c). *Poweshiek Skipperling Critical Habitat.* Retrieved 05 23, 2019, from https://www.fws.gov/midwest/Endangered/insects/posk/fCHmaps/poskchMI.pdf

USFWS. (2017). *Rusty Patched Bumble Bee Bombus affinis.* Retrieved 05 22, 2019, from https://www.fws.gov/midwest/endangered/insects/rpbb/pdf/RPBBFactSheet10Jan2017.pdf

USFWS. (2019a). *Eastern Massasauga (Sistrurus catenatus)*. Retrieved 05 23, 2019, from ECOS Environmental Conservation Online System: https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=C03P

USFWS. (2019b). *Eastern prairie fringed orchid (Platanthera leucophaea)*. Retrieved 05 23, 2019, from ECOS Environmental Conservation Online System: https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=601

USFWS. (2019c, 05 17). *Fact Sheet: Snuffbox (freshwater mussel): Epioblasma triquetra*. Retrieved 05 22, 2019, from Midwestern Region Endangered Species: https://www.fws.gov/midwest/Endangered/clams/snuffbox/SnuffboxFactSheet.html

USFWS. (2019d, 05 17). *Michigan: County Distribution of Federally-Listed Endangered and Threatened Species*. Retrieved 05 22, 2019, from Midwest Region Endangered Species: https://www.fws.gov/midwest/Endangered/lists/michigan-cty.html

USFWS. (2019e). *Northern Long-eared Bat (Myotis septentrionalis)*. Retrieved 05 23, 2019, from ECOS Species Profile for Northern long-eared Bat (Myotis septentrionalis): https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A0JE

USFWS. (2019f, 05 17). *Northern Long-eared Bat Archives*. Retrieved 05 23, 2019, from Midwest Region Endangered Species: https://www.fws.gov/midwest/Endangered/mammals/nleb/archives.html

USFWS. (2019g, 05 17). *Northern Riffleshell*. Retrieved 05 22, 2019, from Midwest Region Endangered Species: https://www.fws.gov/midwest/Endangered/clams/n-riffleshell.html

USFWS. (2019h). *Poweshiek skipperling (Oarisma poweshiek)*. Retrieved 05 23, 2019, from ECOS Environmental Conservation Online System: https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=I0W1

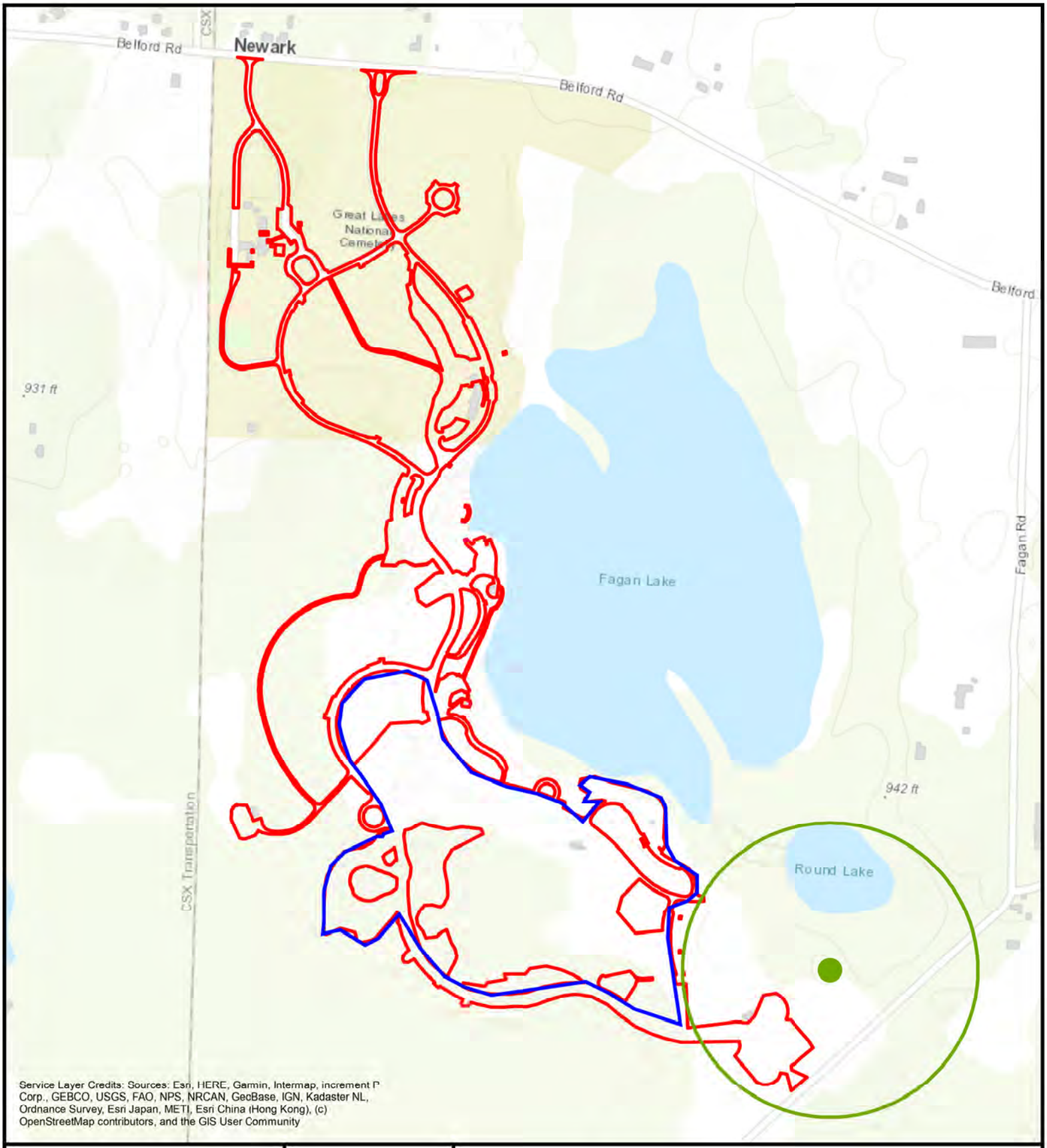
USFWS. (2019i). *Rayed Bean (Villosa fabalis)*. Retrieved 05 23, 2019, from ECOS Environmental Conservation Online System: https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=F01A

USFWS. (2019j, 05 17). *Rayed Bean and Snuffbox Mussels*. Retrieved 05 23, 2019, from Midwest Region Endangered Species: https://www.fws.gov/midwest/Endangered/clams/rayedbean/FR_FinalRuleList_RayedBeanSnuffboxFeb2012.html

USFWS. (2019k, 04 08). *Rusty Patched Bumble Bee Map*. Retrieved 05 22, 2019, from Endangered Species: https://www.fws.gov/midwest/endangered/insects/rpbb/rpbbmap.html

Attachment A

Figure 1 and Photograph Log



VA OCFM
Great Lakes National Cemetery

N

0 250 500
Feet

May 2019
GCS WGS 1984
This map is for reference only.

Legend

- Project Study Area
- 660-Foot Buffer Zone
- Approximate Location of Active Bald Eagle Nest
- Phase 2 Expansion Disturbance Area

Project:
VA OCFM GLNC

PHOTOGRAPH LOG

Photo No.	**Date:**
1	5/10/19

Description:

Typical view of open field with maintained lawn within the study area.

Photo No.	**Date:**
2	5/10/19

Description:

Typical view of agricultural land within the study area.

Project:
VA OCFM GLNC

PHOTOGRAPH LOG

Photo No. 3	**Date:** 5/10/19
Description: Typical view of forested land within the study area.	

Photo No. 4	**Date:** 5/10/19
Description: View looking east at bald eagle nest located in woods outside of the study area near Round Lake.	

Attachment B

USFWS IPaC and MNFI Reports

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
Phone: (517) 351-2555 Fax: (517) 351-1443
http://www.fws.gov/midwest/endangered/section7/s7process/step1.html

In Reply Refer To: May 03, 2019
Consultation Code: 03E16000-2019-SLI-0470
Event Code: 03E16000-2019-E-01156
Project Name: Great Lakes National Cemetery

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Fish and Wildlife Service if they determine their project may affect listed species or critical habitat.

There are several important steps in evaluating the effects of a project on listed species. Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website athttp://www.fws.gov/midwest/endangered/section7/s7process/index.html. This website contains step-by-step instructions to help you determine if your project may affect listed species and lead you through the section 7 consultation process.

Under 50 CFR 402.12(e) (the regulations that implement section 7 of the Endangered Species Act), the accuracy of this species list should be verified after 90 days. You may verify the list by visiting the ECOS-IPaC website (http://ecos.fws.gov/ipac/) at regular intervals during project planning and implementation and completing the same process you used to receive the attached list.

For all **wind energy projects** and **projects that include installing towers that use guy wires or are over 200 feet in height**, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project area or may be affected by your proposed project.

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

Although no longer listed under the Endangered Species Act, bald eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*) and Migratory Bird Treaty Act (16 U.S.C. 703 *et seq*), as are golden eagles. Projects affecting these species may require measures to avoid harming eagles or may require a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at http://www.fws.gov/midwest/midwestbird/EaglePermits/index.html to help you avoid impacting eagles or determine if a permit may be necessary.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit http://www.fws.gov/migratorybirds/AboutUS.html.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries

- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
(517) 351-2555

Project Summary

Consultation Code: 03E16000-2019-SLI-0470

Event Code: 03E16000-2019-E-01156

Project Name: Great Lakes National Cemetery

Project Type: LAND - CLEARING

Project Description: Phase II of Cemetery Development

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.8534722809244N83.6197315294576W

Counties: Oakland, MI

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/1/office/31410.pdf	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/10043/office/31410.pdf	Threatened

Reptiles

NAME	STATUS
Eastern Massasauga (=rattlesnake) *Sistrurus catenatus*	Threatened

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:

- All Projects: Project is Within EMR Range
- All Projects: Tier 2 EMR Habitat Present

Species profile: https://ecos.fws.gov/ecp/species/2202
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/7800/office/31410.pdf

Clams

NAME	STATUS
Rayed Bean *Villosa fabalis*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/5862
Species survey guidelines:
https://ecos.fws.gov/ipac/guideline/survey/population/6062/office/31410.pdf

Snuffbox Mussel *Epioblasma triquetra*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/4135
Species survey guidelines:
https://ecos.fws.gov/ipac/guideline/survey/population/5281/office/31410.pdf

Insects

NAME	STATUS
Poweshiek Skipperling *Oarisma poweshiek*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/9161

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Long-eared Owl *asio otus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Willow Flycatcher *Empidonax traillii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for

that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

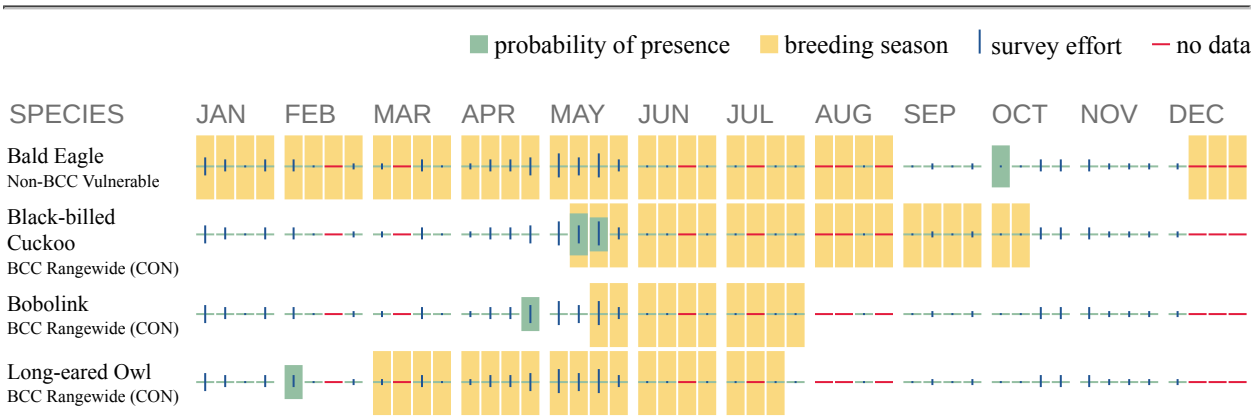
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

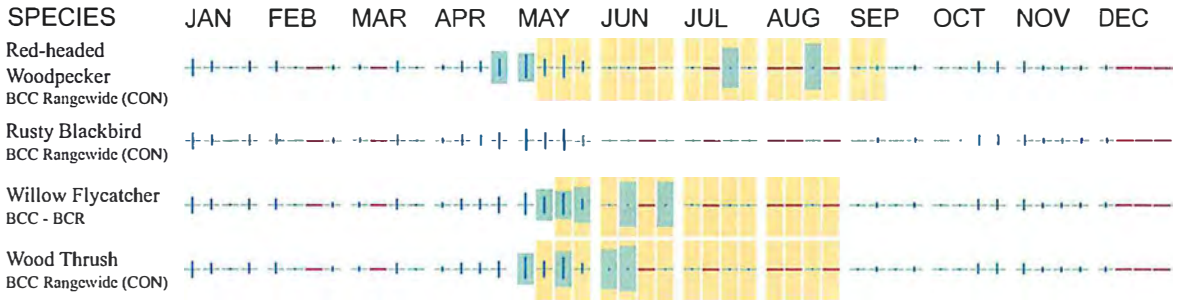
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act

requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can

implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- PEM1C

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1C

RIVERINE

- R5UBFx
- R5UBH

Michigan Natural Features Inventory Information Request

Requestor: Clara Austin

Project Name: Great Lakes National Cemetery - T & E Species Information

Project Location: Holly, MI

Date Created: 05/02/2019

Use of Data

By acceptance of the information services made available through MNFI the recipient understands that access to the information is provided for primary use only. MNFI requests that the user respect the confidential and sensitive nature of the information. There should be no redistribution of the information. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection. Additionally, since the information is constantly being updated MNFI requests that any information service provided by MNFI is destroyed upon completion of the primary use. This information is valid for one year only.

The recipient(s) of the information understand that state endangered and threatened species are protected under state law (Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection). Any questions, observations, new findings, violations or clearance of project activities should be conducted with the Michigan Department of Natural Resources, Wildlife Division. Contact the Endangered Species Coordinator at (517) 284-9453. The recipient(s) of the information understand that federally endangered and threatened species are protected under federal law (Endangered Species Act of 1973). Any questions, observations, new findings, violations or clearance of project activities should be conducted with the U.S. Fish and Wildlife Service in East Lansing at (517) 351-2555. Recipients of the information are responsible for ensuring the protection of protected species and obtaining proper clearance before project activities begin.

Description of Data

The species in this report are listed alphabetically by scientific name. Each record from the database is listed individually. Therefore you may see multiple listings for the same species. The locational and survey date information may be the only differentiating factors when looking at multiple occurrences for a given species. Heritage methodology is followed when entering species occurrences into the MNFI database. Detailed information on heritage methodology can be obtained from NatureServe's website at http://www.natureserve.org. Detailed information on the species listed in this report can be found in abstracts and the rare species explorer on the MNFI website at https://mnfi.anr.msu.edu.

The MNFI database is an ongoing and continuously updated information base. The database is the only comprehensive single source of existing information on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. This database cannot provide a definitive statement on the presence, absence, or condition of the natural features in any given locality, since most sites have not been specifically or thoroughly surveyed for their occurrence. Some of the element records are historical. While this historical information may not be important for regulatory purposes, it is important for management and restoration purposes and for scientific use. Furthermore, plant and animal populations and natural communities change with time. Therefore, the information services provided should not be regarded as a complete statement on the occurrence of special natural features of the area in question. In many cases the information may require the interpretation of a trained scientist.

Any comments or questions can be directed to MNFI via our e-mail at mnfi@msu.edu or by calling 517-284-6200.

Plants and Animals

Scientific Name	Common Name	State Status	Federal Status	Count
Cypripedium candidum	White lady slipper	T		1
Platanthera leucophaea	Prairie white-fringed orchid	E	LT	1
Sistrurus catenatus	Eastern massasauga	SC	LT	2

Number of Species: 3 **Number of Occurrences: 4**

There should be no redistribution of these data. MNFI requests that the user respect the confidential and sensitive nature of these data. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection.

Natural Communities

Community Type	Count
Southern Hardwood Swamp	1
Great Blue Heron Rookery	1
Dry-mesic Southern Forest	1

Number of Community Types: 3 **Number of Occurrences: 3**

There should be no redistribution of these data. MNFI requests that the user respect the confidential and sensitive nature of these data. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection.

Michigan Natural Features Inventory Information Request

Cypripedium candidum

White lady slipper **Vascular Plant**

Federal Status: **State Status:** T **Global Rank:** G4 **State Rank:** S2

Last Observed Date: 1961-06-09

County: Oakland

Watershed: Flint

Town Range	Section
T05NR07E	13, 14, 23, 24, 25, 26

Dry-mesic Southern Forest

Federal Status: **State Status:** **Global Rank:** G4 **State Rank:** S3

Last Observed Date: 2011-06-16

County: Oakland

Watershed: Flint

Town Range	Section
T05NR07E	13, 24

There should be no redistribution of these data. MNFI requests that the user respect the confidential and sensitive nature of these data. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection.

Great Blue Heron Rookery

Great Blue Heron Rookery

Animal Assemblage

Federal Status: **State Status:** **Global Rank:** G5 **State Rank:** SU

Last Observed Date: 1981-05-23

County: Oakland

Watershed: Flint

Town Range	Section
T05NR07E	9, 16

Platanthera leucophaea

Prairie white-fringed orchid

Vascular Plant

Federal Status: LT **State Status:** E **Global Rank:** G2G3 **State Rank:** S1

Last Observed Date: 1884-pre

County: Genesee

Watershed: Flint

Town Range	Section
T06NR07E	35

There should be no redistribution of these data. MNFI requests that the user respect the confidential and sensitive nature of these data. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection.

Sistrurus catenatus

Eastern massasauga

Vertebrate Animal

Federal Status: LT **State Status:** SC **Global Rank:** G3 **State Rank:** S3

Last Observed Date: 2018-06-27

County: Genesee, Oakland

Watershed: Shiawassee, Flint

Town Range	Section
T05NR06E	24
T05NR07E	19, 20, 29, 30

Sistrurus catenatus

Eastern massasauga

Vertebrate Animal

Federal Status: LT **State Status:** SC **Global Rank:** G3 **State Rank:** S3

Last Observed Date: 2017-06-28

County: Oakland

Watershed: Flint

Town Range	Section
T05NR07E	23, 24, 26

Southern Hardwood Swamp

Federal Status: **State Status:** **Global Rank:** G3 **State Rank:** S3

Last Observed Date: 2017-05-03

County: Oakland

Watershed: Flint

Town Range	Section
T05NR07E	13, 14

Federal Protection Status Code Definitions

LE = Listed endangered
LT = Listed threatened
LE/LT = Partly listed endangered and partly listed threatened
PDL = Proposed delist
E(S/A) = Endangered based on similarities/appearance
PS = Partial status (federally listed in only part of its range)
C = Species being considered for federal status

State Protection Status Code Definitions

E = Endangered
T = Threatened
SC = Special concern
X = Presumed extirpated (legally 'threatened' if rediscovered)

Global Heritage Status Rank Definitions

The priority assigned by NatureServe 's national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
GH = Of historical occurrence throughout its range, i.e. formerly part of the established biota, with the expectation that it may be rediscovered (e.g. Bachman's Warbler).
GU = Possibly in peril range-wide, but status uncertain; need more information.
GX = Believed to be extinct throughout its range (e.g. Passenger Pigeon with virtually no likelihood that it will be rediscovered).
G? = Incomplete data
Q = Taxonomy uncertain
T = Subspecies
U = Unmappable through out the global geographic extent
? = Questionable

Subnational Heritage Status Rank Definitions

The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

S1 = Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.
S2 = Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
S3 = Rare or uncommon in state (on the order of 21 to 100 occurrences).
S4 = Apparently secure in state, with many occurrences.
S5 = Demonstrably secure in state and essentially ineradicable under present conditions.
SA = Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range.
SE = An exotic established in the state; may be native elsewhere in North America (e.g. house finch or catalpa in eastern states).
SH = Of historical occurrence in state and suspected to be still extant.
SN = Regularly occurring, usually migratory and typically nonbreeding species.
SR = Reported from state, but without persuasive documentation which would provide a basis for either accepting or rejecting the report.
SRF = Reported falsely (in error) from state but this error persisting in the literature.
SU = Possibly in peril in state, but status uncertain; need more information.
SX = Apparently extirpated from state.

There should be no redistribution of these data. MNFI requests that the user respect the confidential and sensitive nature of these data. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection.

This page is intentionally left blank

AECOM Imagine it. Delivered.

Phase I Archaeological Survey of the Phase 2 Expansion for the Great Lakes National Cemetery

Holly Township, Oakland County, Michigan

Mabbett & Associates, Inc.

June 2019

Phase I Archaeological Survey of the Phase 2 Expansion Project, Great Lakes National Cemetery, Holly Township, Oakland County, Michigan (ER-01-179)

Prepared for:

Mabbett & Associates, Inc.
5 Alfred Circle
Bedford, Massachusetts 01730

Prepared by:

Suzanne Ostyn
Jennifer Rankin, MA, RPA
Christopher Leary
Ben Goodwin, M.A., RPA

Submitted by:
AECOM
525 Vine Street, Suite 1800
Cincinnati, Ohio 45202

(513) 651-3440

CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE

Principal Investigator:

Jennifer Rankin, MA, RPA

JUNE 2019

ABSTRACT

In May 2019, AECOM, on behalf of Mabbett & Associates, Inc., conducted a Phase I archaeological field reconnaissance for the Phase 2 Expansion Project for the Great Lakes National Cemetery in Holly Township, Oakland County, Michigan. The current project represents an expansion to the initial 22.96 hectares (56.73 acres) investigated for cultural resources in 2003 (Parson and Feeney 2004; ER-01-179), which was developed over the past 15 years as the Great Lakes National Cemetery for the federal lead agency, the U.S. Department of Veteran Affairs, National Cemetery Administration.

The 2019 field survey focused on the portions of the 18.98 hectare (46.92 acre) Phase 2 Expansion Project which had not been surveyed previously for cultural resources. As a result, a total of 12.97 hectares (32.05 acres) of the Phase 2 Expansion was systematically surveyed for cultural resources in 2019, with the remaining 6.01 hectares (14.87 acres) visually inspected within the limits of the prior 2003 survey area. The current survey was accomplished through the examination of 679 sample loci (SL) at the Michigan State Historic Preservation Office (SHPO) recommended 50-foot (15-meter) survey interval. Of this total, 184 SL were examined through the excavation of shovel tests, with the remainder pedestrian inspected due primarily to obvious evidence of modern disturbance.

As a result of this field survey, no new or previously-identified archaeological resources were encountered within the proposed Phase 2 Expansion for the Great Lakes National Cemetery, and no further cultural resources consultation is therefore recommended prior to development of the Phase 2 Expansion Project.

Table of Contents

1. Introduction 1
1.1 Project Description and Area of Potential Effects 2
1.2 Report Organization 2
2. Literature Review and Research Design 3
2.1 Archival Research 3
2.2 Research Design 5
3. Environmental Overview 8
3.1 Geology and Physiography 8
3.2 Hydrology 8
3.3 Soils 8
3.4 Modern Climate and Land Use 9
4. Cultural Overview 11
4.1 Prehistoric Michigan 11
4.1.1 Paleo-Indian Period (10,500 B.P. – 9000 B.P.) 11
4.1.2 Archaic Period (9500 B.P. – 3000 B.P.) 12
4.1.3 Woodland Period 16
4.2 Historic Michigan 18
4.2.1 Protohistoric (1492 A.D. – 1670 A.D.) 18
4.2.2 Historic Indian/European Imperial Period (1670 A.D. – 1815 A.D.) 20
4.2.3 Modern Michigan and Oakland County (1800 A.D. – Present Day) 22
5. Field Methodology 23
6. Phase I Archaeological Field Reconnaissance Results 24
7. Conclusions and Recommendations 27
8. References Cited 28

Tables

Table 2-1. Inventoried Archaeological Resources Recorded Within 1.6 Kilometers (1 Mile) of the Project 3
Table 2-2. Historic Archival Sources Consulted for the Project 4
Table 6-1. Phase I Archaeological Survey Metrics 24
Table 6-2. Representative Soil Profiles, Woodlot 25
Table 6-3. Representative Soil Profiles, Agricultural Fields 25

Appendices

Appendix A – Report Mapping
Appendix B – Report Photography
Appendix C – Field Forms
Appendix D – Agency Correspondence

1. Introduction

The following report details the Phase I archaeological survey conducted for the Phase 2 Expansion of the Great Lakes National Cemetery, located in Holly Township, Oakland County, Michigan (the Project). The totality of the Phase 2 Expansion measures 18.98 hectares (46.92 acres) in size, of which 6.01 hectares (14.87 acres) was examined previously for archaeological resources (Parson and Feeney 2004; ER-01-179). The 2019 archaeological field reconnaissance was performed by archaeologists from AECOM, and involved systematic Phase I survey of the approximately 12.97 hectares (32.05 acres) of the Phase 2 Expansion located outside of the previously-surveyed areas (see **Appendix A, Figures 1-1 and 1-2**). The lead federal agency for this Project is the Department of Veterans Affairs, National Cemetery Administration.

The Phase I archaeological survey involved the implementation of a variety of archaeological and archival methods, including a literature review pertaining to the region, an inventory of previously-identified archaeological resources and cultural resource surveys conducted within 1.6 kilometers (1.0-mile) of the Project, development of a research design as a construct for the analysis of results, and the archaeological field reconnaissance of the Project land requirements. The methods employed during this Project were designed to comply with over four decades of Federal regulation governing archaeological resources surveys. Specifically, these regulations include the National Historic Preservation Act (Public Law 89-665, as amended by Public Law 96-5 15) and the guidelines set forth by the Michigan Office of the State Archaeologist (OSA).

The goal of the Phase I survey was the identification and delineation of any archaeological resources that could potentially be impacted during construction activities within the Project Area of Potential Effects (APE). Archaeological resources identified during the field reconnaissance of the Project APE could be analyzed and assessed to determine eligibility for listing in the National Register of Historic Places (NRHP). Recommendations could then be made for avoidance or mitigation of any sensitive archaeological sites, as stipulated within the National Historic Preservation Act of 1966 (as amended 2000). To accomplish these goals, several research strategies were employed:

- Development of a Research Design, incorporating the results of the archival research to provide a better understanding of the local and regional characteristics that influence site location and distribution;
- Background research, specifically a literature and physiographic review, at local libraries and the archives maintained by the Michigan Historic Preservation Office (MHPO) and OSA at the State Library in Lansing; and,
- Field reconnaissance of the Project APE, which was conducted by using a set-interval testing grid with each 15-meter Sample Locus (SL) surveyed through either shovel test probes or pedestrian inspection (primarily in areas of disturbance or exposed soils).

The Phase I archaeological survey detailed herein was conducted by AECOM in May 2019, under the direction of Field Director Suzanne Ostyn, and Principal Investigator Jennifer Rankin, M.A., RPA.

1.1 Project Description and Area of Potential Effects

The Great Lakes National Cemetery Project involves development of a national veteran's cemetery to meet the burial needs of 90,890 gravesites for World War II and Korean War veterans by the year 2040. Proposed impacts include construction of an administration/maintenance building, public information center, a flag/assembly area, committal service shelters, phased development of 25,251 columbarium niches and 65,639 gravesites, and associated work (roadway and parking construction, utility installation, etc.). Additionally, grading and filling will be required to prepare the landform for new construction throughout much of the project area. To accommodate these numbers, a 227-hectare (561-acre) tract of land (designated Site E) was adopted as the preferred site based on soil suitability and minimal environmental constraints.

Site E is a generally rectangular parcel situated between Belford and Lahring Roads (to the north and south, respectively), a section of the CSX Railroad to the east, and Fagan Road to the west. Fagan Lake and Round Lake occupy the northern half of Site E. In 2003, Phase I cultural survey work was conducted for the Phase 1 stage of the Project, covering approximately 22.96 hectares (56.73 acres) of the parcel for initial development of the cemetery. The current Phase 2 Expansion Project is designed to encompass a total of 18.98 hectares (46.92 acres) in size, of which 6.01 hectares (14.87 acres) was examined previously for archaeological resources (Parson and Feeney 2004). As a result, the current field investigations focused on the 12.97 hectares (32.05 acres) of Phase 2 which had not been surveyed previously for cultural resources, while the portion of the Phase 2 Expansion situated within the limits of the prior survey work were visually inspected for cultural resources. The Area of Potential Effects (APE) considered for this study therefore included the totality of the Phase 2 Expansion Project.

1.2 Report Organization

The following report is organized according to the outline suggested by the OSA. As such, the report begins with the Literature Review and Research Design, summarizing the various archaeological and environmental factors which influenced the archaeological survey of the project APE (**Chapter 2**). This is followed by an overview of the natural environment of this portion of Oakland County (**Chapter 3**). **Chapter 4** provides an overview of the prehistoric and historic context for this region, while **Chapter 5** outlines the various field methods utilized during the survey of the Project. The results of the fieldwork are discussed in **Chapter 6**. The final narrative section of the report, **Chapter 7**, summarizes the results obtained from this Phase I archaeological survey, and attempts to address the research questions posed by the Research Design through an analysis of the archaeological results. Figures, such as mapping of the Project, photographs of the work areas, agency correspondence and the forms generated during fieldwork, are included as **Appendices A** through **D** to this document.

2. Literature Review and Research Design

Prior to the initiation of the 2019 archaeological field reconnaissance for the Project, AECOM conducted archival research in an effort to develop a prehistoric and historic context specific to the Project. This research included a review of previous cultural resources/archaeological investigations undertaken in the vicinity of the Project, and the collection and analysis of archaeological data inventoried with the Michigan SHPO and Michigan OSA in Lansing, Michigan. The following chapter outlines the results of this archival research, and developed the Research Design used during implementation of the Phase I survey conducted for the Phase 2 Expansion Project.

2.1 Archival Research

The background research for the Project was conducted in the spring of 2019, prior to the initiation of the archaeological fieldwork. Archaeologists from AECOM consulted the archives maintained by the Michigan SHPO and OSA, in particular, the collected data from all inventoried archaeological resources located within 1.6 kilometers (one mile) of the Project land requirements contained within the State Archaeological Site File. While no NRHP-listed properties have been recorded within 1.6 kilometers (one mile) of the Project, a total of 17 archaeological resources have been previously recorded within this study buffer. Of this total, 15 archaeological resources were identified during the initial cultural resource survey for the Great Lakes National Cemetery conducted in 2003 (Parson and Feeney 2004). None of these resources occur within or near the un-surveyed portion of the Phase 2 Expansion Project.

Table 2-1. Inventoried Archaeological Resources Recorded Within 1.6 Kilometers (1 Mile) of the Project

Site ID	Temporal Component	Site Type	NRHP Status
20OK172	Prehistoric- Indeterminate	Burial	Unknown
20OK487	Historic- Mid-Nineteenth Century-Twentieth Century	Farmstead	Eligible
20OK488	Historic- Mid-Nineteenth Century-Twentieth Century	Farmstead	Potentially Eligible
20OK489	Prehistoric- Indeterminate	Lithic Scatter	Not Eligible
20OK490	Prehistoric- Woodland	Lithic and Ceramic Deposit	Not Eligible
20OK491	Historic- Nineteenth/ Twentieth Century	Ephemeral Ceramic Scatter	Not Eligible
20OK492	Prehistoric- Indeterminate	Lithic Scatter	Not Eligible
20OK493	Prehistoric- Indeterminate	Isolated Find	Not Eligible
20OK494	Prehistoric- Indeterminate	Isolated Find	Not Eligible
20OK495	Prehistoric- Indeterminate	Isolated Find	Not Eligible
20OK496	Prehistoric- Indeterminate	Isolated Find	Not Eligible
20OK497	Historic- Indeterminate	Isolated Find	Not Eligible
20OK498	Prehistoric- Indeterminate	Isolated Find	Not Eligible
20OK499	Prehistoric- Indeterminate	Isolated Find	Not Eligible
20OK500	Prehistoric- Indeterminate	Isolated Find	Not Eligible
20OK501	Prehistoric- Indeterminate	Isolated Find	Not Eligible

Site ID	Temporal Component	Site Type	NRHP Status
20OK533	Prehistoric- Unknown	Unknown	Unknown

As indicated above, a majority of the 17 inventoried archaeological resources on-file within the 1.6 kilometers (one mile) study area represent single-specimen or ephemeral findspots of prehistoric material, out of context with any larger or intact archaeological deposits. The notable exceptions are a prehistoric burial (20OK172), located well to the north of the Project, and the two historic sites (20OK487 and 20OK488) which represent the archaeological footprint of nineteenth century farmsteads. Both of these resources were identified as a result of the 2003 Phase I archaeological fieldwork conducted for Phase 1 of the current Project; Phase II testing undertaken on 20OK487 in 2004 determined this resource as eligible for the NRHP, while site 20OK488 was recommended as potentially eligible based on the Phase I data and analysis. The construction activities associated with Phase 1 of the Project avoided both of these resources, and the current work projected for the Phase 2 Expansion will likewise avoid any ground disturbance within or near these two resources.

As noted in the Parson and Feeney 2004 report filed for Phase 1 of the current Project, there has been very little systematic survey work conducted across this portion of Oakland County. The 1980 Stamps and Zurel Phase I survey, the Stamps 1980 survey, and the 1992 Dunham et al. 1993 survey work, when viewed in conjunction with the results detailed in the Parson and Feeney 2004 report, suggest that there is some potential for both prehistoric and historic archaeological deposits within the proposed limits of the Phase 2 Expansion. While the Stamps 1980 Phase I survey, conducted over 4 miles (6.4 kilometers) to the southwest, did not identify any archaeological resources, the other three surveys noted above resulted in the identification of both numerous and potentially eligible archaeological sites. The 1980 Stamps and Zurel report identified 246 distinct prehistoric locations and 32 historic sites, which contained materials diagnostic to every main prehistoric temporal period and historic specimens dating from the nineteenth and twentieth centuries. The 1993 Dunham survey identified four potentially eligible historic sites (20GS111-20GS114) and two non-eligible prehistoric sites (20GS115 and 20GS116). As noted above and elsewhere in this document, the Phase I fieldwork conducted for the Phase 1 portion of the current cemetery project identified 15 archaeological resources, 11 of which contained prehistoric specimens and four dating to the historic period, with two of the latter recommended either eligible or potentially eligible for the NRHP.

Concurrent with review of the cultural resources data maintained by the Michigan SHPO and OSA, AECOM examined available historic-era mapping and aerial photography of the Project location, in an effort to define the extent of historic settlement, occupation and activity within and around the Phase 2 Expansion location. The following table lists the archival sources consulted as part of this review.

Table 2-2. Historic Archival Sources Consulted for the Project

Date	Reference	Title
1857	Burhans	*Map of Oakland County, Michigan*
1872	Beers	*Atlas of Oakland County, Michigan*
1896	Kace	*Illustrated Atlas of Oakland County, Michigan*
1908	Ogle & Co.	*Standard Atlas of Oakland County, Michigan*
1920	U.S. Geological Survey	*Holly, MI* 15-Minute series topographic quadrangle
1930	Hixon, W.W. & Co.	*Plat Book of Oakland County, Michigan*
1960	Rockford Map Publishers	*Plat Book of Oakland County, Michigan*

The review of the archival mapping outlined in the table above provide an indication as to the potential for the presence of historic resources within the proposed limits of the Phase 2 Expansion Project. In summary:

- The 1857 Burhans *Map* of the county does not depict individual structures, but does indicate that the Project area would have, at that time, spread across portions of three separate lots: the large Darius Austin parcel, and the smaller Nic. Yorton and John Foresith parcels, the latter of which contained Fagan Lake. Fagan Road is present on this map, although only the Austin property fronts onto the 1857 iteration of the road.
- Approximately 15 years later, the 1872 Beers *Atlas of Oakland County, Michigan* displays two properties in the current Project area: the 280-acre D. Austin parcel (effectively the same depicted on the earlier map) and the 120-acre R.G. Green parcel, which contains most of Fagan Lake. The Flint & Pere Marquette Railroad was constructed during the intervening 15 years, as it is present just to the west of the Project area on the 1872 map. No structures are shown within the Project area, with the closest projected well to the south on the D. Austin property, close to Fagan Road.
- The 1896 Kace Illustrated *Atlas* projects roughly the same landscape as that shown on the 1872 mapping, with the D. Austin property now owned by Ms. Ellen T. Austin, and the R.G. Green parcel now owned by the R. G. Green Estate. No structures are depicted within or near the proposed Phase 2 Expansion.
- This same general continuity of land ownership and use is also suggested on the 1908 Ogle & Co. *Atlas*, with the Austin property shrinking to 80 acres in size while remaining in the ownership of Ellen Austin, and the Green property expanding to the south and listed under the ownership of Sarepta Fisher. No structures are again indicated within or near the Project.
- The 1920 iteration of the 15-minute series Holly, MI topographic quadrangle is absent any structures within or near the Project, and suggests a rural agricultural landscape, broken up between woodlots and cultivated fields, across this portion of the county.
- The 1930 and 1960 plat book for Oakland County suggests a change to the Project area, with the previous parcels absorbed within the 429-acre Bessie tract, which also encompassed the entirety of Fagan Lake. The location of the structure on the former Austin property, clearly indicated on the 1872, 1896 and 1908 maps, is not present on either the 1930 and 1960 plat map.

Based on the observations outlined above, it appears likely that the Project area was utilized for either cultivation or woodlots throughout the historic period. Sustained occupations were present since the nineteenth century on surrounding landforms, but none appear to have been located within or near to the Phase 2 Expansion Project work area.

2.2 Research Design

In an attempt to efficiently and effectively complete a Phase I archaeological survey of the Project land requirements, the following Research Design was developed to guide the field reconnaissance. This Research Design was constructed through analysis of several factors relevant to the Project, including: existing and prehistoric environmental conditions and vegetation patterns; the documented archaeological record of the region, both prehistoric and historic; previous regional archaeological experience of the AECOM staff; and the modern utility and development of the landforms contained within the Project area. Elements of the following

discussions have been developed from the previous archaeological research undertaken by AECOM staff in Michigan over the past decade, under the guidance of AECOM Central Region Archaeological Department Manager Christopher Bergman, Ph.D., as well as the results from the prior archaeological investigations conducted for Phase 1 of the Project (Parson and Feeney 2004).

The prehistoric occupation documented across the landforms within Oakland County is broadly similar to that encountered elsewhere in southeastern Michigan. Prehistoric sites associated with every major temporal period have been documented across the county; the 1980 Stamps and Zurel survey work recorded 246 distinct prehistoric occupations within Oakland County. While the majority of these resources did not produce material diagnostic to a specific temporal period, their work does provide a rough chronology for the county. As summarized in Parson and Feeney 2004, four primary observations were suggested by the 1980 work of Stamps and Zurel, including:

1. A majority of the prehistoric deposits which yielded temporally-diagnostic data was associated with Archaic occupations, manifest as notched and stemmed PPKs, axes and bannerstones;
2. The highest frequency of prehistoric sites occur along the interface between the glacial lake plains in the southeastern section of the county, and the hilly uplands in the northwest of the county;
3. Woodland and historic period Native American archaeological sites were more likely to occur at the confluence of major streams; and,
4. Very little evidence was identified for Early Woodland and Middle Woodland occupations, which Stamps and Zurel postulated was a reflection of regional population densities, with sites from this period more likely to cluster along the shorelines of the nearby Great Lakes and primary tributaries.

The 2004 Parson and Feeney study assessed the existing data set at that time to indicate that prehistoric sites were more likely to be encountered on higher elevations above and/or overlooking lakes and wetlands, with a significantly lower potential for the presence of prehistoric resources on poorly-drained and lower-lying landforms. The results of the 2004 Phase I survey conducted on the initial Phase 1 portion of the National Cemetery project area appears to have borne these observations out; the majority of the prior survey area was classified as low potential for prehistoric resources, and while 11 individual prehistoric resources were identified, all 11 were either isolated single-specimen findspots or ephemeral scatters of lithics (and, in one instance, two ceramic sherds). Based on these results, nearly all of the current Phase 2 Expansion area is most appropriately classified as low potential, given the relatively flat, low-lying topography present across the survey area.

With regard to historic-era archaeological resources, several elements of the nineteenth and twentieth century occupation of the region are represented within the Michigan OSA inventory of archaeological sites, as well as on the sequence of historic mapping consulted for the Project (see **Table 3-2**, above). Of particular relevance are the two nineteenth century farmstead sites (20OK487 and 20OK488) identified by the 2004 Parson and Feeney archaeological investigations on the adjoining portions of these landforms to the north of the current Project area. These resources were recommended as potentially eligible as a result of the 2003 Phase I survey work, and subsequent Phase II testing in 2004 of 20OK487 determined the resource to be eligible for the NRHP. The research design developed prior to the 2003 field reconnaissance defined the survey area as displaying a moderate potential for the presence of historic archaeological resources, based on review of the available historic mapping and presence of

historic archaeological sites in similar settings across this portion of the county. The current Phase 2 Expansion Project area is most appropriately classified in this same manner, as possessing a moderate potential for historic archaeological resources. This assessment is consistent with the results obtained from the prior 2003 survey work conducted to the north on adjoining landforms to the current Project, which encountered both ephemeral non-eligible historic deposits and evidence of sustained nineteenth and twentieth century occupations. While the historic mapping reviewed as part of the current study does not conclusively depict a structure or dwelling within the Phase 2 Expansion area, the presence of eligible, and potentially eligible, nineteenth century archaeological deposits within several hundred feet of the current Project suggests an increased potential for the presence of additional elements of the historic landscape.

3. Environmental Overview

A wide range of environmental conditions, including climate and the related floral and faunal communities, significantly influenced the type and extent of prehistoric and historic occupation, settlement and subsistence patterns across southern Michigan. The following chapter describes the prehistoric and historic environmental setting of the region in general, and the Project in particular, in order to develop a context for better understanding the location and preservation of cultural resources identified as a result of the AEOCM Phase I archaeological field reconnaissance.

3.1 Geology and Physiography

The Project lies within the Eastern Lake section of the Interior Plains physiographic division (Sommers 1977). This region is characterized by severe local relief, with elevations varying widely between the deeply-cut river valleys and the vast tracts of uplands. This region rests atop ancient and resistant Cambrian and Pennsylvanian-aged rock. Repeated glacial invasions have removed much of the sedimentary deposits of sandstone and limestone, leaving granite, gneiss, and other igneous and metamorphic rocks exposed.

Although the region was thoroughly scoured by glaciers during the Late Pleistocene (up to approximately 10,000 years B.P.), the basal materials that underlie Oakland County are much older. The Project is located in the Michigan Basin, a large depositional basin composed of marine sediments, with smaller concentrations of organic, alluvial and lacustrine deposits. The underlying bedrock is characterized by periodic folding, which resulted in unconformities within the stratigraphic sequence for the region.

The overall physiography of Oakland County, like most of the surrounding region, is characterized by a variety of glacially-formed features, including numerous lakes and wetlands, drumlines, eskers, moraines, kames, moraines and outwash plains. In the vicinity of the Project, several end moraines and low knolls are present on the landscape, overlooking glacial deposits and lakes (including Fagan Lake and Round Lake, both situated within several hundred feet of the Project).

3.2 Hydrology

The Project area in Oakland County is situated in the Flint River watershed, which is a component element of the Saginaw River drainage basin. Several tributaries of the Flint River trend close to the Project, including Swartz Creek, which extends approximately 2,000 feet (600 meters) south of the Project. This portion of Oakland County is characterized by numerous lakes and low-lying marshes and swamps; the Project area is effectively bounded to the north by Fagan Lake and Round Lake, and seven more named lakes occur within one mile (1.6 kilometers) of the Project.

3.3 Soils

The settlement patterns of both American Indian groups and early colonial settlers were influenced by individual and group soil preferences. Quite often, vegetational indicators were surveyed to determine soil fertility and moisture prior to migration and frontier settlement. To illustrate one example from the colonial period of American history, Palatinate Germans in Pennsylvania were drawn to areas that resembled the Rhineland limestone soils in their European place of origin. Their successes with this fertile soil are particularly ironic, since the

Scotch-Irish avoided limestone soils, associating them with the "dry lands" of Scotland (Hulbert 1930:77).

The current phase of the Project is situated atop three primary soil types, as indicated in the 1982 *Soil Survey of Oakland County, Michigan* (Feenstra 1982). These three distinct soil types include:

- Marlette Sandy Loam, 1-6 percent slope (10B): The Marlette series of soils are typically well-drained and found on till plains and moraines across the county. The soil column within this series is composed of a sandy loam Ap and B&A horizons, to depths averaging between 40 and 50 centimeters below ground surface, underlain by clay loams.
- Owosso Sandy Loam, 1-6 percent slope (25B): These soils are formed in loamy material, usually on well-drained moraine landscape features. An Ap soil horizon is typically present just below the ground surface, composed of a dark brown (10YR 3/3) sandy loam underlain by pale brown (10YR 6/3) to yellowish brown (10YR 5/4) fine sandy loams.
- Kibbie Fine Sandy Loam, 0-4 percent slope (34B): Kibbie series soils are usually encountered on lake plains and moraines, and are formed in loamy and sandy materials. The soil stratigraphy is characterized by a relatively shallow sequence of sandy, silty and clay loams, with the interface between the Ap and the B2t soil horizons located at average depths between 15 and 30 centimeters below ground surface.

All three soil types present within the current Project area likely date to the Early or Middle Holocene, and are generally unlikely to contain deeply buried soil horizons. As such, while the majority of the Project area displays the potential for containing archaeological resources, these soils horizons suggest any materials would be encountered at relatively shallow depths within the soil column. A large area of Houghton and Adrian Mucks soils bounds the current Project to the southeast, composed of bog-like organics with no potential to contain archaeological deposits.

3.4 Modern Climate and Land Use

The modern climate of Oakland County is heavily influenced by the proximity of Lake Michigan to the west. The Great Lakes produce a moderating effect, resulting in a cooler summer and warmer winter than a land mass at the same latitude with no major body of water nearby. The length of the growing season varies from year to year, typically averaging between 90 to 100 days annually. The average high temperature during the summer months is a mild 75 degrees Fahrenheit, while the winter months are into the low teens.

Precipitation occurs sporadically throughout the year, with a slight increase in annual rainfall in early summer and autumn. During the winter months, the region averages between 34.6 inches of snow annually. Like most of the lower Great Lakes region, the first snows of the winter typically set in during the first two weeks of November, and intensify throughout December and January (Feenstra 1982:98).

The majority of Oakland County is covered by urban development and residential plots, with the remainder of the county broken up between maintained forested lots and cultivated agricultural fields and pasture. The expansion of the Detroit metropolitan area over the past several decades has further increased the sustained occupation and utility across Oakland County. Most of the current Project area has been utilized as cultivated fields since the historic period

and into the modern era, which has in turn given way to the development of the cemetery grounds over the past decade.

4. Cultural Overview

The following discussion is a synthesis of various current and accepted sources regarding the known prehistoric and historic occupation across this portion of southern Michigan. This regional information provides a framework for addressing the NRHP assessment and eligibility of identified archaeological resources.

4.1 Prehistoric Michigan

4.1.1 Paleo-Indian Period (10,500 B.P. – 9000 B.P.)

The Paleo-Indian cultural tradition in the eastern United States has been recognized as part of a widespread, homogeneous New World culture, typified by a distinctive lithic assemblage. The most distinctive members of this assemblage are lanceolate-shaped, typically fluted, projectile points fashioned from a wide range of material. Artifact types, which remain fairly consistent across a wide range, geographically, of sites, represent tools utilized in the processes of hunting, butchering, and hideworking activities.

Most of what is currently known about this earliest of cultural developments in the New World is, by nature, inferred from the sporadic and opportunistic recovery of artifacts, typically from a surficial context and manifest as the ubiquitous diagnostic, fluted projectile point (Dorwin 1966; Prufer and Baby 1963). These data have been analyzed in conjunction with geochronological and paleoecological data to make generalized assumptions about the earliest Early Holocene inhabitants. Adaptive strategies employed during this epoch were focused on surviving with a predominantly harsh, unstable environment. Paleo-Indian sites generally reflect areas where small bands of people gathered to perform specific, short-duration tasks, often geared towards resource procurement. By nature, this type of site becomes manifest archaeologically within an extremely narrow footprint that can be problematic to effectively identify and analyze. It has been argued that the earliest subsistence strategies in North America were not typified by a hunting bias towards megafauna (such as mastodon), but were instead characterized by a balanced hunting economy based on the exploitation of migratory game (especially caribou) and supplemented by extensive gathering (Fitting 1965; Ritchie and Funk 1973).

Any informed discussion of the prehistoric landscape of eastern North America before 10,000 B.P. begins, of necessity, with an examination of the known environmental and climatic factors present across the continent at that time. Michigan is no exception; in fact, the climatic conditions present across this region can be said to have been in a near-constant state of flux during the Late Pleistocene and Early Holocene. The advance and retreat of the various glacial ice sheets between 13,000 and 9000 B.P. alternately covered the region under hundreds (and, often, thousands) of feet of ice and exposed a harsh, tundra-like landscape that extended south from the leading edge of the ice sheets. As such, the identification of Paleo-Indian sites across Michigan is a problematic exercise at best, since the region was, at various times, either inhospitable or unattainable for human habitation.

The Lower Peninsula of Michigan has a documented Paleo-Indian cultural efflorescence beginning as early as 12,000 B.P., and represented by several large occupations. Buckmaster and Paquette (1996) suggest a possible Paleo-Indian chronology (based entirely on projectile point typologies) divided into three distinct temporal periods: Agate Basin (10,500 to 10,000 B.P.), Hell Gap (10,000 to 9500 B.P.) and Great Lakes Cody Complex (9400 to 9000 B.P.).

The subsequent chronology identified by Buckmaster and Paquette, which includes the Hell Gap and Cody traditions, are viewed by many as completely disparate occupations of the region during major environmental epochs, and distinct from the cultural lifeway represented in the Upper Peninsula by the Agate Basin tradition. Between 10,000 and 9,500 B.P., the Marquette Advance ice sheet covered much of the northern Upper Peninsula in several hundred feet of ice, pushing southwards the tundra-like environment seen in the region over the preceding 500 years. The retreat of this ice sheet after 9,500 B.P. opened the region again for prehistoric occupation, and a variety of sites began to appear across the landscape.

Contemporaneous sites from southern Ontario, located to the northeast of the project area, are generally small-sized occupations of relatively short duration. A handful of sites, however, may possibly represent localities that were repeatedly visited by hunting or resource procurement expeditions. The Fisher site, by way of example, is situated atop a knoll overlooking an abandoned shoreline of the glacial lake predecessor of Lake Algonquin, in Simcoe County. The lithic assemblage identified on this site consisted of fluted points, end-scrapers, gravers, and debitage (including numerous channel flakes). A second example of a Paleo-Indian site on the shore of Lake Algonquin occurs near the town of Parkhill, in Middlesex County. The Parkhill site, which yielded some 80 fluted points, probably was occupied by 45 to 75 individuals (Mason 1981).

The Late Paleo-Indian period in the Great Lakes region is perhaps best represented at the Holcombe site (20MB30), located in southeastern Michigan. This site, apparently occupied by 20 to 50 people, consisted of five to eight discrete areas of cultural debris, surrounded by an open, central area. Faunal remains were recovered at Holcombe, including bone fragments of barren ground caribou. The lithic assemblage recovered at Holcombe consisted of projectile points which have been clearly fluted, as well as examples which are basally thinned lanceolates. This latter group of artifacts displays links with types which, in western North America, are referred to as Plano points (Ellis and Ferris 1990; Fitting et al 1966).

4.1.2 Archaic Period (9500 B.P. – 3000 B.P.)

Defining the boundary between the Paleo-Indian and Early Archaic periods is a problematic exercise. At some ill-defined point between 10,000 and 8,000 B.P., a transition was made across eastern North America between the Paleo-Indian cultures which had dominated the landscape for the better part of 3000 years and a new, displacing tradition. The difficulty in effectively differentiating Early Archaic sites from Late Paleo-Indian sites is exacerbated in the broader context, as the Late Paleo-Indian era in the Great Lakes is contemporaneous with the early stages of the Early Archaic in other portions of eastern North America. In addition, the shorelines of the Early Holocene Great Lakes, especially Lake Superior and Lake Huron, were strikingly different during the Early Archaic from their current configuration. The recession of the last ice sheets left behind a relatively low water level, opening up landforms for occupation that would eventually reside at the bottom of the current Great Lakes. As a result, it can be conjectured that a significant number of sites from the period have been rendered inaccessible for systematic archaeological investigations, if they have even been preserved at all.

The identification of the advent of the Early Archaic in the upper Great Lakes is based primarily on the sudden absence of fluted bifaces from lithic assemblages of the period, which has been referred to as the Plano Horizon. The toolkits recovered from Plano Horizon sites transcend the arbitrary boundary between the Late Paleo and Early Archaic periods, having been identified from both contexts at sites across Michigan, including the aforementioned Holcombe and Gorto sites. The Early Archaic Plano Horizon in Michigan encompassed a variety of different projectile point types, all of which have been theorized to fall within two major lithic tool traditions: the Agate Basin and Eden-Scottsbluff. Both traditions extend across the division between Late

Paleo-Indian and Early Archaic, and points related to both have been recovered from sites across Michigan.

The projectile point that is most indicative of a Plano Horizon occupation is the Hi-Lo biface, a lanceolate point that has been identified in archaeological deposits from the western Great Lakes east to the upper Atlantic Coast (Justice 1987:46). It has been conjectured that these points are representative of a hunting focus, centered on exploitation of the Early Holocene caribou population that would have thrived along the tundra-like environments recently exposed by the retreating glaciers. The Hi-Lo type has also been viewed as a distinctive upper Great Lakes manifestation of a much larger shift in tool manufacture across eastern North America (Shott 1999:75). In fact, current archaeological thinking places the Hi-Lo within a broad tradition that is contemporaneous with the widely-recognized Early Archaic Dalton Horizon, which predominates on Early Archaic sites across southeastern North America from 10,000 to 9,000 B.P. (Ellis and Deller 1982).

Around 9500 B.P., a new Early Archaic typology begins to appear in archaeological deposits across North America east of the Mississippi River. Represented by the presence of a new form of tool, the stemmed and/or notched biface, the Kirk Horizon defines the end of the morpohological traditions dating back to the Paleo-Indian period. Gone are the lanceolate forms that dominate the prehistoric toolkits from the advent of human occupation of North America, replaced by a completely different style of lithic manufacture.

The Kirk Horizon in Michigan is represented by a variety of distinct tool types and forms, all of which have been identified from sites as far away as the southeastern Atlantic Coast. These include the Kirk Stemmed, Kirk Corner-Notched, Thebes, and Decatur. Early specimens of these point types were typically worked from exotic chert sources, especially those found in the Allegheny Plateau region of eastern Ohio. Over time, the utilization of non-local materials diminished, which some archaeologists view as suggestive of a reduction in group territorial range (Shott 1999: 78).

While a thorough analysis of the settlement patterns across the state represented by the known Early Archaic sites has not yet been fully undertaken (perhaps due, in part, to the absence of any systematic archaeological investigations on a Kirk horizon site, in spite of their abundance within the state), recent research has begun to shed light on the character of the Early Archaic landscape. The early stages of archaeological research in Michigan formulated a distinct view of the Early Archaic landscape as one of small, dispersed bands of hunters scattered across the terrain, utilizing and re-utilizing areas maximal to resource procurement locations. In this hypothesis, the population densities were seen as extremely low, with only a handful of groups occupying the frozen tundra left behind by the retreat of the glaciers. Recent research controverts these theories, as new hypotheses have been developed, based primarily upon a better understanding of the regional geological forces at work during the era. The paucity of sites inferred in early research could not take into account the fluctuating water levels of the surrounding lakes; as the glacial ice sheets receded to the north, the lake basins slowly began to fill, a process which exposed a fluctuating shoreline and, by logical extension, prehistorically-attractive adjacent landforms. As the current levels of Lake Superior and Huron have effectively eradicated the Early Archaic shorelines, the sites that would most likely have been located in close proximity have, likewise, been inundated.

The Gorto site is indicative of the type of Early Archaic site that may be found in Michigan (Buckmaster and Paquette 1988). Strikingly similar to a contemporaneous site on Lake Michigan in northern Wisconsin (the Renier site), the Gorto site contains material from the Agate Basin and Eden-Scottsbluff traditions, as well as notched bifaces possibly representative of the later Early Archaic Kirk Horizon. The Eden-Scottsbluff bifaces recovered from Gorto were

fashioned from heat-treated material found in northern Wisconsin (Hixton silicified sandstone), highly suggestive of a relationship between the Gorto and Renier sites. Shott (1999:75) conjectures that these pair of sites have strong ties to other Plano Horizon sites in the western Great Lakes and Great Plains.

If the current state of archaeological research and, by extension, knowledge of the Early Archaic in Michigan suffers from a lack of systematic testing of the known sites, the situation in the Middle Archaic stands at the opposite end of the spectrum. In Michigan, as in most of eastern North America, the interval between the heavily Paleo-influenced Early Archaic cultures and the first vestige of settled, agrarian communities in the Late Archaic is poorly represented, and poorly understood, within the archaeological record. While the dearth of archaeological data for the Middle Archaic in certain parts of Michigan has prevented a detailed picture of the prehistoric landscape from being developed, what can be said with some degree of certainty is that the period was witness to a dramatic change in climatic and environmental conditions, so much so that the paucity of sites from the Middle Archaic has been conjectured to be resultant from the fluctuating environment.

Between 8500 and 5100 B.P., a wide-ranging climatic shift began to take hold in the Great Lakes region. Known as the Hypsithermal Interval, this change would inaugurate a new epoch in human habitation of the Great Lakes. Following the retreat of the glacial ice sheets to the north of present-day Lake Superior, the climate and vegetation patterns of the Upper and Lower Peninsulas were strongly influenced by the still-active glacial mass. Prevailing winds out of the north during the Paleo-Indian and Early Archaic eras maintained the spruce-pine forests that trailed along the southern edge of the glacier, retarding the ability of prehistoric cultures to effectively exploit the native vegetation. This established boreal forest environment was not conducive to either floral or faunal development, and the stagnation of the environment may have been a mitigating factor behind the decline of site frequency, size, and density during the early stages of the Middle Archaic.

The Hypsithermal Interval radically changed the prevailing ecological conditions of the previous 4000 years since the introduction of human populations into the region. The warming trend experienced across eastern North America profoundly affected the Great Lakes region. The circulation shift off of the glacial north fostered the development of broadleaf forest communities, a habitat much more conducive to human habitation and utility. Aquatic resources began to flourish as the water levels rose, both in the Great Lakes and the ancillary rivers. These factors may have been enough to trigger a rise in human occupation of the region, but the trend from south to north meant that the Upper Peninsula experienced these forces well after the Lower Peninsula.

The Late Archaic period in Michigan, much like other portions of the Great Lakes, has been viewed as an antecedent to the vast cultural changes experienced by native societies during the Early Woodland. By 4500 B.P., the majority of the landforms in the state were covered by the vegetational patterns documented by early European visitors to the area, over 5000 years into the future. The severe weather patterns of the previous 6000 years across the region gave way to a moderate, stable climactic environment that was ideally suited to prehistoric occupation and utility.

Arbitrarily dated in the state between 5000 and 2000 B.P., Late Archaic sites tend to be larger and more complex occupations, focused more on exploiting the natural resources in a specific area over a longer period of time than sporadically across a large prehistoric landscape. The recognized cultural differentiation of the Late Archaic was based primarily on the development of stabilized regional and local environments that made "the maximum use of all resources within restricted areas" (Dragoo 1976:11). This trend towards a greater exploitation economy, begun

towards the end of the Middle Archaic in the Lower Peninsula, culminated in the Late Archaic with what Caldwell (1958) defines as "primary forest efficiency": a complete and effective adaptation to and utilization of a forest-edge environment.

Late Archaic sites, in stark contrast to earlier occupations, are often of relatively large size and represent a longer-duration settlement. These settlement systems reflect the necessity for altering resource procurement strategies as a response to shifting seasonal availability of different resources. During the spring and early summer, for instance, the exploitation of lacustrine resources (such as shellfish, fish, turtles, and migratory birds) produced sites above and adjacent to water courses. The autumn harvest of nuts and vegetables took place at sites that can be characterized as small camps on slight knolls and terraces. Winter camp sites were situated above stream valleys for the exploitation of upland mammalian resources, such as deer and, in the Upper Peninsula, caribou.

The Late Archaic trends seen on the Lower Peninsula represented a relatively swift march towards the cultural dynamism of the Early Woodland. The abundance of Late Archaic sites in the Lower Peninsula, especially those that contain sealed archaeological deposits with diagnostic tools in context with radiocarbon dates (such as the Brandt site on Lake Huron in Iosco County), is not mirrored in the Upper Peninsula. Only a fraction of the few Late Archaic sites in the Upper Peninsula region have produced radiocarbon dates in association with diagnostic artifacts. The North Manitou 3 site (20LU38) and Screaming Loon site (20EM23), both located at the upper extent of the Lower Peninsula (and distinctly separate from the extensive Late Archaic populations of the southern Lower Peninsula), contained lithic material not seen in the southern Lower Peninsula and associated with radiocarbon dates between 3630 and 2830 B.P. The square-based, small side-notched points recovered from these sites have strong morpohological correlates with points identified from Late Archaic sites within the northern Lake Huron basin (Robertson et al. 1999: 104).

In the Lake Superior basin, one of the local expressions of the Late Archaic was termed the Old Copper Complex. Focused in Wisconsin and on Isle Royale (located approximately 45 miles north of the Upper Peninsula shoreline in northern Lake Superior), the Old Copper Complex includes a variety of distinct cultural features, most significantly the exploitation of natural copper resources at these locations. While the native copper had been a known quantity at least as far back as the Early Archaic in the western Lake Superior basin (Martin 1999:153), the Late Archaic period was witness to a sharp upswing in the mining and utility of copper. Data from mining pits on Isle Royale indicate that the procurement of copper at that location dates to at least the Middle Archaic, and sites on the island during that time period include a small amount of copper artifacts within the assemblage (Martin 1999:155).

Late Archaic artifacts related to the Old Copper Complex include awls, tanged knives, axe/hatchet blades, gouges, socketed spear points, tanged points, fish hooks, and gorgets. Some of these artifacts bear striking resemblance to material recovered from the Maritime and Laurentian Archaic traditions, located in the eastern Great Lakes region. The material culture of the Laurentian Brewerton phase included copper tools and ornaments, which suggests that a native trade economy in the Great Lakes may have been expanding during the Late Archaic. In addition, typical Laurentian side-notched projectile points have been recovered in direct association with copper artifacts excavated from burials of the Old Copper Complex (Mason 1981:166). The presence of such imported raw materials as copper in Brewerton assemblages, as well as the appearance of similar lithic artifact types, hints at an incipient, yet wide-ranging, exchange network of a scale not seen in the Great Lakes region prior to this era, and on par with that of the later Middle Woodland (Ritchie 1980:101).

In spite of the extensive utilization of copper documented across the upper Great Lakes during the Late Archaic, recent research may suggest that there is no direct correlation between sites in upper Lake Superior (on Isle Royale) and sites on the Upper Peninsula (Clark 1996:130). The Shield Archaic appears to have developed in the upper Great Lakes, which is more of a blanket term for Late Archaic-era sites of the region that have not displayed diagnostic evidence of one of the more robust traditions of the Lower Peninsula and the western Great Lakes. These sites preserve features which resemble an earlier Archaic tradition, including lithic material similar to the lanceolate types of the much earlier Plano horizon.

The terminal end of the Archaic tradition in the Great Lakes is represented by the introduction of ceramic technology, manifest in artifact assemblages as early as 4000 B.P. in the southern Great Lakes. The current archaeological record of the region suggests that, while societies of the Lower Peninsula began to develop into the larger-scale societies seen elsewhere in eastern North America, the traditional Late Archaic lifeway remained the prevailing characteristic of the peoples on the Upper Peninsula.

4.1.3 Woodland Period

Typically defined by the widespread introduction of a new native technology, ceramics, the Early Woodland period across the lower Great Lakes and eastern seaboard of North America is a well-defined stage in what has been seen as an inexorable march of indigenous populations from the semi-nomadic Archaic lifeways to the large-scale settlements of the Mississippian and Late Woodland periods.

The introduction of a local ceramic industry in the upper Great Lakes ushered in a new era, one which mirrored the developments seen in the lower Great Lakes during the Early Woodland, but temporally contemporaneous with the Middle Woodland. While it may be an oversimplification to append an entire societal shift to a single technological advance, the appearance of ceramics in the archaeological assemblages after 2000 B.P. is a strong indicator of a different lifeway, distinctly separate from that seen over the previous 5000 years. Termed by Fitting (1975:98-99) the Lake Forest Middle Woodland, this lifeway (subdivided into several regional variants) profoundly altered the cultural landscape of the upper Great Lakes.

The Middle Woodland period in eastern North America was witness to a wide variety of different societal groups, developing complementary technologies while interacting in a large economic sphere that indirectly linked the Atlantic seaboard with the major watershed of the continental interior, the Mississippi River. The presence of exotic materials in Middle Woodland assemblages (including the native copper of upstate Michigan, which has been recovered in archaeological deposits across the east coast) is a leading indicator of the active interaction between different cultural groups. Almost all Middle Woodland sites east of the Mississippi contain evidence of a local ceramic industry, relatively stable settlement patterns, and an elaboration of burial practices. The most widely-recognized, and, perhaps, influential Middle Woodland culture is the Hopewell, centered in modern-day Ohio and extending out into the surrounding regions, including southern Michigan. The overtly elaborate mounds and earthworks are emblematic of the era, and represent one of the most distinctive cultural efflorescence of North American prehistory.

It was, therefore, on the periphery of this dynamic cultural environment that the Lake Forest Middle Woodland developed across the upper Great Lakes. Situated at the northern fringe of the Hopewellian sphere of influence (which extended north into the central Lower Peninsula) and to the east of several similar prehistoric cultures, the Lake Forest maintained an autonomy during a period of high cultural interactivity. While there are several regionalized complexes within the Lake Forest, the expansive mortuary practices and distinct ceramic and lithic

technologies of the neighboring societies failed to make a profound impact on Lake Forest society. Regional complexes within the overarching Lake Forest tradition include the Green Bay/Bay du Noc, Menominee River, Copper Country, Southeast Lake Superior Shore/Naomikong Point, St. Mary's River, Traverse Corridor, Straits of Mackinac, and Goodwinian (Brose and Hambacher 1999:178-189). While all of these complexes display a certain degree of local variation, there are commonalities in artifact type, settlement/subsistence patterns, and mortuary practices.

It has been postulated that Lake Forest Middle Woodland cultures focused on exploiting riverine resources, including, for what may have been the first time, seasonally-spawning fish populations (Brose and Hambacher 1999:177). Cleland (1974), among others, viewed Middle Woodland settlement patterns as slightly-modified variants of Late Archaic lifeways, with the emphasis on large inland camps and a near-abandonment of the lake shorelines. This view has been contested by data from large, coastal sites, like the Summer Island site on the northern Lake Michigan coast, which Brose (1970) has suggested is representative of a sustained occupation designed to exploit coastal resources. What cannot be disputed through an examination of the archaeological record is the dependence of Lake Forest peoples on fishing, whether on the coastal shorelines or above the various rivers. Upper Peninsula Artifact assemblages recovered from Lake Forest include a variety of materials. Primarily, however, most Lake Forest ceramics (or regional variations thereof) sources (predominantly quartz and quartzite), a remains consistent with the supposition that the lacustrine resource procurement (fishing). The described by Brose and Hambacher (1999:173) tenoned coils (and) oblique or horizontal panel. These ceramics contained designs and motifs seen in Hopewellian sites to the south; these sites are also unique, although southern contexts (such as Cleland's identification of Snyders Cluster points from the Spider Cave site in Delta County, on the northern shoreline of Lake Michigan [Cleland and Peske 1968]).

The prehistoric utilization of copper, which had been a component of archaeological deposits in for over 6000 years, was manifest on sites not only across Michigan during the Middle Woodland, but was also disseminated across eastern North America during the era. While it is unclear exactly what role copper played in the Lake Forest cultures, the copper mined in the Lake Superior basin eventually found its way into Hopewellian burial mounds across Ohio, fashioned into iconic works of native art. The copper that has been found in Middle Woodland contexts has typically been in the form of tools, either supplanting or accompanying the lithic tool kit. While many of these copper implements have been sourced back to the Lake Superior basin, as of yet there has not been a Middle Woodland-era mining site identified on the major copper source, Isle Royale. This may suggest that the mining of copper was conducted by small groups of people at sporadic intervals, rather than a concerted effort at an economic system dependent upon the trade and utility of copper (Martin 1999).

By the mid-point of the first millennium of the modern era, the cultures of Michigan had adapted to a changing climate, both in terms of ambient weather patterns and neighboring cultures. Six hundred years of what can be called a "Woodland" lifeway (ill-defined as a seasonally-shifting settlement pattern designed to exploit natural resources, primarily fish, while developing a ceramic technology) had produced cultures that were as similar as they were at variance. The Late Woodland period would bring about a shift towards the cultures that would occupy the region when European contact ended the prehistoric era of the upper Great Lakes in the seventeenth century.

Elsewhere in eastern North America, the Late Woodland was witness to a denouement of the elaborate social organization that was the Hopewellian sphere of influence. All but gone are the elaborate mortuary practices of the Hopewell world, which had reached an apex with the construction of the anthropomorphic and geometric mound complexes of the lower Great Lakes.

The large villages of the Middle Woodland were dramatically reduced in size and distribution, and the social stratification represented by distribution of wealth (manifest primarily in burial goods) becomes less distinct. For the cultures of Michigan, living on the periphery of this Hopewellian world, the Late Woodland can be viewed as a relatively stable era with a trend towards incorporating new natural resource procurement strategies, perhaps to replace the copper trade economy that may have flourished during the Middle Woodland. Across the region, known Late Woodland sites exhibit a set of shared, distinctive characteristics that were representative of a cultural dynamic which focused on exploiting both faunal resources as well as wild rice habitats. This incorporation of wild rice into the native diet, seen most clearly on sites at the western end of the peninsula (and mirroring neighboring sites in upper Wisconsin), marks a profound shift in native lifeways that would alter the settlement and subsistence patterns for people of the region through to the Historic Period. Site distribution will now focus on exploiting not just profitable riverine resource locales (such as the seasonally-spawning fish sites of the Middle Woodland), but wild rice habitats as well (Brashler et al. 1997:565; Martin 1999:221-222).

The Late Woodland period across the upper Great Lakes effectively marks the end of the prehistoric era for the region. While the outward push of the Mississippian cultures from the southeastern portion of North America can be seen by the increased presence of these types of ceramics in archaeological deposits, the settlement and subsistence patterns demonstrated by early Late Woodland sites are conjectured to be markedly similar to those documented by European visitors towards the end of the seventeenth century. As a result, it is tempting to utilize Contact-era ethnohistoric sources to describe the cultural and societal patterns of the Upper Peninsula that become manifest as archaeological deposits. As problematic as this exercise inherently is, it may be likely that the tribal moieties documented by early European chroniclers were mirrored during the long preceding years of the Late Woodland.

4.2 Historic Michigan

The nebulous, and often speculative, boundaries between prehistoric temporal periods in eastern North America stand in sharp contrast to the division between the prehistoric and historic eras for the Great Lakes. While there is a somewhat hazy interregnum between the two blocks of time (often referred to as the Protohistoric Period), the arrival of Europeans into the region was a clear harbinger of the profound changes that would, over the relatively short course of two hundred years, transform the Lake Superior and Michigan watersheds into an industrial and commercial center for the American empire. The discussion below attempts to provide a framework for this tumultuous era, during which the indigenous societies of the region would be replaced by the modern villages, towns, and cities of the industrialized West.

4.2.1 Protohistoric (1492 A.D. – 1670 A.D.)

Similar to most of eastern North America, there is apocryphal evidence for European interaction with native North American societies that predates the advent of what has become known as the era of European Exploration. From Nordic adventurers in the northeast to Chinese treasure fleets off the Atlantic Coast, these various accounts have yet to be proven within the archaeological record. What can be ascertained, with some degree of certainty is that, as early as the mid-fifteenth century, Europeans began to appear off the Atlantic Coast of the North American landmass. Over the course of the next two hundred years, different groups of European peoples exploited the advantageous position provided by a disparity in technology and, even more importantly, immunity to airborne pathogens, to encroach into the margins of the North American mainland.

It is difficult to affix a date to the first encounter between a European and the people of the region, and even more problematic to attempt to estimate when items of European manufacture reached the Great Lakes. It seems likely that the encroachment of French-speaking peoples into the watershed of the St. Lawrence River, which began as early as Cartier's expedition of 1535, would have introduced a variety of material into the exchange economy of the upper Great Lakes that may have reached people on the Lower Peninsula. Cleland (1999:280) posits that the first historic-period site in Michigan is the Cloudman site, located on Drummond Island at the extreme eastern end of the Upper Peninsula near the northern entrance to the Mackinac Straits. This site produced a variety of Late Woodland artifacts in context with European material (a handful of iron scraps, glass beads, and a copper knife fashioned into a French form). It has been hypothesized that the historic component on this site, which most likely dates to between 1615 and 1630, represents an Ottawa settlement, and the European artifacts were obtained from trade with more eastern moieties, such as the Huron (Branstner 1992, 1995).

As the small French settlements in the St. Lawrence watershed constituted the most proximal group of Europeans to the upper Great Lakes, it should come as no shock that the cultural groups across the region would come to be known through a Gallic filter. While only "official" (government-sanctioned) expeditions into the upper Great Lakes were recorded, it seems likely that individuals or small groups of French would have ventured out into the lakes. Certainly, the missionary work of French Jesuits to the Huron of the eponymous lake and Georgian Bay brought Europeans into the region between 1630 and 1650.

It was during this period that the names assigned to the peoples of the upper Great Lakes would become affixed for posterity. Most of the early ethnohistoric information recorded for the peoples of the upper Great Lakes was collected by Jean Nicolet, a Frenchman who lived with a variety of groups of the region as early as 1618. The French identified two distinct linguistic groups across the region, which they referred to as the Iroquoian and Algonquian. The groups within the Algonquian sphere included the various peoples of the western Great Lakes, including those described by Nicolet in the Lake Superior basin. Nicolet lists three groups as occupying the Lake Superior basin of the Upper Peninsula prior to 1650: the Saulteaur (also known as the Pahouitingwach Irini, or people of the falls), the Mikinac (turtle people), and the Nouquet (bear people). These three groups are all ascribed to different portions of the Upper Peninsula. The Saulteaur occupied the eastern portion of the peninsula, centered above the falls on the St. Mary's River. To the south, Mikinac lands encompassed what would become known as the Mackinac Straits. The lesser known Nouquet were described as occupying the central portion of the Upper Peninsula (and would therefore be the closest group to the project area). Little else besides place-names were provided by Nicolet for these groups, but they have been accepted as the forerunners of the Ojibwa, or Chippewa, peoples of the historic period (Cleland 1992:86).

In addition to the native moieties discussed above, the Menominee occupied the northern coastline of Lake Michigan. The Menominee, whose name derived from the native word for "wild rice" (Oumalouminek, or manomin) in the Algonquian tongue, occupied the area around the watershed that would become known by the same name at the time of Nicolet's journeys across Lake Michigan (in 1634-35 A.D.). During the seventeenth century, the Menominee occupied villages stretching across the entirety of the northern shoreline of Lake Michigan, from the Mackinac Straits in the east around to the entrance to Green Bay in the west (an area that roughly corresponds to modern-era Menominee settlements in northeastern Wisconsin).

At some point between 1640 and 1650, bands of Iroquois-speaking peoples from modern-day New York State conducted a devastating series of raids into the country of the Huron, perhaps in an effort to replenish a population devastated by the introduction of European pathogens, carried into the center of Iroquois communities by French missionaries and entrepreneurs. Armed with modern guns supplied by (or taken from) the French of Quebec and the Dutch of the

New Netherlands, Iroquois warriors invaded the heartland of the Huron country in search of captives, and most likely not the monopoly of the fur trade that was once conjectured to be at the heart of the conflict. These "mourning-wars" would almost certainly have disrupted native trade networks of the upper Great Lakes, as the Huron moved west to escape the depredations of the Iroquois. The longer-reaching impact of the conflict on the peoples of the upper Great Lakes was the rapid displacement of Huron and Ottawa from their traditional lands around Lake Huron and the Georgian Bay (present-day southern Ontario) westward into portions of the Upper and Lower Peninsulas, and eventually as far west as Green Bay. This movement led the Iroquois to venture further out in search of captives, which effectively depopulated the Lower Peninsula for the next fifty years. French accounts of an Iroquoian war band raiding into the Saulteaur country on the eastern end of the Upper Peninsula intimate that the Saulteaur decimated their attackers to such an extent that Iroquois attention was turned southwards during the remainder of the period (Cleland 1992:87-90). Incidental to the project area, groups of displaced Huron (known in the accounts as Ottawa and Petun) had settled as far west as Chequamegon Bay, on the southern Lake Superior shoreline in modern-day Wisconsin.

There is an extremely small number of protohistoric sites known in Michigan. The vast majority have been identified within, or directly adjacent to, the Mackinac Straits, a location that would become a focal point for both European and indigenous activity during the next century.

4.2.2 Historic Indian/European Imperial Period (1670 A.D. – 1815 A.D.)

In 1671, an entrepreneur (and sometime diplomat) in the employ of Quebec visited the mission at St. Mary's, located adjacent to the village of the Saulteaur. Known as Saint Lusson, he attended, in the name of the King of France, a large gathering of different native groups and laid official claim to the Lake Superior basin for the French. And so, unlike traditional European acquisition of land that required a war of conquest to secure the desired territory, the upper Great Lakes were brought within the imperial arms of the French monarchy by the pronouncement of a minor colonial functionary to an assembly of native warriors who did not even speak the language.

The depredations of the Iroquois during the 1650s and 1660s profoundly altered the cultural dynamic of the upper Great Lakes. Over the course of the next fifty years, the lands once occupied by the Huron Confederacy (a loose conglomeration of peoples in the Iroquoian language group) and the lands of the Lower Peninsula of Michigan were left predominantly vacant, apart from small bands of hunters who exploited game across the region. The Huron had been scattered across eastern North America, either incorporated into the Iroquois world of the southern Great Lakes or splintered into smaller groups on the shores of the western upper Great Lakes. It was into this environment that the Fleur-de-Lis of imperial France was planted, ushering in the advent of the historic era to the Lake Superior and Lake Michigan basin.

The near-total eradication of the Huron meant that the French Jesuit missions had to move deeper into the upper Great Lakes in search of converts to the cross. As a result, new missions were founded in close proximity to villages of the western Great Lakes, including several on the Upper Peninsula. Proselytizing efforts were directed at the Saulteaur near the falls of St. Mary's (Raymbault, the site of the first Jesuit mission in the Lake Superior basin, founded in 1641), at the conglomerate settlements around the Mackinac Straits, and along the southern shoreline of Lake Superior at the mixed Huron refugee community of Chequamagon Bay. In addition, a short-lived mission to the Nouquet was established at St. Michel in 1659. The attempt to incorporate European belief systems into the native cultural mores did not always take, and the majority of the upper Great Lakes Jesuit missions were quickly abandoned. The mission located at the Mackinac Straits, known as St. Ignace by the French, did, however, gain a foothold into the interior of the Great Lakes that would soon be exploited by the government of New France.

Over the next fifty years, the small native settlement at the straits grew in size, bolstered by the migration of displaced Hurons from the east, seasonal hunting bands looking to turn a profit, and an influx of French traders, officials and soldiers to the newly-founded Fort du Baud. The burgeoning fur trade, which reached its apex around 1685, provided a serious economic motivation for native societies to interact with the French. The settlement became a focal point for French activity in the upper Great Lakes, as missionaries and traders stopped on the way to the distant reaches of Lake Superior. This included several persons of particular significance to the region, including the Jesuit missionary Marquette (who founded the mission site at the straits), and Antoine de la Mothe de Cadillac, who was commandant of Fort du Baud for a time.

The eighteenth century was a time of climactic change for the denizens of the upper Great Lakes, as the various societies were drawn inexorably into the armed conflict between the competing imperial aspirations of France, England, and, eventually, the United States. This association, which grew out of a shared symbiotic economy that developed as a result of the fur trade, would prove exceedingly difficult for the native peoples to engage in, and would eventually lead to catastrophe.

As France viewed the upper Great Lakes as their colonial dominion, the government of New France, centered in Quebec, considered the Ojibwa, Ottawa, and Menominee (to name but a few) of the region subject to the crown's authority. Hundreds of miles from formal civil authority, however, the edicts of the French were viewed entirely differently. White (1991) includes the region as part of the Pays d'en Haut, or middle ground, where native societies and European citizens (primarily missionaries and traders) developed a distinctly different culture than that east of the Appalachians. By his account, the perceived dominance of European culture, both spiritually and temporally (and materially), was not a substantive part of the eighteenth century landscape of the upper Great Lakes. Instead, the native cultures adopted the French into a worldview that integrated with pre-existing social mores, and in turn the French of the frontier accepted this situation, to the extent that traditional native belief systems were honored. Over the course of the first fifty years of the eighteenth century, a unique environment was fostered across the region, where French presence did not necessitate European exploitation, and the vast colonization practices seen on the Atlantic seaboard were replaced by a shared community (White 1991).

When the end came for the indigenous era in Michigan, however, it proceeded quickly. European imperial designs on the North American continent touched off a series of wars which culminated in the worldwide conflagration known alternately as the French and Indian War and the Seven Year's War. One of the main theaters for the conflict was the lower Great Lakes and Ohio River valley, a region contested by both the French and English crowns (and, to some extent, the colonial governments subservient to each). While direct conflict did not extend into the Upper Peninsula, the native populations were pulled into the war by their ties to New France.

During the previous fifty years, New France had begun a process of fortifying strategic points in the Great Lakes, with an eye towards protecting what they considered their domain. The encroachment of other European interests into the region, including the Hudson Bay Company to the north and the active English-speaking influx of traders to the south, necessitated a much stronger presence in the Lakes for policy-makers in the corridors of Versailles. A chain of frontier forts was constructed, linking the St. Lawrence River with the Mississippi. Old Fort du Baud was abandoned, replaced by a much sturdier military post known as Fort Michilimackinac in 1715. Fort Ponchartrain was erected at the entrance to the straits between Lake Erie and Lake St. Clair (the eventual site of the modern city of Detroit). These highly obtrusive manifestations of imperial hegemony into the region became focal points for native activity and trade, and

solidified the relationship between the Quebec government and the conglomerate villages of the Upper Peninsula region.

Fort Michilimackinac (known at its construction as Fort DeLignery) is the primary archaeological site of the period in the region. Located on the southern, Lower Peninsula side of the Mackinac Straits, the fort was constructed in 1715, within view of the abandoned settlement of St. Ignace (which was vacated at the turn of the eighteenth century). The small wooden outpost of 1715 was soon restructured, as both French and indigenous peoples congregated near the source of material goods and information. The Fort would grow in size over the next thirty years, as the French government attempted to secure a stronger foothold in the northern lakes. As the year 1744 began, however, imperial conflicts between France and England ignited into open war, a situation that would last through to 1763 with the capitulation of New France and the abandonment of French dominion over the Great Lakes.

4.2.3 Modern Michigan and Oakland County (1800 A.D. – Present Day)

Originally annexed as part of the Northwest Territory in the late eighteenth century, the Michigan Territory was established by an act of Congress in 1805, despite the fact that considerable portions of the eventual state was the province of various Native American groups. The 1807 Treaty of Detroit, negotiated between the United States government and several Native American nations, including the Ottawa, Wyandot, Potawatomi and Chippewa, ceded tribal claims to most of southeastern Michigan and portions of the new state of Ohio. Tensions between British Canada and the United States forestalled large-scale colonial intrusions into the territory until after the War of 1812. As southeastern Michigan was one of several primary theaters of the conflict, the conclusion of the war brought on the end of Native American occupation in the territory. Surveyors broke into the woodlands to the west of Detroit in the half-decade after the war's end, establishing provident locations for settlement across the landscape. One of these, Rochester, was settled in 1817, and became the first permanent settlement within what would become Oakland County (Pomeroy 1990).

Oakland County was established by Governor Lewis Cass, a veteran of the War of 1812, in 1819, soon after sustained Euro-American settlement was established across this portion of the state. As was the case across Michigan, Ohio and Indiana during this period, the decades following the end of the final war with Britain ushered in a wave of surveying, settlement and expansion, fostered by improvements in transportation and communication which expedited commerce across the landscape. Michigan was eventually christened as a full State of the Union on January 26, 1837, and the railroads followed soon thereafter. By the end of the nineteenth century, six different railroads were laid across Oakland County (Pomeroy 1990).

5. Field Methodology

The field survey of the project APE was conducted using standard archaeological reconnaissance methods, as outlined by the MHPO and OSA. The methods were developed through the formulation of a Research Design (see **Chapter 2**), previous consultation with the Michigan OSA on similar undertakings across the region, and examination of the 2004 Phase I archaeological report detailing the field reconnaissance investigations undertaken on the initial section of the cemetery. These methods included visual surface inspection and subsurface shovel testing. The proposed Phase 2 expansion area was examined through the delineation of linear survey transects at 15-meter (50-foot) intervals. Individual sample loci (SL) grid points were then established along each transect. The systematic survey of the individual SL points at the 15-meter (50-foot) interval allowed for a full controlled pedestrian inspection, with shovel tests excavated in areas which were not demonstrably disturbed, on steep slope, or covered in standing water. Each hand-excavated shovel tests measured a minimum of 50 centimeters in diameter, or 50 centimeters by 50 centimeters square, and extended to a depth of 10 centimeters into sterile deposits, where such could be identified. All soil removed from each test was screened through six millimeter mesh hardware cloth and any artifacts recovered were placed in plastic sample bags marked with the appropriate segment, shovel test, and depth designations. In instances where archaeological materials have been recovered from a shovel test, four additional shovel tests would be excavated around the positive test at the reduced interval of 7.5 meters, in order to assess the extent and continuity of archaeological deposits.

The use of a GPS unit proved invaluable in recording data, as well as accurately checking the location of the various survey areas while conducting the fieldwork. Electronic versions of project engineering plans obtained from the client were utilized to create map files accessible in the field using a Trimble TDS 1 (GPS) with a Geo XT receiver. The boundaries of the direct APE for the project are depicted on these files and, prior to entering the field, were superimposed with a grid of data points which relate to SLs in the field spaced at the standard 15-meter interval. In the field, the real-time navigation function of the GPS receiver enables the archaeologists to find with sub-meter precision each SL represented on the electronic grid. This pre-determination of survey design greatly enhances the regularity and efficiency of the survey compared with, for instance, the alternative method of pacing distances between SLs and recording their positions with the GPS in the field.

Within the files loaded onto the hand-held GPS receivers, each of these pre-determined data points is associated with a number of electronic value fields. These value fields relate to: the survey methodology used at a specific SL; presence or absence of archaeological resources; and the general character of artifacts collected (historic/prehistoric), and these data were input into the receiver on the spot. Additional data regarding topography, vegetation, and previous disturbance (e.g. logging roads, mining talus) at the specific SLs were recorded by hand on paper forms. The GPS receivers were also used to map archaeological resources encountered and a variety of landscape features of relevance to the survey.

As the Phase I archaeological survey conducted on the Project land requirements included within this volume did not encounter/recover any cultural materials, the AECOM laboratory and analytical processes typically applied to archaeological assemblages is not detailed herein. Documentary materials (field notes, laboratory notes, analysis forms, photographs, etc.) were processed, cataloged, analyzed, and prepared in accordance with 36 CFR Parts 79 and 800.

6. Phase I Archaeological Field Reconnaissance Results

AECOM conducted the archaeological field reconnaissance on the proposed Project area detailed within this report in May 2019. As recommended by the Michigan SHPO and OSA for investigations in Michigan, a 15-meter (50-foot) survey grid was applied across the approximate 12.94 hectare (32.05 acre) of the Phase 2 expansion area which was not covered by the 2004 Phase I survey work. A total of 6.02 hectares (14.87 acres) of the Phase 2 expansion was addressed previously by the 2003 Phase I survey, as indicated on **Appendix A, Figures 6-1 and 6-2**. The 12.94 hectares (32.05 acres) of the Phase 2 expansion not previously addressed through archaeological field reconnaissance was the subject of the 2019 fieldwork; however, the entirety of the Project footprint was visually inspected, to confirm disturbance to the previously-surveyed area.

The Phase 2 Expansion Project area is defined by four settings in which survey was conducted: the developed portion of the Cemetery (Phase 1, previously surveyed by URS in 2003; see Parson and Feeney 2004), a small wooded lot located along the western margins of the Project, a large, open agricultural field situated within the south-central portion of the Project, and a small agricultural field located in the southeastern corner of the Project land requirements. All of these areas are located immediately west and south of Fagan Lake. Survey focused on the latter three landscapes where the topography can be described as low-lying with poor drainage. Repeated rain events caused pools of standing water in some places and overall wet ground conditions. Wetland-type grasses and hydric soils were observed within these settings. An existing, graveled access road extends around the southern perimeter of the Project area through this low terrain. Narrow tree lines between the access road and agricultural fields were inundated with water at the time of survey. While unplowed, small portions of the open agricultural fields displayed 75 to 100 percent ground surface visibility at the time of survey, the majority of these areas required shovel-test excavations.

The delineation of the 15-meter (50-foot) testing grid across the portion of the Phase 2 Expansion which was not surveyed previously resulted in a total of 679 SL for survey. Of this total, 184 SL were surveyed through the hand excavation of shovel tests, with the remainder visually surveyed due to wet conditions, obvious visible disturbance or high levels of ground surface visibility within cultivated fields. The following table details the survey metrics recorded during Phase I investigations.

Table 6-1. Phase I Archaeological Survey Metrics

SL Type	Total SL
Shovel Tests	184
Pedestrian, Cultivated	30
Pedestrian, Wet	83
Pedestrian, Disturbed	382
Totals	**679**

Shovel tests excavated across the Project area exhibited soil profiles consistent with those recorded for the region. Ground conditions specific to the Project area contributed to numerous shovel tests infilling with water at the base of excavation and consistently wet soils. Smooth, unconsolidated glacial till of variable size was recorded throughout a majority of shovel tests. All sample loci field forms are included in Appendix D of this report.

Shovel tests investigated within the wooded section of the Project area were arranged around a main pool of standing water, and were extremely saturated with the exception of a few dry

shovel tests excavated along the edge of the woodlot, adjacent to the existing gravel road. SL 249 was located northwest of a pool of standing water and the soil profile consisted of very dark brown (10YR 2/2) loam to a depth of 20 centimeters below ground surface, followed by ten centimeters of a light yellowish brown (10YR 6/4) sandy loam. The shovel test filled with water at the base of excavation and was negative for cultural material. The shovel test at SL 159 was excavated approximately ten meters west of the gravel access road and contained 25 centimeters of a dark brown (10YR 3/3) sandy loam, underlain by a yellowish brown (10YR 5/6) sandy loam to a final depth of 35 centimeters below ground surface. The soil within this shovel test was noted as dry with many roots throughout. No cultural material was identified within this shovel test. The following table details these representative shovel tests.

Table 6-2. Representative Soil Profiles, Woodlot

<table>
<tr><th>Depth (below ground surface)</th><th>SL 249</th><th>SL 159</th></tr>
<tr><td>0-5 cm</td><td rowspan="4">O Horizon
10YR 2/2 loam
(0-20 cm)</td><td rowspan="5">Ap Horizon
10YR 3/3 sandy loam
(0-25 cm)</td></tr>
<tr><td>5-10 cm</td></tr>
<tr><td>10-15 cm</td></tr>
<tr><td>15-20 cm</td></tr>
<tr><td>20-25 cm</td><td rowspan="2">Bw1 Horizon
10YR 6/4 sandy loam
(20-30 cm)</td></tr>
<tr><td>25-30 cm</td><td rowspan="2">E (A2) Horizon
10YR 5/6 sandy loam
(25-35 cm)</td></tr>
<tr><td>30-35 cm</td><td>Unexcavated</td></tr>
</table>

A majority of shovel tests were excavated within open agricultural fields in the southern portion of the Project area. SL 24 was situated in a small, level agricultural field near Fagan Road. The shovel test excavated at this location consisted of a dark grayish brown (10YR 4/2) sandy loam to a depth of 25 centimeters below ground surface, followed by a pale brown (10YR 6/3) sandy loam to a final depth of 35 centimeters below ground surface. Soils within this shovel test were documented as wet and containing approximately five percent rock/gravel (glacial till); no cultural artifacts were identified. The soil profile observed within the shovel test excavated at SL 678 within a large agricultural field contained 26 centimeters of wet brown (10YR 4/3) sandy loam, underlain by a wet yellowish brown (10YR 5/6) sandy loam to a final depth of 36 centimeters below ground surface. Smooth, round rock (glacial till) was recorded at the interface between strata. Shovel test SL 192 was excavated near the southwestern corner of this same agricultural field, adjacent to an area of standing water, and consisted of approximately 20 percent glacial till. The soil profile in this shovel test was composed of a brown-dark brown (10YR 3/2-3) Ap horizon to a depth of 25 centimeters, overtop a brownish yellow (10YR 6/6) sandy loam mottled with a yellowish brown (10YR 5/8) sandy loam to a depth of 35 centimeters below ground surface. This second stratum contained iron and manganese inclusions. The following table lists these various representative soil profiles observed within shovel tests excavated across the agricultural fields located within the Project area.

Table 6-3. Representative Soil Profiles, Agricultural Fields

Depth (below ground surface)	SL 24	SL 678	SL 192
0-5 cm	**Ap Horizon**	**Ap Horizon**	**Ap Horizon**

<table>
<tr><th>Depth (below ground surface)</th><th>SL 24</th><th>SL 678</th><th>SL 192</th></tr>
<tr><td>5-10 cm</td><td rowspan="4">10YR 4/2 sandy loam
(0-25 cm)</td><td rowspan="4">10YR 4/3 sandy loam
(0-26 cm)</td><td rowspan="4">10YR 3/2-3 sandy loam
(0-25 cm)</td></tr>
<tr><td>10-15 cm</td></tr>
<tr><td>15-20 cm</td></tr>
<tr><td>20-25 cm</td></tr>
<tr><td>25-30 cm</td><td rowspan="2">B Horizon
10YR 6/3 sandy loam
(25-35 cm)</td><td rowspan="3"></td><td rowspan="2">B Horizon
10YR 6/6 sandy loam mottled w/ 10YR 5/8 sandy loam
(25-35 cm)</td></tr>
<tr><td>30-35 cm</td></tr>
<tr><td>35-40 cm</td><td>Unexcavated</td><td>B Horizon
10YR 5/6 sandy loam
(26-36 cm)</td><td>Unexcavated</td></tr>
</table>

Formal Phase I archaeological field reconnaissance was conducted across the 18.98 hectares (46.92 acres) of potential Project land requirements, which varied from existing cemetery facilities, to woodlands and open agricultural fields. The entirety of the Project area was visually inspected for cultural resources, and 184 shovel tests were excavated within the previously-unsurveyed portion of the Phase 2 Expansion. As a result of this field survey, no cultural resources were identified within the defined Project limits.

7. Conclusions and Recommendations

In May 2019, AECOM conducted Phase I archaeological investigations for the Phase 2 Expansion Project at the Great Lakes National Cemetery, located in Holly Township, Oakland County, Michigan. This Project represents the second stage of development under the federal lead agency, U.S. Department of Veteran Affairs, National Cemetery Administration; a previous Phase I archaeological survey (conducted in late 2003 by URS) examined 22.96 hectares (56.73 acres) for the initial Phase 1 of the Project, while the current survey work focused on the on 18.98 hectares (46.92 acres) of potential land requirements associated with the Phase 2 Expansion. Approximately 6.01 hectares (14.87 acres) of the Phase 2 Expansion is co-located with the prior Phase I archaeological survey, and was therefore visually inspected as part of the current survey work conducted for the Project; the remaining 12.97 hectares (32.05 acres) of the Phase 2 Expansion was systematically surveyed for cultural resources in 2019.

Prior to initiation of the field reconnaissance survey, AECOM examined available archival mapping and cultural resources data collected from the Michigan SHPO and OSA, including the initial survey of the Phase 1 Project area conducted by URS in 2003. This archival research indicated that several archaeological resources have been inventoried previously across this portion of Oakland County, including six identified during the 2003 archaeological investigations conducted on Phase 1 of the Project. While no recorded archaeological sites have been documented to occur within the portion of the Phase 2 Expansion which has not been surveyed previously, three of the sites identified as a result of the 2003 survey work were recommended as potentially eligible for the NRHP, and two were examined through Phase II archaeological testing in 2004. Based on analysis of these data (which was revelatory as to site location variables including topographic setting, distance to water, and slope), the Project was considered to display a moderate potential for containing historic-era archaeological resources, most likely associated with prehistoric occupations and/or rural homesteads. AECOM followed the archaeological field methods recommended by the Michigan OSA on all Project land requirements, implementing a 15 meter (50 foot) testing interval, supplemented by total visual pedestrian inspection of the entire Project APE defined for the Phase 2 Expansion.

As a result of the 2019 Phase I archaeological field reconnaissance conducted on the Phase 2 Expansion, a total of 12.97 hectares (32.05 acres) was systematically surveyed for cultural resources in 2019 through application of the 15-meter (50-foot) testing interval. The 6.01 hectares (14.87 acres) of the Phase 2 Expansion covered by the prior 2003 Phase I survey were visually examined to confirm disturbance (and therefore not included within the survey metrics). The survey of the Phase 2 Expansion was accomplished through the examination of 679 SL on the 15-meter (50-foot) testing grid delineated across the 12.97 hectares (32.05 acres) of Phase 2 which was not surveyed previously for cultural resources. Of this total SL count, 184 were examined through the excavation of shovel tests, with the remainder pedestrian inspected due primarily to obvious evidence of modern disturbance. The field survey did not encounter any new or previously-identified archaeological resources within the proposed Phase 2 Expansion for the Great Lakes National Cemetery. No further work is therefore recommended prior to development of the Phase 2 Expansion Project.

8. References Cited

Beers, F.W.
1892 *Atlas of Oakland County, Michigan*. F.W. Beers Publishers, New York.

Branstner, C.N.
1992 *National Register of Historic Places Archaeological Testing of 20Ch06: A Multi-component Site on Drummond Island, Michigan; 1991 Investigations.* Report on file in the Office of the State Archaeologist, Michigan Historical Center, Lansing, Michigan.

1995 *Archaeological Investigations at the Cloudman Site (20Ch06): A Multi-component Native American Occupation on Drummond Island, Michigan; 1992 and 1994 Investigations*. Report on file in the Office of the State Archaeologist, Michigan Historical Center, Lansing, Michigan.

Brashler, J.G., E.B. Garland, M.B. Holman, W.A. Lovis and S.R. Martin
1997 *Adaptive Strategies and Socioeconomic Systems in Northern Great Lakes Riverine Environments: The Late Woodland of Michigan*. Paper presented at the Urbana Late Woodland Conference, University of Illinois at Champagne-Urbana.

Brose, D.P.
1970 *The Archaeology of Summer Island: Changing Settlement Systems in Northern Lake Michigan*. Anthropological Papers No. 41. Museum of Anthropology, University of Michigan, Ann Arbor.

Brose, D.P., and M.J. Hambacher
1999 The Middle Woodland in Northern Michigan, in *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, John R. Halsey editor. Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Brubaker, L.P.
1975 Postglacial Forest Patterns Associated with Till and Outwash in Northcentral Upper Michigan. *Quaternary Research* 5: 499-527.

Buckmaster, M.M., and J.R. Paquette
1988 The Gorto Site: Preliminary Report on a Late Paleo-Indian Site in Marquette County, Michigan. *Wisconsin Archaeologist* 65: 159-168.

1996 Surface Indications of a Late Pleistocene and Early Holocene Occupation at Silver Lake Basin, Marquette County, Michigan. In *Investigating the Archaeological Record of the Great Lakes State: Essays in Honor of Elizabeth Baldwin Gardner*, M. Holman, J. Brashler and K. Parker, eds. New Issues Press, Kalamazoo, Michigan.

Burhans, S.H.
1857 *Map of Oakland County, Michigan*. S.H. Burhans Publishers, Cincinnati.

Caldwell, J.R.
1958 *Trend and Tradition in the Prehistory of the Eastern United States*. Memoirs of the American Anthropological Association No. 88, New York.

Clark, C.P.
1996 Old Fort and Old Copper: The Search for the Archaic Stage on Isle Royale. In *Investigating the Archaeological Record of the Great Lakes State: Essays in Honor of Elizabeth Baldwin Gardner*, M. Holman, J. Brashler and K. Parker, eds. New Issues Press, Kalamazoo, Michigan.

Cleland, C.E.
1974 Northern Michigan Canoe Indians: A Model for Prehistoric Settlement in the Traverse Corridor of Michigan. Paper presented at the 20th Annual Midwest Archaeological Conference, Evanston, Illinois.

1992 *Rites of Conquest: The History and Culture of Michigan's Native Americans*. University of Michigan Press, Ann Arbor.

1999 Cultural Transformation: The Archaeology of Historic Indian Sites in Michigan, 1670-1940. In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, John R. Halsey editor. Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Cleland, C.E., and R.G. Peske
1968 The Spider Cave Site. In *The Prehistory of the Burnt Bluff Area*, assembled by James E. Fitting. Anthropological Papers No. 34, Museum of Anthropology, University of Michigan, Ann Arbor.

Dorr, J.A., and D.F. Eschman
1970 *Geology of Michigan*. University of Michigan Press, Ann Arbor.

Dorwin, J.T.
1966 *Fluted Points and Late-Pleistocene Geochronology in Indiana*. Indiana Historical Society, Prehistory Research Series IV (III). Indianapolis.

Dragoo, D.W.
1976 Some Aspects of Eastern North American Prehistory: Review 1975. *American Antiquity* 41 (1): 3-27.

Dunham, S.B., T.M. Branstner, M.J. Hambacher and M.C. Branstner
1993 *Cultural Resource Inventory Survey: GENESYS Health Care Systems Project Site, Genesee County, Michigan.* Report prepared by Great Lakes Research Associates, Inc., for Rowe Engineering, Inc.

Ellis, C.J., and D.B. Deller
1982 Hi-Lo Materials from Southwestern Canada. *Ontario Archaeology* 38: 3-22.

Ellis, C.J., and N. Ferris
1990 The Archaeology of Southern Ontario to A.D. 1650. Occasional Publication of the London Chapter, Ontario Archaeological Society 5, London, Ontario.

Fitting, J.E.
1965 Late Woodland Cultures of Southeastern Michigan. Anthropological Papers No. 24, Museum of Anthropology, University of Michigan, Ann Arbor.

1975 *The Archaeology of Michigan: A Guide to the Prehistory of the Great Lakes Region*. Bulletin No. 56. Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Feenstra, J.E.
1982 *Soil Survey of Oakland County, Michigan.* United States Department of Agriculture, Soil Conservation Service, in Cooperation with the Michigan Agricultural Experimental Station.

Fitting, J.E., J. DeVisscher and E.J. Wahla
1966 *The Paleo-Indian Occupation of the Holcombe Beach*. Anthropological Papers No. 27. Museum of Anthropology, University of Michigan, Ann Arbor.

Hixon, W.H.
1900 *Atlas of Michigan*. W.H. Hixon & Company.

Hixon, W.W. & Co.
1930 *Plat Book of Oakland County, Michigan*. W.W. Hixon & Company, Rockford, Illinois.

Holloway, R.G. and V.M. Bryant
1985 *Pollen Records of Late Quaternary North American Sediments*. American Association of Stratigraphic Palynologists Foundation.

Hulbert, A.B.
1930 *Soil: Its Influence on the History of the United States; With Special Reference to Migration and the Scientific Study of Local History*. Yale University Press, New Haven, Connecticut.

Justice, N.D.
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States*. Indiana University Press, Bloomington.

Kapp, R.O.
1999 Michigan Late Pleistocene, Holocene, and Presettlement Vegetation and Climate. In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, John R. Halsey editor. Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Kapp, R.O.
1999 Michigan Late Pleistocene, Holocene, and Presettlement Vegetation and Climate. In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, John R. Halsey editor. Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Martin, S.R.
1999 *Wonderful Power: The Story of Ancient Copper Working in the Lake Superior Basin*. Wayne State University Press, Detroit, Michigan.

Mason, R.J.
1981 *Great Lakes Archaeology*. Academic Press, New York, New York.

McHale Milner, C.
1991 Localization in Small Scale Societies: Late Prehistoric Social Organization in the Western Great Lakes. In *Between Bands and States*, edited by Susan A. Gregg. Occasional Paper No. 9. Center for Archaeological Investigations, Southern Illinois University, Carbondale.

1994 *Regional Identity and Interregional Interaction during the Juntunen Phase, A.D. 1200-1600*. Paper presented at the Canadian Archaeological Association Conference, Edmonton, Alberta.

McPherron, A.L.
1967 The Juntunen Site and the Late Woodland Prehistory of the Upper Great Lakes Area. Anthropological Papers No. 30. Museum of Anthropology, University of Michigan, Ann Arbor.

Ogle, G.A.
1908 *Standard Atlas of Oakland County, Michigan*. George A. Ogle & Co., Chicago.

Parson, K. and C. Feeney
2004 *Phase I/II Archaeological Investigations for the Proposed New National Cemetery Project, Holly Township, Oakland County, Michigan*. Prepared by URS Corporation, for the Department of Veterans Affairs, National Cemetery Administration.

Pomeroy, T.
1990 *Oakland County: Making it Work in Michigan.* Windsor Publications, Inc.

Prufer, O.H. and R.S. Baby
1963 *Paleo-Indians of Ohio*. Ohio Historical Society, Columbus, Ohio.

Ritchie, W.A.
1980 *The Archaeology of New York State*. Revised Edition. Harbor Hill Books, Harrison, New York.

Ritchie, W.A. and R.E. Funk
1973 Aboriginal Settlement Patterns in the Northeast. New York State Museum Service, Memoir 20. New York State University.

Robertson, J.A., W.A. Lovis, and J.R. Halsey
1999 The Late Archaic: Hunter-Gatherers in an Uncertain Environment. In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, John R. Halsey editor. Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Shott, M.J.
1999 The Early Archaic: Life After the Glaciers. In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, John R. Halsey editor. Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Sommers, L.M.
1977 *Atlas of Michigan*. Michigan State University Press, East Lansing.

Stamp, R.B.
1999 An Archaeological Survey of the Groveland Oaks County Park. Technical Report Series No. 25, Rochester, Michigan. Report of Oakland County Parks and Recreation.

Stamps, R.B. and R.L. Zurel
1980 *A Pilot Survey of the Archaeological Resources of Oakland County, Michigan*. Technical Report Series No. 27, Rochester, Michigan. Report for Michigan History Division, Michigan Department of State.

United States Geological Survey (USGS)
1920 *Holly, MI.* 15-minute series topographic quadrangle. State of Michigan, Department of Internal Affairs, Topographic and Geologic Survey.

White, R.
1991 *The Middle Ground: Indians, Empires and Republics in the Great Lakes Region, 1650-1815*. Studies in North American Indian History, Cambridge University Press, New York, New York.

Appendix A Report Mapping

Date Saved: 5/29/2019 Document Path: G:\Cincinnati\DCS\Resources\Disciplines\CRM\Orphan Projects\VA_CEM\Project_Location_topo_20190529_mod.mxd

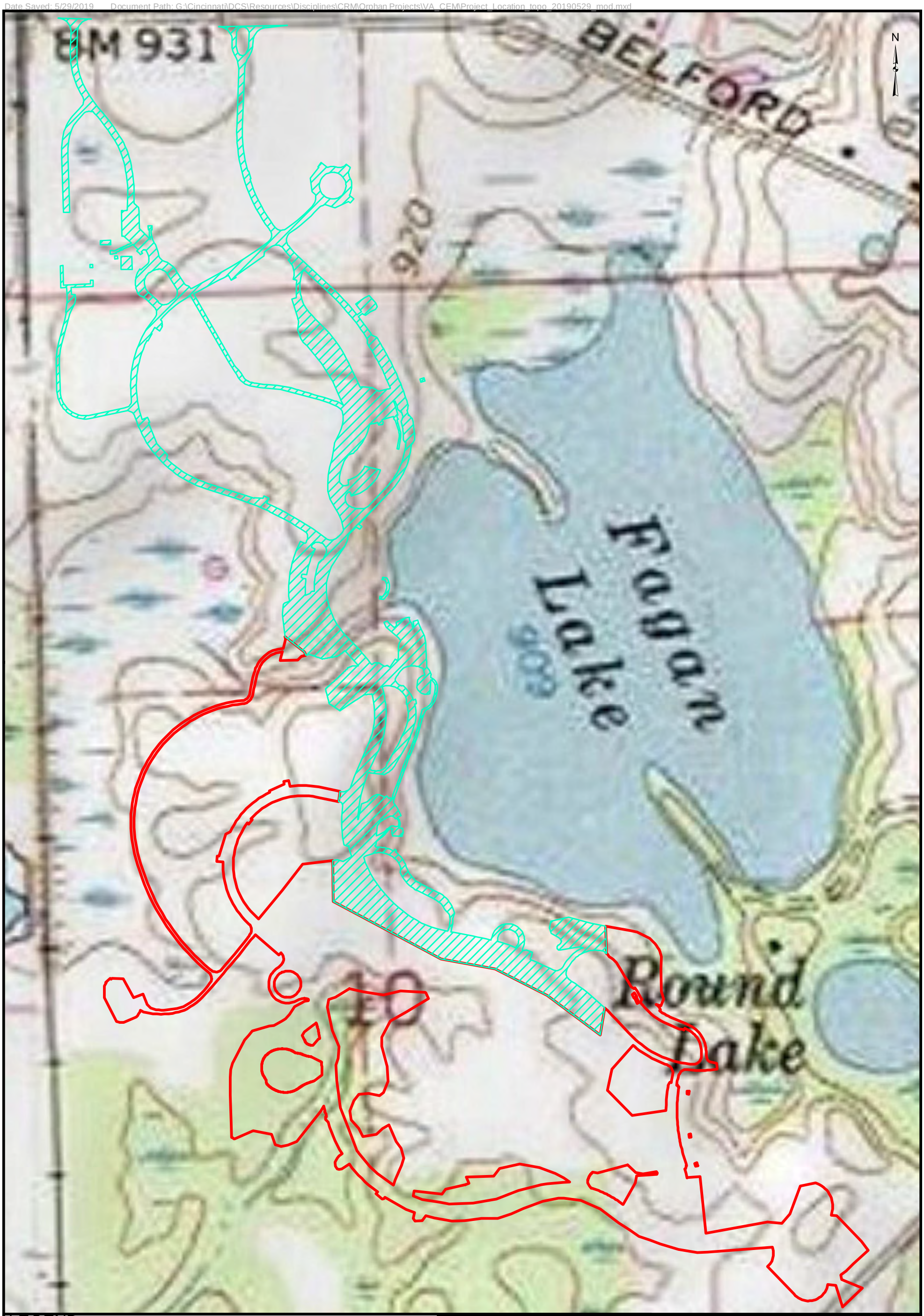


Figure 1-1.
Great Lakes National Cemetery,
Phase 2 Expansion

AECOM

Date Saved: 5/29/2019 Document Path: G:\Cincinnati\DCS\Resources\Disciplines\CRM\Orphan Projects\VA_CEM\Project_Location_aerial_20190529_mod.mxd

LEGEND

Previous Survey

Project Area

200 0 200 Feet

60 0 60 Meters

N

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

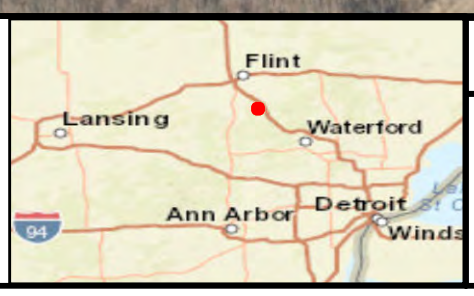


Figure 1-2.
Great Lakes National Cemetery,
Phase 2 Expansion

AECOM

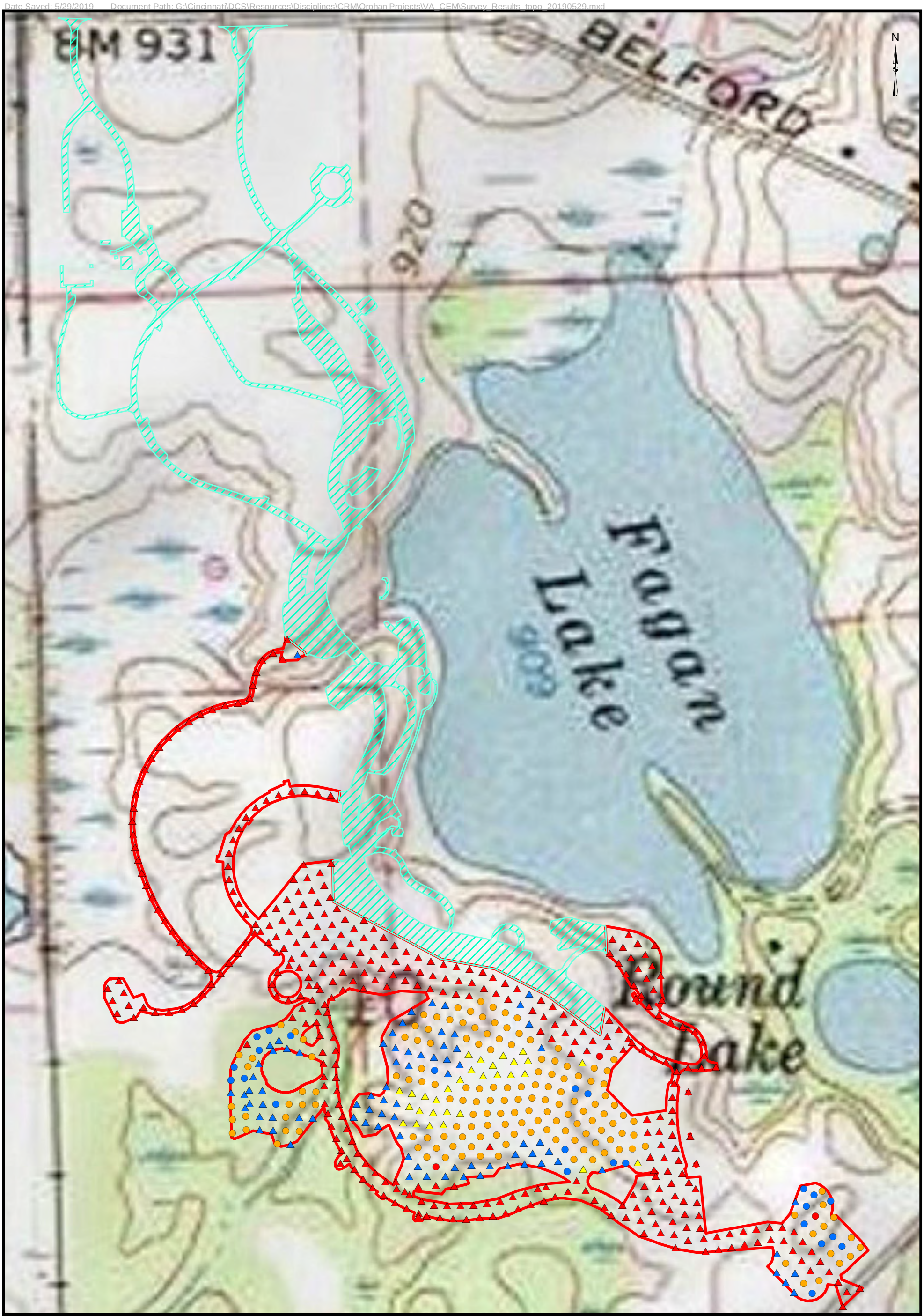
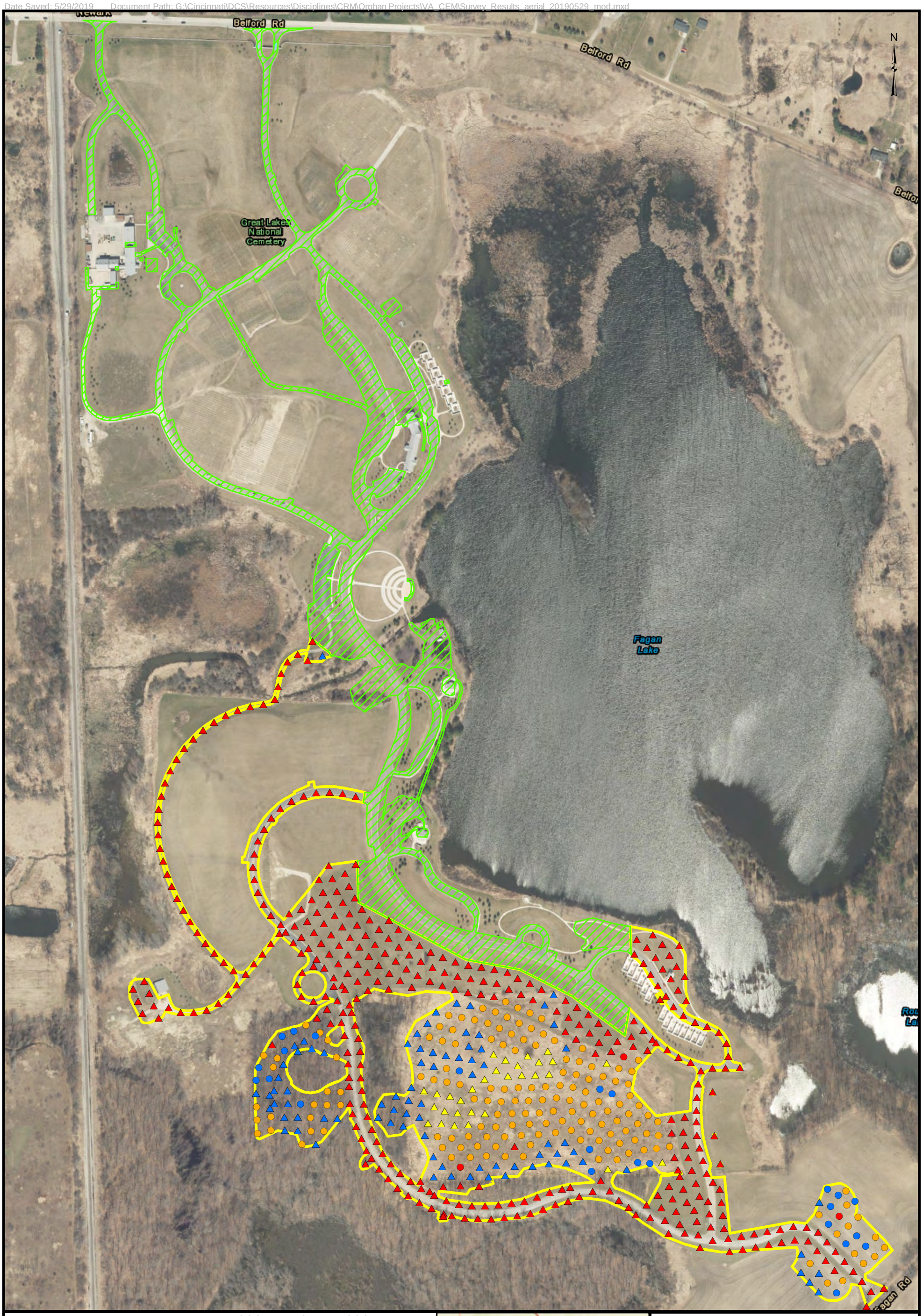


Figure 6-1.
Phase I Archaeological Survey
Results, Phase 2 Expansion

JOB NO.

AECOM

Date Saved: 5/29/2019 Document Path: G:\Cincinnati\DCS\Resources\Disciplines\CRM\Orphan Projects\VA_CEM\Survey_Results_aerial_20190529_mod.mxd



LEGEND

Previous Survey

Project Area

SL Type

- Ped
- Ped, Disturbed
- Ped, Wet
- ST
- ST, Disturbed
- ST, Wet

200 0 200 Feet

60 0 60 Meters

N

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

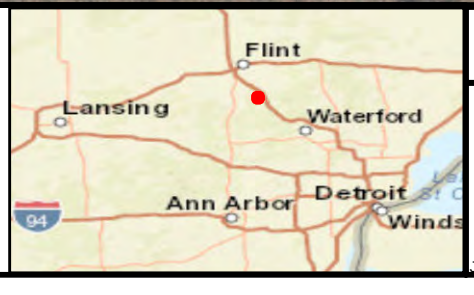


Figure 6-2.
Phase I Archaeological Survey
Results, Phase 2 Expansion

JOB NO.

AECOM

Appendix B Report Photography

Plate 1. Great Lakes National Cemetery Entrance, Facing South

Plate 2. Wooded lot, Facing Northwest

Plate 3. Wooded lot, Facing North

Plate 4. Large Agricultural Field, Facing Southwest

Plate 5. Large Agricultural Field, Facing North

Plate 6. Large Agricultural Field, Facing East

Plate 7. Small Agricultural Field, Facing Southwest

Plate 8. Standing Water in Wooded lot, Facing West

Plate 9. Existing Gravel Access Road, Facing East

Plate 10. Tree Line, Facing West

Plate 11. Manicured Lawn, Facing Northwest

Plate 12. Manicured Lawn, Facing Southeast

Appendix C Field Forms

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number GREAT LAKES 60605402.4
Recorder S. Ostyn
Date 5/9/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
51	E	15m interval	level, grassy ag field	I II	0-21cm 21-31cm	10YR 4/2 SaLo 10YR 6/3 SaLo } WET	Ø	~5% rock/gravel, wet soil (fallow soy.)
24	E	" "	" "	I II	0-25cm 25-35cm	" " " "	Ø	" " " "
50	E/W	" "	" "	I II	0-26cm 26-40cm	" " " "	Ø	5-10% rock, H2O @ base
29	E/W	" "	" "	I II	0-34cm 34-44cm	" " " "	Ø	" " " "
45	P/W	" "	" "					Heavily rutted area, standing water
22	E	" "	" "	I II	0-34cm 34-44cm	10YR 4/3 SaLo 10YR 6/4 mot. w/ 6/6 SaLo	Ø	~5% rock; saturated soil
28	E	" "	" " adjacent to standing H2O	I II	0-36cm 36-46cm	" " " "	Ø	~5% rock, wet soil II: very compact
46	E/W	" "	level, grassy ag field	I II	0-28cm 28-38cm	10YR 4/2 SaLo 10YR 6/3 SaLo	Ø	~5% rock, H2O @ base
73	E/W	" "	" "	I	0-37cm	10YR 4/2 SaLo	Ø	H2O @ base
46	E/W	" "	" "	I	0-30cm	" "	Ø	H2O @ base

***Use one code only.** **E=** Excavated Shovel Test, **P=** Pedestrian, **D=** Disturbed, **W=** Wet, **S=** Slope
****P=** Prehistoric, **H=**Historic, **M=** Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes national veterans cemetary
Recorder KIP 60605402.4
Date 5-9-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
21	E	15 m	non-plowed ag. field, grand vis 50%	I II	0-30 30-45	10YR 4/2 SaLo 10YR 5/3 SaLo (w/ cl)	Ø	no water
9	E	15 m	non-plowed ag. field, grand vis ~ 10%	I II	0-40 40-50	10YR 4/2 SaLo 10YR 5/3 SaLo (w/ cl)	Ø	moist but did not fill with water
1,2	P/D	" "	Existing gravel/ improved road	—	—	—	Ø	Within road
136-144	P/D	" "	" "	—	—	—	Ø	Within rd/ improved edge of road
16-21	P/D	" "	" "	—	—	—	Ø	" "
3-6	P/W	" "	ag field, heavily rutted, standing water	—	—	—	Ø	Standing H_2O
125-135	P/D	" "	Existing gravel/ improved road	—	—	—	Ø	Within rd/ improved edge of road
11-15	P/D	" "	" "	—	—	—	Ø	" "
644-647	P/D	" "	" "	—	—	—	Ø	" "

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes National Veterans Cemetery
Recorder KIP 160605402.6
Date 5-9-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
31	E	15 m	non-plowed ag field; ground vis ~ 50%	I II	0-20 20-30	10YR 4/2 SaLo 10YR 6/3 SaLo	∅	weeds
25	E	15 m	SAA	I II	0-25 25-35	10YR 4/2 SaLo 10YR 6/4 SaLo	∅	SAA
30	E	15 m	SAA	I II	0-20 20-30	10YR 4/2 SaLo 10YR 6/3 SaLo	∅	a little more moist
49	E/W	15m	SAA	I II	0-30 30-40	10YR 4/2 SaLo 10YR 6/3 SaLo	∅	water @ 40 cm
23	E	15 m	SAA	I II	0-30 30-40	10YR 4/2 SaLo 10YR 6/3 SaLo	∅	drier
48	E	15 m	SAA	I II	0-20 20-45	10YR 4/2 SaLo 10YR 5/3 SaCL	∅	first STP w/ clay
27	E/W	15 m	non-plowed ag field; ground vis less than 10%	I II	0-45 45-55	10YR 4/2 SaLo 10YR 6/3 SaLo	∅	water @ 55 cm
69	E	15 m	non-plowed ag field; ground vis ~ 50%	I II	0-20 20-35	10YR 4/2 SaLo 10YR 6/4 SaCL	∅	dry
68	E/W	15 m	SAA	I II	0-30 30-40	10YR 4/2 SaLo 10YR 6/3 SaLo	∅	water @ 40 cm
26	E	15 m	SAA	I II	0-40 40-50	10YR 4/2 SaLo 10YR 6/3 SaLo	∅	insulated wire on surface nearby

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes 60605402.4
Recorder S. Ostyn
Date 5/9/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
67	E/W	15m interval	level, grassy, ag. field	I	0-26cm 26-30cm	10YR 4/2 SaLo 10YR 6/3 SaLo } wet	Ø	~5% rock, H_2O @ base
72	E	" "	" "	I II	0-25cm 25-35cm	10YR 4/2 SaLo 10YR 5/3 SaLo } wet	Ø	~5% rock, saturated soil
7	E	" "	grassy ag field, heavily rutted, w/ standing H_2O	I II	0-30cm 30-40cm	10YR 4/3 SaLo 10YR 6/4 mot w/ 6/6 SaLo } wet	Ø	" "
10	E/W	" "	" "	I II	0-33cm 33-43cm	10YR 4/3 SaLo 10YR 6/4 SaLo } wet	Ø	~5% rock, H_2O @ base
311, 312	P/W	" "	Ag field w/ standing H_2O					Standing water
291, 292	P/W	" "	" "					" "
258, 259	P/W	" "	" "					" "
238	P/W	" "	" "					" "

***Use one code only.** **E=** Excavated Shovel Test, **P=** Pedestrian, **D=** Disturbed, **W=** Wet, **S=** Slope
****P=** Prehistoric, **H=**Historic, **M=** Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder Gostyn
Date 5/10/19

Segment ____
Transect ____
Location Wooded wetland area (Western project area)

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
112	E	15m interval	wooded level w/ vernal ponding	I II	0-18cm 18-30cm	10YR 3/3 Salo 10YR 6/4 Salo } WET	Ø	~5% rock, many roots, ~15m S of pond
153, 154, 181	P/W	"	wooded, ponding					Standing H_2O
107	E/W	" "	" "	I	0-4cm	10YR 2/2 Salo – WET	Ø	Immediate H_2O infilling.
156	E/W	" "	" "	I	0-20cm	" "	Ø	Saturated soil, H_2O @ base
183, 155, 113, 108	P/W	" "	wooded, vernal ponding					Standing water
114, 109, 105	P/W	" "	" "					" "
104	E	" "	wooded, ~15m N of wetland	I II	0-19cm 19-29cm	10YR 3/2 Salo 10YR 6/4 Salo } WET	Ø	~5% rock, many roots; southern edge of project area
110	E	" "	wooded, level, vernal ponding	I II	0-23cm 23-37cm	10YR 3/3 Salo 10YR 5/6 Salo } WET	Ø	~15m N of standing water/wetland
159	E	" "	" "	I II	0-25cm 25-35cm	" " " "	Ø	~10m W of rd ditch, many roots, dry
180	E	" "	" "	I II	0-33cm 33-43cm	" " " "	Ø	~8m W of rd ditch, dry

***Use one code only.** **E**= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
****P**= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes national veterans cemetery
Recorder KIP
Date 5-10-19

Segment
Transect
Location Wooded wetland area (Western project area)

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
425	E	15 m	wooded area w/ leaf scatter	I II	0-30 30-40	10YR 2/2 Lo 10YR 6/4 saCLLo	∅	ground vis ∅
426	E	15 m	SAA	I II	0-25 25-35	10YR 2/2 Lo 10YR 6/4 SaLo	∅	SAA
115	E	15 m	SAA	I II	0-30 30-40	10YR 2/2 Lo 10YR 6/4 SaLo	∅	SAA
157	E/W	15 m	SAA	I II	0-20 20-35	10YR 2/2 Lo 10YR 6/4 saCLLo	∅	SAA; water @ 35 cm
158	E	15 m	SAA	I II	0-25 25-35	10YR 2/2 Lo 10YR 6/4 SaLo	∅	ground vis ∅
116	E	15 m	SAA	I II	0-20 20-30	10YR 2/2 Lo 10YR 6/4 SaLo	∅	SAA
111	E	15 m	SAA	I II	0-20 20-30	10YR 2/1 Lo 10YR 5/4 SaLo	∅	terminated due to root impasse @ 30cm
179	E	15 m	SAA	I II	0-15 15-35	10YR 2/2 Lo 10YR 6/4 SaLo	∅	ground vis ∅

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder S. Ostyn
Date 5/10/19

Segment ____
Transect ____
Location ____

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
416	E	15m interval	wooded, mostly level w/ vernal ponding	I II	0-25cm 25-35cm	10YR 3/3 SaLo 10YR 5/6 SaLo > WET	Ø	~5% rock/gravel, heavy roots
414, 333	P/D	" "	Edge of existing road	—			—	Prev. dist. edge of rd.
415, 331	P/D	" "	Wooded, rutted	—			—	Poss. 2-track, in ruts
286, 252, 250	P/W	" "	wooded, pond	—			—	standing water
417	E/W	" "	Wooded, ~15m NW of pond	I II	0-18cm 18-34cm	10YR 3/3 SaLo 10YR 5/6 SaLo > WET	Ø	completely saturated, H_2O @ base
248	E/W	" "	wooded, ~20m W of pond	I II	0-20cm 20-27cm	" " " "	Ø	" "
227	E/W	" "	wooded, mostly level w/ vernal ponding	I II	0-20cm 20-36cm	" " " "	Ø	" "
220 198	P/W	" "	wooded, standing H_2O	—			—	In water
183, 182	P/W	" "	" "	—			—	In water
197	E/W	" "	wooded, level, areas of ponding	I II	0-20cm 20-27cm	" " " "	Ø	completely saturated, H_2O @ base

***Use one code only.** **E**= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
****P**= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder S. Ostyn
Date 5/10/19

Segment _____
Transect _____
Location Wooded wetland area (Western project area)

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
231	E	15m interval	wooded, minimal undergrowth	I II	0-19cm 19-25cm	10YR 3/3 SaLo 10YR 5/6 SaLo	Ø	Dry soil, ~8m W of rd ditch, edge of woods. Root impasse
284	E	" "	" "	I II	0-21cm 21-33cm	" " " "	Ø	Dry soil, ~15m W of rd ditch, edge of woods
117, 232, 233	P/W	" "	wooded, vernal ponding					Standing water

***Use one code only.** **E=** Excavated Shovel Test, **P=** Pedestrian, **D=** Disturbed, **W=** Wet, **S=** Slope
****P=** Prehistoric, **H=**Historic, **M=** Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes National Veterans Cemetery
Recorder KIP
Date 5-10-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
1015-1022	P/D	15 m	Existing paved road	—	—	—	—	in road

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes National veterans cemetery
Recorder KIP
Date 5-10-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
941-947	P/D	15 m	existing Paved road	—	—	—	—	in road
1028-1033	P/D	15 m	existing Paved road	—	—	—	—	in road
1043-1049	P/D	15 m	existing Paved road	—	—	—	—	in road
1058-1065	P/D	15 m	existing Paved road	—	—	—	—	in road
1084-1097	P/D	15 m	existing paved road	—	—	—	—	in road
1098-1111	P/D	15 m	existing Paved road	—	—	—	—	in road
1066-1074	P/D	15 m	existing Paved road	—	—	—	—	in road
1075-1083	P/D	15 m	existing Paved road	—	—	—	—	in road
1050-1057	P/D	15 m	existing Paved Parking lot	—	—	—	—	in Parking lot
1034-1041	P/D	15 m	existing sidewalk	—	—	—	—	in sidewalk

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes National Veterans Cemetery
Recorder KIP
Date 5-10-19

Segment
Transect
Location Wooded wetland (Western project area)

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
332	E	15 m	wooded area w/ leaf litter	I II	0-20 20-30	10YR 2/1 LO 10YR 5/4 SiLo	∅	ground vis ∅
305	E/W	15 m	SAA; next to standing water	I II	0-15 15-40	10YR 2/1 LO 10YR 6/4 SaLo	∅	SAA; water @ 40 cm
249	E/W	15 m	SAA	I II	0-20 20-30	10YR 2/2 LO 10YR 6/4 SaLo	∅	SAA; water @ 30 cm
418	E/W	15 m	wooded area w/ leaf litter	I II	0-15 15-25	10YR 2/2 LO 10YR 6/4 SaLo	∅	SAA; water @ 25 cm
419	P/D	15 m	SAA	—	—	—	—	heavily rutted 2-track road
420	E	15 m	SAA	I II	0-25 25-35	10YR 2/2 LO 10YR 6/4 SaLo	∅	ground vis ∅
421	E/W	15 m	SAA	I II	0-20 20-30	10YR 2/2 LO 10YR 6/4 SaLo	∅	SAA; water @ 30 cm
422	E/W	15 m	SAA	I II	0-25 25-35	10YR 2/2 LO 10YR 6/4 SaLo	∅	SAA; water @ 35 cm
423	P/W	15 m	SAA	—	—	—	∅	in standing water
424	E	15 m	SAA	I II	0-30 30-40	10YR 2/2 LO 10YR 6/4 SaCLLo	∅	ground vis ~20%

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder SMO
Date 5/13/19

Segment _____
Transect _____
Location _____

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
275	E	15m	level ag field fallow soy	I II	0-26cm 26-36cm	10YR 3/3 sa lo 10YR 6/4 sa lo	Ø	wet
273	E	" "	" "	I II	0-27cm 27-37cm	" "	Ø	strat I wet strat II dry
272	E	" "	" "	I II	0-29cm 29-39cm	10YR 4/3 sa lo - wet 10YR 5/6 sa lo - dry	Ø	layer of dense rock @ interface
271	E	" "	" "	I II	0-26cm 26-39cm	10YR 4/3 sa lo - wet 10YR 6/4 sa lo - wet	Ø	smooth round rocks
678	E	" "	" "	I II	0-26cm 26-36cm	10YR 4/3 sa lo - wet 10YR 5/6 sa lo - wet	Ø	smooth round rock @ interface
680	E	" "	" "	I II	0-32cm 32-42cm	10YR 4/3 sa lo 10YR 6/4, 5/6 sa lo - compact	Ø	" "
597	E	" "	" "	I II	0-38cm 38-48cm	" "	Ø	wet
595	E	" "	" "	I II	0-29cm 29-39cm	10YR 4/3 sa lo 10YR 6/4 sa lo	Ø	
593	E	" "	" "	I II	0-29cm 29-39cm	10YR 3/3 sa lo 10YR 6/4 sa lo w/clay	Ø	
504	E	" "	" "	I II	0-28cm 28-38cm	" "		moist

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder SMO
Date 5/13/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
407	E/W	15m	level ag field fallow soybean	I II	0-23 cm 23-33 cm	10YR 4/3 sa lo - wet 10YR 6/4-6 sa lo w/clay	Ø	H_2O @ base smooth round rock
408	E	" "	" "	I II	0-28 cm 28-38 cm	10YR 4/3 sa lo 10YR 6/4 sa lo - wet	Ø	moist smooth round rock
311,312 291,292	P/W	" "	low lying portion of ag field					Standing water (lg ponding area)
258,259 238	P/W	" "	" "					" "

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder ALW
Date 5/13/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
556	E	15m	level agfield fallow soy	I II	0-24 cm 24-34 cm	10YR 4/3 sa lo 10YR 5/4-6 sa lo	Ø	20% glacial till
351	E	" "	" "	I II	0-30 cm 30-40 cm	" "	Ø	" "
269	P/W	" "	" "	—	—	—	Ø	standing water in field, near edge
303 → 304	P/W	" "	" "	—	—	—	Ø	" "
326	P/W	" "	" "	—	—	—	Ø	" "
324 → 325	P/W	"	" "	—	—	—	Ø	" "
352 → 354	P/W	" "	" "	—	—	—	Ø	" "
355	E/W	" "	grass along edge of field	I	0-15 cm	10YR 3/3 sa lo	Ø	wetland grasses infilled after soil cap removal
356	P/D	" "	gravel road	—	—	—	Ø	gravel road

***Use one code only.** **E=** Excavated Shovel Test, **P=** Pedestrian, **D=** Disturbed, **W=** Wet, **S=** Slope
****P=** Prehistoric, **H=**Historic, **M=** Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder AZW
Date 5/13/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
675	P	15m	level ag field fallow soy	—	—	—	Ø	>80% vis
676	E	15m	" "	I II	0-33cm 33-43cm	10YR 4/3 sa lo 10YR 6/4-6 sa lo	Ø	≈ 20% glacial till
679	E	" "	" "	I II	0-24cm 24-34cm	" "	Ø	" "
189	E	" "	" "	I II	0-25cm 28-35cm	" "	Ø	" "
562	P/W	" "	" "	—	—	—	Ø	Saturated soil in swale/edge of field
561	E	" "	" "	I II	0-24cm 24-34cm	" "	Ø	wet soil 20% till gravels
560	E	" "	" "	I II	0-26cm 26-36cm	" "	Ø	—
559	E	" "	" "	I II	0-28cm 28-38cm	" "	Ø	" "
558	E	" "	" "	I II	0-27cm 27-37cm	" "	Ø	" "
557	E	" "	" "	I II	0-24cm 24-34cm	" "	Ø	" "

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder 5/13/19
Date Aug

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
684	E	15m interval	level ag field, fallow soy	I II	0-23cm 23-35cm	10YR 4/3 SaLo 10YR 6/4-6 SaLo	Ø	~5% rock/gravel ~25m W of field edge
605	P	" "	" "				Ø	>80% vis
636	E	"	" "	I II	0-24cm 24-36cm	" " " "	Ø	~5% rock/gravel (smooth, rounded stone) glacial?
277	E	"	" "	I II	0-28cm 28cm	" " " " w/ clay	Ø	" "
276	E	"	" "	I II	0-29cm 29-39cm	" " " "	Ø	" "
635	E	" "	" "	I II	0-31cm 31-41cm	" "	Ø	" "
633	E	" "	" "	I II	0-35cm 35-45cm	" "	Ø	" "
632	E	" "	" "	I II	0-28cm 28-38cm	" "	Ø	" "
630	E	" "	" "	I II	0-24cm 24-39cm	" "	Ø	" "
629	E	" "	" "	I II	0-27cm 27-37cm	" "	Ø	" "

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes national veterans cemetery
Recorder KIP
Date 5-13-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
725-732	P/D	15 m	existing paved road, and edge of road	—	—	—	—	in road
436-442	P/D	15 m	existing paved road	—	—	—	—	in road
305-307	P/D	15 m	existing maintance facility	—	—	—	—	in / near facility
327-330	P/D	15 m	existing maintance facility	—	—	—	—	in / near facility
774-805	P/D	15 m	existing paved road	—	—	—	—	in road

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes national veterans cemetery
Recorder KIP
Date 5-13-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
411, 437, 488, 489	P/D	15 m	existing cemetery facility, structures, manicured lawn	—	—	—	—	in/ nearby existing structures
280-283	P/D	15 m	existing paved road	—	—	—	—	in road
428-434	P/D	15 m	existing paved road	—	—	—	—	in road
458-462	P/D	15 m	existing paved road	—	—	—	—	in road
470-479	P/D	15 m	existing paved road	—	—	—	—	in road
688-696	P/D	15 m	existing paved road	—	—	—	—	in road
697-708	P/D	15 m	existing paved road	—	—	—	—	in road
448-456	P/D	15 m	existing paved road	—	—	—	—	in road
480-487	P/D	15 m	existing paved road	—	—	—	—	in road
740-758	P/D	15 m	existing paved road	—	—	—	—	in road

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes national veterans cemetery
Recorder KIP
Date 5-13-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
592	E	15 m	non-plowed ag. field	I II	0-25 25-35	10YR 4/4 Lo 10YR 6/4 SaCLLo	∅	grained vis ~15%
404	E	15 m	SAA	I II	0-30 30-40	10YR 4/4 Lo 10YR 6/4 SaCLLo	∅	SAA
406	E	15 m	SAA	I II	0-35 35-45	10YR 4/2 Lo 10YR 6/4 SaCLLo	NOT COLLECTED - rusted metal chainlink of an indeterminate age (0-10 cmbs)	
409	P/D	15m	wooded area	—	—	—	—	20% visibility
1114, 1115, 106	P/D	15 m	existing cemetery facility; manicured lawn	—	—	—	—	in/nearby existing structures
225, 226	P/D	15m	Existing Paved road	—	—	—	—	in road
212-224	P/D	15m	existing Paved road	—	—	—	—	in road
378-388	P/D	15 m	existing cemetery facility, structures, manicured lawn	—	—	—	—	in/nearby existing structures
466-469	P/D	15 m	existing cemetery facility, structures, manicured lawn	—	—	—	—	in/nearby existing structures
443-447	P/D	15 m	existing cemetery facility, structures, manicured lawn	—	—	—	—	in/nearby existing structures

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes National Veterans Cemetery
Recorder KIP
Date 5-13-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
638-643	P/D	15 m	existing cemetery manicured grassy area	—	—	—	—	in highly manicured area
279	P/D	15 m	existing cemetery manicured grassy area	—	—	—	—	in highly manicured area
77-87	P/D	15 m	existing cemetery manicured grassy area	—	—	—	—	in highly manicured area
63-66	P/D	15 m	existing cemetery manicured grassy area	—	—	—	—	in highly manicured area
143-144	P/D	15 m	existing paved road	—	—	—	—	on edge of road
121-124	P/D	15 m	existing paved road	—	—	—	—	in road
145-148	P/D	15 m	existing paved road	—	—	—	—	in road
598	E/W	15 m	non-planted ag. field	I II	0-30 30-40	10YR 4/2 Lo 10YR 6/4 Sa CLLo	∅	ground vis ~15% water @ 40 cm
596	E	15 m	SAA	I II	0-30 30-40	10YR 4/4 Lo 10YR 6/4 Sa CLLo	∅	ground vis ~10%
594	E	15 m	SAA	I II	0-25 25-35	10YR 4/4 Lo 10YR 6/4 Sa CLLo	∅	SAA

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes National veterans cemetery
Recorder KIP
Date 5-13-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
685	E	15 m	non-plowed ag. field	I II	0-30 30-50	10YR 4/2 Lo 10YR 6/4 SaCLLo	∅	ground vis 10%
599	E/W	15 m	SAA	I II	0-35 35-45	10YR 4/2 Lo 10YR 6/4 SaCLLo	∅	SAA, water @ 45 cm
683	E	15 m	SAA	I II	0-30 30-40	10YR 4/2 Lo 10YR 6/4 SaCLLo	∅	ground vis ~20%
634	E	15 m	SAA	I II	0-30 30-40	10YR 4/4 Lo 10YR 6/4 SaCLLo	∅	SAA
274	E	15 m	SAA	I II	0-25 25-35	10YR 4/4 Lo 10YR 6/4 SaCLLo	∅	ground vis ~30%
631	E/W	15 m	SAA	I II III	0-40 40-46 46-50	10YR 4/2 Lo 10YR 2/1 SiCLLo 10YR 6/4 SaCLLo	∅	Strat II was a black organic layer visible in entire STP. No
⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	artifacts were recovered. STP terminated due to water @ 50 cm
628	E/D	15 m	edge of non-plowed ag. field; lots of gravel	I	0-10	10YR 4/4 Lo	∅	STP in a gravel patch on edge of ag. field. Highly disturbed
677	E/W	15 m	non-plowed ag. field	I II	0-40 40-50	10YR 4/2 Lo 10YR 6/4 SaCLLo	∅	ground vis ~10%; water @ 50 cm
682	E	15 m	SAA	I II	0-30 30-40	10YR 4/2 Lo 10YR 6/4 SaCLLo	∅	ground vis ~10%

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder S. Ostyn
Date 5/14/19

Segment _____
Transect _____
Location _____

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
308	P/W	15 m interval	level ag field, low lying					edge of field, saturated soil
309	E	" "	" "	I II	0-27cm 27-37cm	10YR 4/3 Salo 10YR 6/4 mot w/ 5/6 Salo	Ø	~5% smooth, sm. round rock
313	E	" "	" "	I II	0-32cm 32-42cm	" " " "	Ø	Moist soil; ~15m E of Tg wet area, N of heavily rutted
314	E	" "	" "	I II	0-26cm 26-36cm	" " " "	Ø	~5% sm round rock
118-120 160-163	P/W	" "	wooded, low lying					Saturated, dissected from flooding, poss.
166-169	P/W	" "	" "					wetland, standing water to North
186-188 169,170	P	" "	level ag field, low lying					75-90% visibility
189,205 242,164	P	" "	" "					
171,190 206	P	" "	" "					

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder S. Osfyn
Date 5/14/19

Segment
Transect
Location by ag field

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
300	E	15m interval	level ag field (low lying)	I II	0-25cm 25-35cm	10YR 4/3 SaLo 7.5YR 4/4-6 SaLo	Ø	Moist soil, limited small, round rocks
266	E	" "	" "	I II	0-28cm 28-38cm	" " " "	Ø	" "
245	E	" "	" "	I II	0-28cm 28-38cm	" " " "	Ø	" " sm-med round rocks
89, 100, 101	P/W	" "	southern edge of ag field, low lying	—				Standing water; N of gravel rd
165	P/W	" "	western edge of ag field	—				Saturated soils
311, 312 291, 292	P/W	" "	level ag field, low lying	—				Standing water
258, 259 238	P/W	" "	" "	—				" "
173	E	" "	" "	I II	0-23cm 23-33cm	10YR 4/3 SaLo 7.5YR 4/4 SaCLo - compact	Ø	II: Dense, compacted some round rock
191	E	" "	" "	I II	0-37cm 37-47cm	10YR 4/3 SaLo 7.5YR 4/1 mot w/ 10YR 5/6 SaLo w/ clay	Ø	II: Soils becoming hydric
289	E	" "	" "	I II	0-23cm 23-33cm	10YR 4/3 SaLo 10YR 5/6 SaLo	Ø	NW corner of ag field

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder A.W
Date 5/14/19

Segment ____
Transect ____
Location ____

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cmbgs)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
255	P/W	15m	level ag field fallow soy	—	—	—	Ø	saturated soil
254	E	" "	" "	I II	0-23 23-33	10YR 4/3 sa lo 10YR 5/8 sa lo-redox, wet soil	Ø	20% glacial till gravels @ interface
253	P/W	" "	grassy wetland edge of field	—	—	—	Ø	saturated soil
336	E	" "	level ag field fallow soy	I II	0-22 22-32	10YR 3/3 sa ls-wet 10YR 5/8 sa lo-redox, wet	Ø	20% glacial till in swale
337	E	" "	" "	I II	0-26 26-36	10YR 4/3 sa lo 10YR 5/6 sa lo	Ø	20% till " "
338	E	" "	" "	I II	0-34 34-44	10YR 3/3 sa lo-wet 10YR 5/8 sa lo w/clay-redox-wet	Ø	in low swale
339	E	" "	" "	I II	0-32 32-42	" "	Ø	" "
315	E	" "	" "	I II	0-28 28-38	10YR 4/3 Sa Lo 10YR 5/6 Sa Lo } WET	Ø	20% glacial till
293-296 318,346	P	" "	" "	—	—	—	—	75-90% visibility
260-261	P	" "	" "	—	—	—	—	" "

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder ALW
Date 5/14/19

Segment ____
Transect ____
Location ____

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cmbgs)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
102	P/W	15m	grassy wetland edge of ag field	—	—	—	Ø	saturated soil wetland
90	P/D	" "	treeline, edge of field	—	—	—	Ø	rock + timber piles
192	E	" "	level ag field fallow soy	I II	0-25 25-35	10YR 3/2-3 sa lo 10YR 6/6, 5/8 sa lo wetland soil	Ø	20% glacial till Fe, Mn staining in strat II
243	E	" "	" "	I II	0-28 28-38	" "	Ø	" "
234 → 235	P/W	" "	" "	—	—	—	Ø	saturated soil, ruts
236	E	" "	" "	I II	0-24 24-34	10YR 4/3 sa lo - wet 10YR 5/8 sa lo - dense/compact	Ø	gravel sized Fe, Mn @ interface
237	E/W	"	" "	I	0-20	10YR 3/3 sa lo - saturated	Ø	water @ 20cm
202	E	" "	" "	I II	0-24 24-34	10YR 4/3 sa lo 10YR 6/4-6 sa lo	Ø	20% glacial till
257	E	" "	" "	I II	0-25 25-35	" "	Ø	" "
256	E	" "	" "	I II	0-26 26-36	" "	Ø	" "

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder [illegible]
Date 5/14/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
268	E	15m	level ag field fallow soy	I II	0-28cm 28-38cm	10YR 3/3 sa lo wet 10YR 6/4 sa lo	Ø	20% glacial till
210 → 211	P/W	" "	wetland grasses level field	—	—	—	Ø	saturated soil
247	P/W	" "	" "	—	—	—	Ø	" "
302	E	" "	level ag field fallow soy	I II	0-32cm 32-42cm	10YR 4/3 sa lo 10YR 6/4-6 sa lo	Ø	25% glacial till
323	E	" "	" "	I II	0-29cm 29-39cm	" "	Ø	" "
350	E	" "	" "	I II	0-38cm 38-50cm	" "	Ø	" " Sandier strat I
244	E	" "	" "	I II	0-34cm 34-44cm	10YR 3/3 sand 10YR 5/6 sa lo	Ø	" "
208	E	" "	" "	I II	0-31cm 31-41cm	" "	Ø	" "
193	E	" "	" "	I II	0-32cm 32-38cm	" "	Ø	" "
175	E/D	" "	edge of field/ wetland	I	0-25cm	10YR 4/3, 5/8 sa lo w/ clay	Ø	mottled soil, possible old road

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes national veterans cemetery
Recorder KIP
Date 5-14-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
392	E	15 m	non-plowed ag. field	I II	0-40 40-50	10YR 2/2 Lo 10YR 6/4 SaCL	∅	ground vis ~80%
544	E	15 m	SAA	I II	0-30 30-40	10YR 4/4 Lo 10YR 6/4 SaCL	∅	ground vis ~70%
366-377	P/D	15 m	edge of gravel road	—	—	—	—	area has been cleared, graded and improved
229-230	P/D	15 m	edge of gravel road	—	—	—	—	area has been cleared, graded and improved
196 178 149-152	P/D	15 m	edge of gravel road	—	—	—	—	area has been cleared, graded, and improved
91-99	P/D	15 m	edge of gravel road	—	—	—	—	area has been cleared, graded, and improved
75-76	P/D	15 m	edge of gravel road	—	—	—	—	area has been cleared, graded, and improved
52-62	P/D	15 m	gravel road	—	—	—	—	in road
33-42	P/D	15 m	gravel road	—	—	—	—	in road
70, 71 74, 357-360	P/D	15 m	gravel road	—	—	—	—	in road

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes national veterans cemetery
Recorder KIP
Date 5-14-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
172	E	15 m	non-plowed ag. field	I II	0-25 25-35	10YR 4/2 Lc 10YR 6/4 SaCL	∅	ground vis ~70%
199	E	15 m	SAA	I II	0-30 30-40	10YR 4/2 Lc 10YR 6/4 SaCL	∅	ground vis ~90%
200	E	15 m	SAA	I II	0-30 30-40	10YR 4/2 Lc 10YR 6/4 SaCL	∅	SAA
201	E	15 m	SAA	I II	0-20 20-30	10YR 4/4 Lc 10YR 6/4 SaCL	∅	SAA
290	E	15 m	SAA	I II	0-25 25-35	10YR 4/4 Lc 10YR 6/4 SaCL	∅	ground vis ~70%
288	E	15 m	SAA	I II	0-20 20-35	10YR 4/4 Lc 10YR 6/4 SaCL	∅	SAA
287	P/W	15 m	edge of ag field; grasses	—	—	—	—	standing water
310	E	15 m	non-plowed ag. field	I II	0-25 25-35	10YR 4/4 Lc 10YR 6/4 SaCL	∅	ground vis ~70%
391	E	15 m	SAA	I II	0-30 30-40	10YR 4/4 Lc 10YR 5/3 SaCL	∅	SAA
390, 389	P/W	15 m	edge of ag. field; grasses	—	—	—	—	standing water

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes National Veterans cemetery
Recorder KIP
Date 5-14-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
246	E	15 m	non-plowed ag. field	I II	0-25 25-35	10YR 4/2 Lo 10YR 6/4 SaCL	Ø	Ground vis ~80%
267	P/D	15 m	SAA	—	—	—	—	N. E; heavily rutted; ground vis ~90%
301	E	15 m	SAA	I II	0-25 25-35	10YR 4/2 Lo 10YR 6/4 SaCL	Ø	Ground vis ~80%
322	E	15 m	SAA	I II	0-25 25-35	10YR 4/2 Lo 10YR 6/4 SaCL	Ø	SAA
265	E	15 m	SAA	I II III	0-10 10-50 50-60	10YR 4/4 SiLo 10YR 2/1 CLLo 10YR 6/4 SaCLLo	Ø	SAA
209	E	15 m	SAA	I II	0-25 25-35	10YR 4/4 Lo 10YR 6/4 SaCL	Ø	SAA
176, 194	P/W	—	grassy area	—	—	—	—	saturated soil, grasses
103	P/D	—	treeline	—	—	—	—	treeline, timber, and rock piles
174	E	15 m	non-plowed ag. field	I II	0-30 30-40	10YR 4/4 Lo 10YR 6/4 SaCL	Ø	ground vis ~70%
207	E	15 m	SAA	I II	0-30 30-40	10YR 2/2 Lo 10YR 6/4 SaCL	Ø	SAA

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder ALW
Date 5/15/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
978 → 979	P/D	15m	asphalt	—	—	—	Ø	paved road
1002 1009	P/D	" "	" "	—	—	—	Ø	" "
980 → 995	P/D	" "	manicured lawn					graded, memorial markers

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder ACW
Date 5/15/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
772 → 773	P/D	15m	parking area	—	—	—	Ø	asphalt
824 → 838	P/D	" "	asphalt	—	—	—	Ø	paved road
839 → 842	P/D	" "	structure	—	—	—	Ø	existing facility
761 → 765	P/D	" "	" "	—	—	—	Ø	" "
709 → 724	P/D	" "	manicured lawn	—	—	—	Ø	graded, along western edge of lake
892 → 908	P/D	" "	asphalt	—	—	—	Ø	paved road
909 → 923	P/D	" "	gravel	—	—	—	burial vaults	access rd to construction area
1016 → 1019	P/D	" "	construction	—	—	—		construction area
1112	P/D	" "	—	—	—	—	" "	" "
1015 → 1022	P/D	" "	asphalt	—	—	—	Ø	paved road

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes National veterans cemetery
Recorder KIP
Date 5-15-19

Segment _____
Transect _____
Location _____

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
490-494	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation
495-550	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation
435 412 417	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation
563-587	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation
648-666	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation
667	P/W	15m	edge of grass & ag. field	—	—	—	—	wet
668-673	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation
601-627	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation along road edge
270 278, 279	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation
637, 638, 686, 687	P/D	15m	manicured lawn	—	—	—	—	developed portion of cemetery - vegetation

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes national veterans cemetery
Recorder KIP
Date 5-15-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
319	E	15 m	non-plowed ag. field	I II	0-35 35-50	10YR 4/4 Lo 10YR 6/4 SaCL	∅	Ground vis ~50%
297	E	15 m	SAA	I II	0-35 35-50	10YR 4/4 Lo 10YR 6/4 SaCL	∅	SAA
262	E	15 m	SAA	I II	0-35 35-45	10YR 4/4 Lo 10YR 6/4 SaCL	∅	SAA
240	E	15 m	SAA	I II	0-35 35-45	10YR 4/4 Lo 10YR 6/4 SaCL	∅	SAA
239	P	15 m	SAA	—	—	—	—	70% - 90% visibility
875-879	P/D	15 m	existing paved road	—	—	—	—	in road
857-863	P/D	15 m	existing paved road	—	—	—	—	in road
820-823	P/D	15 m	existing paved parking lot	—	—	—	—	in parking lot
807-819	P/D	15 m	existing paved road	—	—	—	—	in road
759, 760, 767-771	P/D	15 m	existing paved parking lot	—	—	—	—	in parking lot

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes National veterans cemetery
Recorder KIP
Date 5-15-19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cm)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
545	E/W	15 m	non-plowed ag. field	I II	0-40 40-50	10YR 4/4 Lo 10YR 5/4 sacL	Ø	ground vis ~ 80%; water @ 50 cm
546	E	15 m	non-plowed ag. field; numerous weeds	I II	0-55 55-65	10YR 4/4 Lo 10YR 5/4 sacL	Ø	ground vis ~ 70%
547	E	15 m	SAA	I II	0-35 35-45	10YR 4/4 Lo 10YR 5/4 sacL	Ø	SAA
548	P/W	15 m	edge of ag. field	—	—	—	—	wet
343	E/W	15 m	non-plowed ag. field	I II	0-60 60-70	10YR 4/4 Lo 10YR 6/3 mw/10YR 6/3 siCL	Ø	ground vis ~ 30%; water @ 70 cm
589	E	15 m	SAA	I II	0-35 35-45	10YR 4/4 Lo 10YR 6/4 sacL	Ø	ground vis ~ 50%
590	E	15 m	SAA	I II	0-30 30-40	10YR 4/4 Lo 10YR 6/4 sacL	Ø	SAA
591	E	15 m	SAA	I II	0-40 40-50	10YR 4/4 Lo 10YR 6/4 sacL	Ø	ground vis ~ 70%
401	E	15 m	SAA	I II	0-35 35-45	10YR 4/4 Lo 10YR 6/4 sacL	Ø	SAA
347	E	15 m	SAA	I II	0-30 30-40	10YR 4/4 Lo 10YR 6/4 sacL	Ø	ground vis ~ 50%

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder S. Ostyn
Date 5/15/19

Segment _____
Transect _____
Location _____

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
340	E	15m interval	level ag. field, fallow soy	I II	0-24cm 24-34cm	10YR 4/3 Salo - Moist 10YR 6/4 mot w/ 5/4 Salo - Moist w/ clay	Ø	Northern portion of field, slight rise ~5% sm rounded rock (glacial)
341	E	" "	" "	I II	0-27cm 27-37cm	" " " "	Ø	" "
342	E	" "	" "	I II	0-26cm 26-36cm	" " " "	Ø	" "
344, 345	P	" "	" "					75-90% visibility
399	E	" "	" "	I II	0-20cm 20-30cm	10YR 4/3 Salo → Moist 10YR 6/4 mot w/ 5/6 w/ clay	Ø	slight rise, ~25% sm rounded rock
400	E	" "	" "	I II	0-29cm 29-39cm	" " " "	Ø	" "
554	E	" "	" "	I II	0-29cm 29-39cm	" " " "	Ø	" "
403	E	" "	" "	I II	0-49cm 49-59cm	10YR 4/3 Salo 10YR 3/2 mot w/ 5/6 w/ iron + manganese	Ø	Redox
349	E	" "	" "	I II	0-38cm 38-48cm	10YR 4/3 Salo 10YR 6/4 mot w/ 5/6 Salo w/ clay	Ø	~5% sm. rounded rock (glacial)
321	E	" "	" "	I II	0-28cm 28-38cm	10YR 4/3 Salo 10YR 5/4-6 Salo	Ø	" "

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder ALW
Date 5/15/19

Segment ____
Transect ____
Location ____

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cmbgs)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
402	E	15m	level ag field fallow soy	I II	0-47 47-57	10YR 4/3 sa lo - dry 10YR 6/4-6 sa lo	Ø	5% glacial till
348	E	15m	" "	I II	0-34 34-44	10YR 3/3 sa lo - wet 10YR 5/6 sa lo	Ø	" "
320	E	15m	" "	I II	0-23 23-33	" "	Ø	slight rise "
298	E	15m	" "	I II	0-33 33-43	10YR 4/3 sa lo - dry 10YR 5/8 sa lo w/clay	Ø	" "
263	E	15m	" "	I II	0-35 35-45	10YR 3/3 sa lo - wet 10YR 5/6 sa lo w/clay	Ø	5% till swale
241	E	15m	" "	I II	0-32 32-42	" "	Ø	" "
986-987	P/D	15m	existing road and parking lot	—	—	—	—	in road / parking lot
996-1001	P/D	15 m	existing paved road	—	—	—	—	in road
988-991	P/D	15m	existing facility	—	—	—	—	in / nearby facility
929-933	P/D	15 m	existing facility	—	—	—	—	in / nearby facility

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Page__ of ____

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder S. Ostyn
Date 5/15/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
299	E	15 m interval	level, ag field	I II	0-28cm 28-38cm	10YR 4/3 Salo 10YR 5/4-6 Salo	Ø	~5% roundrock (glacial)
264	E	" "	" "	I II	0-28 cm 28-38cm	10YR 4/3 Salo 10YR 6/4 Salo w/clay	Ø	" "
204	E	" "	" "	I II	0-25cm 25-35cm	" " " " mot w/5/6	Ø	" "
924-928	P/D	15 m	existing Paved road	—	—	—	—	in road
934-940	P/D	15 m	existing Paved road	—	—	—	—	in road
968-975	P/D	15 m	existing Paved road	—	—	—	—	in road
1024-1027	P/D	15 m	existing Paved road	—	—	—	—	in road
866-874	P/D	15 m	existing Paved Parking lot	—	—	—	—	in Parking lot
845-856	P/D	15 m	existing Paved parking lot	—	—	—	—	in Parking lot
948-958	P/D	15 m	existing paved road	—	—	—	—	in road

***Use one code only.** **E**= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
****P**= Prehistoric, **H**=Historic, **M**= Modern

AECOM

Sample Loci (SL) Form

Project Name and Number Great Lakes
Recorder AWW
Date 5/15/19

Segment
Transect
Location

SL #	SL Type*	Distance from Previous SL	Vegetation/ Topography	Strat	Depth (cmbgs)	Soil Profile (Color and Texture)	Artifacts** (Type, Count)	Comments
393	E	15m	level ag field fallow soy	I II	0-27 27-37	10YR 4/3 sa lo - moist 10YR 6/4-6 sa lo	Ø	10% glacial till
394	E	" "	" "	I II	0-38 38-48	" "	Ø	" "
395	E	" "	" "	I II	0-31 31-41	" "	Ø	" "
396	E	" "	" "	I II	0-36 36-46	" "	Ø	" "
397	E	" "	" "	I II	0-42 42-52	" "	Ø	" "
398	P/W	" "	" "	—	—	—	Ø	saturated soil area of ponding
551	E	" "	" "	I II	0-26 26-36	10YR 4/3 sa lo - dry 10YR 6/4, 5/6 sa lo w/clay - mottled	Ø	20% glacial till
552	E	" "	" "	I II	0-27 27-37	" "	Ø	" "
553	E	" "	" "	I II	0-25 25-35	" "	Ø	" "
555	E	" "	" "	I II	0-28 28-38	" "	Ø	" "

E= Excavated Shovel Test, **P**= Pedestrian, **D**= Disturbed, **W**= Wet, **S**= Slope
P= Prehistoric, **H**=Historic, **M**= Modern

Appendix D Agency Correspondence

STATE OF MICHIGAN
JENNIFER GRANHOLM
GOVERNOR
DEPARTMENT OF HISTORY, ARTS AND LIBRARIES
LANSING
DR. WILLIAM ANDERSON
DIRECTOR

November 2, 2004

MR STEPHEN W TULL
URS CORPORATION
561 CEDAR LANE
FLORENCE NJ 08518-2511

RE: ER-01-179 Phase I/II Investigations, Construction of Veterans National Cemetery, Holly Township, Oakland County (VA)

Dear Mr. Tull:

We have reviewed the report entitled *Phase I/II Archaeological Investigations for the Proposed New National Cemetery Project, Holly Township, Oakland County, Michigan*, prepared by URS Corporation, and we have the following comments:

The report describes the Phase I investigation of a 56.73 acre parcel (designated Phase I), at which initial construction activities will take place. The Phase I survey identified 15 sites: 11 prehistoric sites (20OK489, 20OK490, 20OK492, 20OK493, 20OG494, 20OK495, 20OK496, 20OK498, 20OK499 and 20OK500), and 4 historical period sites (20OK487, 20OK488, 20OK491, and 20OK497).

Based on the Phase I investigations, URS recommended that three sites are potentially eligible for listing on the National Register of Historic Places (NRHP): 20OK487, 20OK488 and 20OK490. URS recommended that the remaining sites are not eligible for the NRHP. We agree that sites 20OK489, 20OK490, 20OK491, 20OK492, 20OK493, 20OK494, 20OK495, 20OK496, 20OK497, 20OK498, 20OK499 and 20OK500 are not eligible for the NRHP.

As potentially eligible sites, 20OK487, 20OK488 and 20OK490 require further consideration. The report explains that no earth-disturbing activities, which could threaten the integrity of the site, are planned in the vicinity of 20OK488. Thus, we agree that no further investigation of the site is recommended at this time. We hasten to add, however, that if plans change, or if additional development is contemplated in the future, which could disturb the site, Phase II evaluation of the site will be necessary.

URS conducted Phase II evaluation of 20OK487 and 20OK490. Site 20OK490 is a prehistoric site identified on the basis of three positive shovel tests that produced five pieces of lithic debitage. Excavation of four 1m x 1m test units resulted in the recovery of five additional prehistoric artifacts: three pieces of debitage and two small ceramic sherds. The results of the Phase I and II investigations suggest that site 20OK490 is a sparse scatter of prehistoric artifacts, which probably represents a very brief occupation. The exterior surfaces of the two small ceramic sherds are badly eroded, and neither sherd could be identified with regard to ware type or cultural affiliation. Consequently, the site can only be identified as a Woodland site; no more specific temporal or cultural placement can be made. Based on the sparse artifact recovery, the fact that most of the artifacts were recovered from the plow zone, and the inability to establish cultural or temporal affiliation, URS recommends that site 20OK490 is not eligible for the NRHP. We agree with their recommendation.

Site 20OK487 is an historical period site comprised of a structural foundation with associated features, and substantial artifact deposits. The location of 20OK487 also corresponds with the location of a

residence depicted on 19th century map sources. Consequently, 20OK487 appears to possess research potential with respect to contributing to our knowledge of the history of the area. URS recommends that 20OK487 is eligible for the NRHP. We agree with their recommendation.

URS suggests avoiding site 20OK487, and offers a series of recommendations to insure that the site will not be disturbed by construction activities. Those recommendations include:

- Modify development plans to avoid the site;
- Identify the site as a sensitive area on all construction documents;
- Keep all vehicles off the site;
- Place orange fencing around the site during construction.

If these protective measures were adopted, we anticipate that, under those conditions, we would consider the project to have no adverse effect upon site 20OK487. If avoiding the site, and implementing the protective measures listed above, is not feasible, it will be necessary to mitigate any adverse effect to the site through archaeological excavation. Excavation would be carried out to recover the information the site holds, and thus prevent the loss of that information when the site is disturbed during construction. Please let us know whether you feel that site avoidance is feasible, or whether you wish to discuss mitigation of the site.

Please submit plans verifying the chosen location, taking into consideration the information contained in this report for our final review and comment.

If you have any questions, please contact Brian Grennell, Environmental Review Specialist, at (517) 335-2721 or by email at ER@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Brian D. Conway
State Historic Preservation Officer

BDC:DLA:bgg

Copy: Bruce Borko, Department of Veterans Affairs

Christopher G. Leary
Cultural Resources Group Director
T: 513.419.3439
M: 513.502.4117
E: christopher.leary@aecom.com

AECOM
525 Vine Street
Cincinnati, OH 45202
aecom.com