Appendix J

Phase I Archaeological Survey Report

Byron Solar Project

Dodge and Olmsted counties, Minnesota

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A REPORT FOR PHASE I ARCHAEOLOGICAL SURVEY

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

MAY 27, 2021

PREPARED FOR:

EDF renewables

PREPARED BY:

Westwood

Westwood

Phase I Archaeological Survey

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

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Abstract

EDF Renewable Energy Inc., (EDF-RE) contracted Westwood Professional Services, Inc. (Westwood) of Minnetonka, MN to conduct a Phase I Archeological Survey for the proposed Byron Solar Project in Dodge and Olmsted Counties, MN. The solar project will consist of an up to 200 MW project on approximately 1,800 acres of land with associated 345kV High Voltage Transmission Line. To better describe the effects of the Project on archaeological resources under the Power Plant Siting Act, archaeological field investigations were conducted in the Project area for both the solar array and transmission line. Rigden Glaab, M.A., RPA, served as Principal Investigator for the Project. Field investigations were conducted October 30 through November 12, 2020 and May 5–7, 2021 by Mr. Glaab, Westwood Cultural Resources Manager Ryan P. Grohnke, Permit Lead Dean T. Sather, and Archaeological Technicians Sara Nelson and Daniel Schneider.

The Project area is in the Southeast Riverine West (3w) Archaeological Region of Minnesota. The Area of Potential Effect (APE) was all areas of potential ground disturbance. The APE surveyed for the Project consisted of approximately 2,001 acres due to Project changes. Field methods consisted of pedestrian survey, generally in agricultural fields exhibiting 35–95% ground surface visibility and supplemented with subsurface shovel testing in areas of high potential for archaeological resources where surface visibility was poor.

One prehistoric isolated find consisting of a utilized flake was identified during the survey (Site # 21DO0020). No significant archaeological resources were observed. It is recommended the Project proceed as planned. Should there be additions or changes to the proposed construction plans, Westwood should be contacted to complete additional survey.

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1.0 Introduction

EDF Renewable Energy Inc., (EDF-RE) retained Westwood Professional Services, Inc., (Westwood) to conduct a Phase I Archaeological Survey of the proposed Byron Solar Project (Project). The Project will generate up to 200 megawatts (MW) of solar energy. The solar project, located on approximately 1,800 acres, will include single-axis PV arrays installed on driven piles, inverters, security fencing, trenched electrical cables, a project substation, temporary laydown areas and gravel access roads. A 345 kV transmission line, less than five miles long, will also be needed to interconnect the Project to the adjacent Byron substation. The Project area is located southeast and east of the City of Kasson in Dodge County, and west of the town of Byron in Olmsted County, MN (Exhibit 1).

Table 1.1. Sections Containing Project Area

County	Township	Range	Sections in Project Area
Dodge	106	16	2, 3, 10-12, 13-15
Dodge	107	16	25, 35, 36
Olmsted	107	15	30, 31

To best describe the effects of the Project on archaeological resources as part of the site permit process under the Power Plant Siting Act, archaeological field investigations were conducted in the Project area. Rigden Glaab, M.A., RPA, served as Principal Investigator for the cultural resource investigations and directly oversaw fieldwork. Mr. Glaab meets the Secretary of the Interior's professional qualification standards, as stipulated in 36 CFR 61, and is licensed to conduct archaeological reconnaissance surveys on MN state lands (License #19-016). Ryan P. Grohnke, Westwood Cultural Resources Manager, assisted in managing the Project.

2.0 Scope of Work

A Phase I Archaeological Survey was conducted to determine whether any undocumented, significant archaeological resources are present within the proposed Project's Area of Potential Effect (APE) and to define vertical and horizontal boundaries of identified sites. If new sites were identified, investigators assessed proposed construction impacts and provided recommendations on avoidance or additional work. The APE for this Project is any location where ground disturbance could occur (Exhibit 1). A total of 2,001 acres were surveyed including locations of Project design changes.

3.0 Survey Methods

Project survey methods included background research, a literature review, and field investigations in the form of pedestrian survey and subsurface shovel testing. Environmental background and historic contexts were used to assess site probability and determine site types most likely to be encountered in the area.

The background research and literature review involved detailed file review in the online Portal maintained by the Office of the State Archaeologist (OSA) and a request for data and files from the Minnesota State Historic Preservation Office (SHPO), specifically examining site maps, archaeological site forms, burial files, and survey reports. Other sources investigated included the Historic Andreas Atlas, Trygg Maps, and county histories and plat books. The background research and literature review identified previous cultural resource investigations and previously recorded archaeological sites, along with levels of disturbance and potential for sites within the APE.

Fieldwork consisted of pedestrian visual ground surface survey, completed in 15-meter interval transects throughout the proposed Project area. Most effective visual inspection is conducted on surfaces such as cultivated fields exhibiting exposed soils. Generally, pedestrian survey is utilized in areas where surface visibility is greater than 25%. Significant slopes, wetlands, and obviously heavily disturbed areas were excluded from survey.

Areas with less than 25% surface visibility were still subject to pedestrian survey to identify surface features. Subsurface shovel testing supplemented the visual survey in areas that demonstrated poor surface visibility but were located in areas of high to moderate potential for cultural resources. Shovel tests, placed generally at 15-meter intervals, consisted of hand-excavated pits that measured 30 to 40 centimeters in diameter. The tests were excavated to cultural sterile subsoil with all soil being screened through ¼-inch mesh hardware cloth to determine if cultural artifacts were present.

4.0 Results of Background Investigations

4.1 Environmental Background

The Project is located in a sparsely populated agricultural region in southern Minnesota in Dodge and Olmsted Counties and is currently comprised almost entirely of agricultural land. Ground surface visibility (GSV) ranges from 85% to 95%.

4.1.1 Landscape

The Project is split between two level IV ecoregions (EPA 2021). Roughly half of the Project is located in the in the Eastern Iowa and Minnesota Drift Plains (47c) ecoregion of the Western Corn Belt Plains (47) of the Temperate Prairies (EPA 2021). The Western Corn Belt Plains ecoregion level III is comprised of a nearly level to gently rolling glaciated till plains and hilly loess plains (Wilken et al. 2011). At the ecoregion level IV scale, the eastern half of the Eastern Iowa and Minnesota Drift Plains ecoregion is comprised of pre-Wisconsin glacial till (White 2020).

The other half of the Project is located in the Rochester/Paleozoic Plateau Upland (52c) ecoregion of the Driftless Area (52) of the Mixed Wood Plains (EPA 2021). The Driftless Area ecoregion level III is comprised of hilly uplands with dissected, loess-capped, bedrock dominated plateaus that feature gentle slopes to steep valleys and bluffs (Wilken et al. 2011). The landscape of the Driftless Area was shaped by erosion through rock strata in the Paleozoic Era (Wilken et al. 2011).

The Project is bound by the Big Woods (51i) and Lower St Croix and Vermillion Valleys (47g) to the North, the Des Moines Lobe (47b) to the west, the Blufflands and Coulees (52b) to the east, and the Rolling Loess Prairies (47f) to the south (EPA 2021).

Prior to Euro-American settlement, the landscape of the Eastern Iowa and Minnesota Drift Plains was primarily comprised of bur oak savanna, tallgrass prairies, and maple-basswood forests (White 2020; MnDNR 2021a). Pre-settlement landscapes of the Rochester/Paleozoic Plateau Upland were predominantly comprised of tallgrass prairie, brush prairie, and oak openings and savannas (White 2020; MnDNR 2021b).

Following Euro-American settlement, much of the regional landscape of both ecoregions has been converted to cropland agricultural production. As the main economic driver, approximately 75 percent of the Western Corn Belt Plains is currently row crop agriculture, with much of the remaining lands used for livestock (Wilken et al. 2011). Roughly 75 percent of the Rochester/Paleozoic Plateau Uplands are used for row crop agriculture or pastoral lands (White 2020). The Minnesota Department of Natural Resources (MnDNR) notes that fire is the most important disturbance regime in these regions (MnDNR 2021a, MnDNR 2021b).

4.1.2 Flora

The Eastern Iowa and Minnesota Drift Plains was previously dominated by bur oak savanna, (*Quercus macrocarpa*) and prairie species such as little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), Indiangrass (Sorghastrum nutans), switchgrass (Panicum virgatum), and numerous forbs (Wilken et al. 2011; MnDNR 2021a). Other tree species that were previously widespread in the Eastern Iowa and Minnesota Drift Plains included the northern pin oak (*Quercus ellipsoidalis*) and quaking aspen (*Populus tremuloides*; MnDNR 2021a). Much of the area has been converted to agricultural croplands, drastically changing the vegetation composition of the region (MnDNR 2021a). The current landscape flora consists predominantly of corn (*Zea mays*) and soybeans (*Glycine max*; MnDNR 2021a). The Eastern Iowa and Minnesota Drift Plains are noted to be one of the most productive areas in the world for growing corn and soybeans (Wilken et al. 2011).

Flora of the Rochester/Paleozoic Plateau Uplands was previously a mosaic of prairie species like little bluestem, Indiangrass, sideoats grama (*Bouteloua curtipendula*), and included forest species such as bur oak savanna, red oak (*Quercus rubra*), elm (*Genus Ulmus*), river birch (Betula nigra), silver maple (*Acer saccharinum*), and ash (*Genus Fraxinus*; Wilken et al. 2011). Current land uses of the Rochester/Paleozoic Plateau Uplands are focused on agricultural production with a focus on corn and soybeans (MnDNR 2021b).

4.1.3 Fauna

Given the agricultural landscape of Ecoregion 47c and 52c, wildlife species such as the white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), gray squirrel (*Sciurus carolinensis*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), beaver (*Genus Castor*), and raccoon (*Procyon lotor*) are commonly encountered (Wilken et al. 2011). Avian species present in the regions include the Canada goose (*Branta Canadensis*), red-tailed hawk (*Buteo jamaicensis*), barn owl (*Tyto alba*), red shouldered hawk (*Buteo lineatus*), turkey vulture (*Cathartes aura*), wild turkey (*Meleagris gallopavo*), bobwhite quail (*Colinus virginianus*), western meadowlark (S*turnella* *neglecta*), pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), and mallard (*Anas platyrhynchos*; Wilken et al. 2011). Rivers, streams and some natural lakes provide habitat for a variety of species like walleye (*Sander vitreus*), bluegill (*Lepomis macrochirus*), northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), sunfish (Family Centrachidae), and others (Wilken et al. 2011).

4.1.4 Soils

Soil data for the Eastern Iowa and Minnesota Drift Plains Ecoregion indicates a pattern of prairie soils (Aquolls and Udolls) to the east and western boundaries of the ecoregion where prairie species were more commonplace (White 2020). Soil data for the Rochester/Paleozoic Plateau Uplands depicts the region as containing dominantly Udalfs soils, with localized Aquents along floodplains of major rivers (MnDNR 2021b). Aquolls are typically wet soils developed under prairie vegetation and Udolls are well drained soils developed under prairie vegetation (MnDNR 2021a). Udalfs are well-drained soils formed under forest vegetation (MnDNR 2021a). The Project soils are composed of silt loam, which are somewhat poorly drained soils (USDA 2021).

4.1.5 Geology

A key to the geological origin of the southeastern Minnesota surface is the glacial advances dating back as early as 1.2 million years ago (MGS 2020). The Project boundary is partially located in an area of older tills and partially located in the Driftless area, outside of the extent of the Des Moines Lobe to the west (MGS 2020). The Quaternary geology of the Project site is from Pre-Wisconsinian glaciation events, minimally impacted by the more recent glacial events in the State. The quaternary overburden associated with the Browerville Formation, Rose Creek Formation, and Elmdale Formations is generally between one and 75 feet in thickness near the Project (Steenburg 2019). Most of the Project is overlain with glacial till (Steenberg 2019). Minor areas of floodplain alluvium are present near streams (Steenburg 2019). These areas are moderately dissected by ditches, streams, and creeks, draining into the Zumbro River. The Project boundary is situated in the southern portion of the Zumbro River Watershed. The drainageways are moderately well-defined in close proximity to the proposed Project.

4.1.6 Geomorphology

Geomorphology of the Project situated in the Eastern Iowa and Minnesota Drift Plains is comprised of glacial till and hilly loess cover the Mesozoic and Paleozoic shale, sandstone, and limestone (Wilken et al. 2011). In the Rochester/Paleozoic Plateau Upland, bedrock exposures with shale, sandstone, dolomite, and limestone are commonplace (Wilken et al. 2011). Aquolls, Udolls, and Udalfs soils cover the majority of the Project (USDA 2021). The soils represent a moderate susceptible to detachment and produce moderate runoff (USDA 2021). The region is drained mainly by the Zumbro River, which can be 25 to 150 feet lower than the surrounding uplands. Other branches of the Zumbro River provide drainage for the area.

Across the Project footprint, the soils are typically an erosional environment. The Project is absent of substantial rivers, floodplain and terraces, which could present a depositional environment. Because the overall Project is dominated by erosional morphology, it is determined to be absent of paleosurfaces.

4.2 Cultural History

In general, there are five major archaeological traditions in Minnesota that consist of the Paleoindian, Archaic, Woodland, Plains Village, and the later Mississippian, Oneota and Psinomani periods (Anfinson 1997; Arzigian 2008; Dobbs 1990; Gibbon 2012). These traditions represent varying degrees of cultural adaptations to changing environmental conditions, endemic population growth, and the movement of Native American groups in the past. The following cultural context presents an interpretation of this history based on current archaeological research and broadly accepted models for pre-contact social lifeways. A brief narrative of historic period developments within the state is as follows:

4.2.1 Paleoindian Period (13,000 to 9,000 Before Present [B.P.])

The Paleoindian Period represents the earliest evidence of human occupation in Minnesota, typically separated into the Early Paleoindian (13,000–12,500 B.P.) and Late Paleoindian (12,500–9000 B.P.) periods (Frison 1998). Spear technology is important during this timeframe, as opposed to an emphasis on atlatl and bow and arrow lithic technology seen during later periods. This reflects a subsistence strategy focused on large game hunting and high mobility. However, Gibbon (2012:37) suggests foraging behavior may have been broader spectrum, as evidenced by the long temporal overlap of eastern Archaic and Paleoindian traditions in Minnesota. Paleoindian settlement and mobility patterns constitute a major discussion point in archaeological research.

Clovis culture is commonly regarded as the first evidence of human occupation in Minnesota during the Early Paleoindian period. Its signature implement, the Clovis projectile point, is made from high quality lithic materials and has a central channel flake that extends part way up the proximal shaft of the tool (Frison 1998). Folsom is another Early Paleoindian technology that temporally follows Clovis during the Early Paleoindian Period. Its projectile point is typically made from high quality materials as well, with the central channel flake extending the entire length of the implement to the distal tip (Hofman 1995). Clovis and Folsom projectile points were used to hunt now-extinct forms of game, including Bison antiquus and mammoths. Evidence for Early Paleoindian occupation in Minnesota is limited to isolated finds of projectile points. Clovis isolated finds (N=30) have been found in central and southeastern Minnesota, while Folsom isolated finds (N=20) are documented in the western and southern parts of the state (OSA 2019).

The Late Paleoindian Period in Minnesota is characterized by an unfluted variety of projectile points similar to earlier lanceolate forms that are associated with the Plano Complex (Dobbs 1990). Agate Basin, Eden, Hell Gap, and Scottsbluff are varieties of projectile points found during this time, which are often associated with bison kill sites. Late Paleoindian sites are significantly more common in Minnesota, with over 200 being recorded. The Browns Valley Site in western Minnesota and the Bradbury Brook Site are important Late Paleoindian localities in the region (OSA 2019).

Paleoindian archaeology in Minnesota mirrors the initial expansion of Homo sapien sapiens during the height of the Eurasian Upper Paleolithic periods into North America (Gilligan 2010:16). The focal point of this migration is hypothesized to have occurred in a region termed Beringia, which extends from the Verkhoyansk Mountains in Siberian Russia to the edge of the now extinct Laurentide glacial ice sheet in western Canada (Hoffecker and Elias 2007). Traditionally, the shallow waters of the Bering Sea are argued to have served as the principal access point into the Americas when sea levels were reduced due to extensive glaciation that occurred during the Pleistocene Epoch (2.588 million to 12,000 B.P.).

The proposition that the Bering land bridge may have served as passageway for early human migrations was first suggested by the Spanish Missionary Fray Jose de Acosta in A.D. 1590 (Hoffecker and Elias 2007:2). Although Spain had not yet explored these waters, de Acosta thought it was the only logical explanation for how indigenous populations would have come to the Americas. Eric Hultén (1937) later coined the term "Beringia" to describe the Quaternary ecology of this unique region. The designation Beringia is named for the famous Danish explorer Vitus Bering, who, by way of Russian contract, was the first European to sail the strait in 1728.

The area associated with the bridge is termed the Bering-Chukchi Platform, which extends 1600 km from the Arctic Ocean to the eastern Aleutians (Hoffecker and Elias 2007:5). Although the majority of this region is flat, the topography is punctuated by a few small islands, such as St. Lawrence Island and Wrangle Island. The majority of the shelf lies beneath less than 100 m of water and drops to 30 m near the Chukotka Peninsula, Russia. Over the 2.6 million year course of the Quaternary Period, 100 Marine Isotope Stages (MIS [Oxygen 16/18 ratios]) have been documented, which show the repeated exposure and inundation of the land bridge constituting 50 glacial/interglacial oscillations (2007:7–8). Initial human migrations into North America appear to be associated with the cold-snap brought on by the Younger Dryas (12,900–11,700 B.P.), which effectively lowered sea-levels by 50 m exposing the platform.

The archaeological record for humans expanding into North America is manifested at both interior and coastal sites. Early interior sites include that of Swan Point, Broken Mammoth, and Healy Lake, Alaska, which suggest population movements between the Laurentide and Cordilleran ice sheets between 13,000–11,000 B.P. (Holmes 2001; Cook 1996; Yesner 2001). Concurrently, a rapid coastal migration is also indicated at several South American localities, such as Monte Verde, which demonstrate potential evidence for groups moving by boat down the Pacific shoreline at approximately 15,000 B.P. (Dillehay 1989; Dixon 1999; Fladmark 1979). Recent genetic work with mtDNA haplogroups in the Americas and Asia appear to confirm the archaeological evidence, showing simultaneous coastal/interior population movement occurring between 18,700 and 14,200 B.P. (O'Rourke 2009; Perego et al. 2009). Alternatively, although followed by much criticism, Bradley and Stanford (2004) suggest that the progenitors of Clovis, and perhaps other groups, were the product of Atlantic migrations associated with peoples of the Solutrean cultures in France. Current genetic evidence refutes this claim; however, the issue does highlight an important debate in Alaskan archaeology (O'Rourke 2009; Perego et al. 2009).

The Pleistocene history of Minnesota is long and complex with most of the state and surrounding regions being covered in glaciers between 18,000 B.P. and 11,000 B.P. (Manz 2019:23). Glaciers did not fully recede until approximately 10,000 years ago, where only the southwestern and southeastern parts of the state remained unglaciated. A dominant feature following deglaciation was Glacial Lake Agassiz. This overlapped the northwest portion of the state and formed during the retreat of the Des Moines Lobe, which principally drained to the south via Glacial River Warren (Gibbon 2012:38). As Lake Agassiz further retreated north, the modern Red River of the North began to form flowing towards the Hudson Bay. In terms of human occupation potential, the southern part of the state is likely the highest probability area to encounter archaeological sites, as it was unglaciated (Gibbon 2012:Map 2.1). Elk, mammoth, and extinct forms of bison (e.g., *Bison antiquus*) may have been hunted by Pleistocene Native Americans of this time frame in Minnesota; however, other resources were probably equally important.

Waguespack (2007:69–70) highlights current evidence for early migrations into North America that indicate hunter and gatherers may have been generalized foragers, as opposed to explicitly large game predators. Historically, the first evidence for the Paleoindian Period comes from New Mexico where archaeologists uncovered fluted projectile points in association with extinct megafauna at sites, such as Blackwater Draw (Cook 1927; Figgins 1927). These important early finds quickly placed the antiquity of humans on the mid-continent of North America at the end of the Late Pleistocene (Howard 1936). Much of the debate generated by these discoveries overly focused on the role mega-fauna placed in the subsistence economy of Paleoindian hunter and gatherers. This pattern is different than many of the interior localities dating prior to 11000 B.P. (e.g., the Village Lake Site at Healy Lake in Alaska [Cook 1969]), which exhibit a broad spectrum diet. Bison and Wapiti appear to be the predominant large game that were hunted during this early period; however, birds and other small mammals were also exploited (Yesner 2001).

Analogous patterns have been observed outside of Minnesota, including eastern Great Basin sites, such as Bonneville Estates Rock Shelter, which demonstrate a broad spectrum diet occurring between 13,100 and 12,000 B.P. (Goebel 2007; Graf 2007:103). The archaeological record from this site suggests the prehistoric inhabitants were participating in a mixed foraging and hunting strategy. The identification of this trend in the Great Basin has led to the suggestion that this early phase be called the "Paleoarchaic" instead of "Paleoindian" in recognition of the markedly different subsistence strategies that were similar to later archaic groups (Graf and Schmitt 2007; Willig 1988; Willig and Aikens 1988). Realistically, the debate about whether early Paleoindians were generalized foragers or large game specialists likely rests "on the relationship between what could have been hunted and what was actually taken" (Waguespack 2007:70; Waguespack and Surovell 2003).

In contrast to these views, Kelly and Todd (1988) take the position that early populations of hunter and gatherers entering into the North American continent were heavily dependent on terrestrial fauna, as opposed to plant resources, since this was a more reliable food source. They argue that the strategies employed by these foragers were starkly different than that of modern hunter and gatherers, in that groups were not operating in seasonally restricted spaces. An optimal foraging analysis for procuring large game has recently been conducted by Byers and Ugan (2005). Specifically, they identified variables that may have deterred Paleoindians from focusing exclusively on mega-fauna, including the large number of individuals needed for processing, difficulty in procuring game, and distribution of game within different environmental patches. The authors conclude that the phenomena of exclusive large mammal hunting likely only occurred in a "narrow range" of places where game was abundant and processing time was low, such as in the Great Plains (2005:1625). Minnesota and surrounding areas were likely encompassed by this narrower range, as suggested by Kelly and Todd (1988).

Continuing with the issue of broad spectrum versus predominant large game hunting has been problematic to the debate of humans entering into the North American continent. Guthrie (1990) has supported the notion that humans could have easily followed the wide trails of proboscideans across the land bridge. Haynes (2001) reasons that modern African elephants can serve as an analogy for understanding how Pleistocene hunters may have interpreted herd characteristics. Such behavioral patterns include 1) the speed, direction, and health of an elephant herd based on the distribution/content of dung, and 2) the relative size of the animals based on the track width. Elephants create a series of fixed and habitually used trails that would have allowed initial colonizers into interior Alaska as a means to systematically explore the landscape. Conversely, Yesner (2001:317) sees the process of colonization into interior Alaska as involving a "push-pull" factor, presenting evidence for the existence of proboscideans in Siberia up to 9000 B.P. This suggests that hunters would have been encouraged to remain in western Beringia for a longer period of time to procure this higher ranked resource. Foragers may have only episodically crossed the land bridge as eastward movement began to develop as the principal subsistence cycle.

A theoretical trajectory of incipient occupation into novel landscapes has been proposed by Beaton (1993) to describe the initial colonization of Australia (also see Yesner 2001). His model breaks down human entry into two categories: transient explorers and estate settlers. Beaton suggests that the settlement pattern associated with transient explorers would be lineal, conforming principally to significant geographic features, such as mountains, rivers, etc. This type of occupation may be associated with the earliest sites in Minnesota, which could be situated along the margins of major river corridors (e.g., Glacial River Warren). High mobility and small populations are necessary with the transient model, since groups are entering into an unfamiliar landscape leading to potentially high extinction rates. In contrast, estate settlers inhabit new lands in a more radial fashion, since there is a greater degree of familiarity with the resources present. Kelly and Todd (1988) argue that immigrant Paleoindians would have needed to switch territories frequently due to unfamiliar landscapes. This would have been an adaptive method to adjust to resource stress by either switching territories or adjusting the types of foods being consumed. In reality, the Early and Late Paleoindian Periods in Minnesota likely represented a combination of these alternating mobility strategies.

4.2.2 Archaic Period (9,000 to 2,500 B.P.)

Approximately 9,000 B.P., a new mode of subsistence strategy began to emerge in the archaeological record across North America (Emerson et al. 2011). The general pattern of this change is the replacement of lanceolate spear-points used during the Paleoindian period, and the adoption of atlatl technology with the presence of groundstone implements. This represents a fundamental difference from earlier forager behavior with a diversification of economy that incorporated more plants into the diets of Native Americans. The Archaic Period in Minnesota began substantially later than other regions starting around 9,000 B.P., principally in the southeastern part of the state (Anfinson 1997; Gibbon 2012). Important Archaic innovations include the use of grooved mauls and axes, canine domestication, copper tools, and incipient horticulture. The Archaic Period in Minnesota is poorly known; however, it comprises its longest temporal frame of human occupation.

Xeric environmental conditions began around 9,000 B.P. with the spread of prairie grassland across most of southern and western Minnesota (Anfinson 1997). Many of the lakes created as a product of Pleistocene glaciation started to dry during this time, leading to a reduction in game (e.g., bison, fish, birds, etc.) dependent on these resources. These environmental transformations promoted a diversification in hunting strategies, which differed dramatically from the Paleoindian period.

Minnesota experienced a wide variety in changing environmental conditions based on its different ecotones across the state during this time. As a consequence, the traditional models of Early, Middle, and Late Archaic found elsewhere in North American do not directly apply. These different environmental regimes necessitated a variety of adaptive strategies to successfully subsist. Archaeologists have defined these internal periods within the state as follows: Prairie Archaic, Lake Forest Archaic, Shield Archaic, and Riverine Archaic (OSA 2019).

The Prairie Archaic Period is found across the western parts of Minnesota, representing an adaption to grassland environments. Key game hunted during this period were bison, which remained a focus throughout the entirety of the Archaic Period. Itasca State Park Site contains one of the best examples of the Prairie Archaic pattern. This site dates approximately to between 9,550 and 7,950 B.P. and yielded the remains of an extinct species of bison and the presence of a side-notched dart point. Other important localities from the Prairie Archaic Period include the Granite Falls Site and the Canning Site. A regional variation of the Prairie Archaic during the later periods is the presence of copper tools in the northwestern part of the state, but few examples in the southwestern areas (Anfinson 1997).

The temporal period known as the Lake Forest Archaic accompanies archaeological sites from about 7,950 B.P. in much of central and northern Minnesota (Anfinson 1997; Gibbon 2012). Prior to this period, most sites in this region would have mirrored those found in grasslands, whose economy focused on bison hunting. As a result, the Prairie Archaic pattern would have been prevalent during the earliest periods based on the similar environment. The expansion of woodlands during the mesic environments of the post-glacial thermal maximum led to a greater diversification of both plant and animal species. The Mississippi River corridor also served as a conduit for archaic groups from other regions, which ultimately influenced the potential spread of technologies and new lifeways into Minnesota. The site of Petaga Point in Kathio State Park is one of the best examples of the Lake Forest Archaic Period and contains evidence of Old Copper culture.

The Shield Archaic Period characterizes sites from far northeastern Minnesota, whose assemblages are the product of Native American adaptations found farther north in Canada (i.e., Canadian Shield). An important characteristic of Shield Archaic sites is the lack of groundstone tools and copper artifacts found. often associated with archaic groups elsewhere in Minnesota (Anfinson 1997; Gibbon 2012). Shield Archaic sites in Canada are typically found near lakes and rivers where caribou and other migratory game may have crossed. Similar to other northern adapted populations, these groups may have utilized specialized technologies, such canoes, snowshoes, toboggans, bark and skin-covered shelters, bark containers, and efficient winter clothing. The Fowl Lake Site is an important Minnesota site near the Canadian border that exemplifies the archaeological record of this period.

The Riverine Archaic period is found at sites located along the lower Mississippi River and other drainages in southeastern Minnesota (Anfinson 1997; Gibbon 2012). The river valley bottomlands provided a rich and varied source of animals and plants that were exploited by Native American populations. Common riverine resources included aquatic tubers, fish, waterfowl, mussels, deer, elk, and bison may have been taken in the uplands. The fertile floodplains also provided suitable locations for horticulture where plants, such as squash and various early cultigens, were grown. The King Coulee Site in Wabasha County is one of the most complete archaic sites from this region and dates to between 3,450–2,450 B.P. A slate gorget, mussel shells, squash seeds, and stemmed projectile points were recovered during the excavations (OSA 2019).

4.2.3 Woodland Tradition (3,000 B.P. to 950 B.P.)

Substantial cultural changes began to occur in Minnesota approximately 2,500 years ago, with Native American adaptations mirroring broader trends across the southern and eastern United States (Arzigian 2008). This timeframe, known as the Woodland Period, is marked by the presence of burial mounds, pottery, bow and arrow technology (ca. 1,450 B.P.), and intensive plant cultivation. Archaeological settlement patterns show Native American groups beginning to aggregate into larger populations along lakes, rivers, and associated drainages. Woodland archaeological sites are often broken into one of a classic tripartite temporal division of Early (3,000–2,150 B.P.), Middle (2,150–1,450 B.P.), and Late Woodland (1,450–950 B.P.) Periods (Emerson et al. 2008).

Traditionally, variations in the Woodland Period across time and space are argued to derive from broader influences that shaped significant trends in cultural practices. These interaction spheres include the Adena (Early Woodland Period), Hopewell (Middle Woodland Period), and Mississippian (Late Woodland Period) Cultures (Anfinson 1997; Gibbon 2012). While these divisions work well for other regions of North America, they do not neatly apply to archaeological sites in Minnesota (Arzigian 2008).

Major Woodland complexes in the various regions of the state include Laurel, Brainerd, and Blackduck (northern Minnesota); Malmo, St. Croix, Onamia, and Kathio (central Minnesota); Fox Lake and Lake Benton (southwestern Minnesota); and La Moille, Howard Lake, Sorg, and Effigy Mound (southeastern Minnesota) (Arzigian 2008). Pottery is an important distinguishing characteristic of these complexes, which are commonly named for the associated type site where they were first discovered. Ceramic vessels range in form from globular to conoidal with shell or sand grit as temper, and designs across the body (e.g., net impressions, patterned incisions). Lithic technology during this timeframe shows a preference for smaller projectile points utilized principally in bow and arrow technology.

A hallmark characteristic of the Woodland Period in Minnesota is presence of burial mounds, of which 12,000 have been recorded in the state (OSA 2019). The areas surrounding Red Wing, Lake Minnetonka, and Mille Lacs Lake have the highest concentrations of burial mounds. Many of these structures have been destroyed due to historic and modern development.

The subsistence strategies of Woodland groups in Minnesota varied widely based on the type of resources available. Wild rice was central to groups living in the northeast quarter of the state, which was husked in excavated pits and parched in ceramic vessels (Arzigian 2008). Other resources hunted or gathered included deer, fish, and various plants, such as maple sap for sugar. Farther west, around the Red River Valley and southern Minnesota, bison continued to be important as they were in the Archaic Period (OSA 2019). The "Three Sisters" of squash, beans, and corn were grown in small garden plots, which were further supplemented with other resources (e.g., fish and aquatic mammals).

4.2.4 Mississippian, Oneota, Plains Village, and Psinomani Traditions (950 B.P. to European Contact)

The Woodland Period ends throughout most of Minnesota around 950 B.P., with the exception of the northern portions of the state (Arzigian 2008; Gibbon 2012). The dominant regional influence was the site of Cahokia in the American Bottom near the modern city of St. Louis, Missouri on the Mississippi River (Pauketat 2009). This influence is most clearly seen in archaeological sites near Red Wing, Minnesota, that contain Cahokian-style ceramics, large palisaded villages, and evidence of corn horticulture. The presence of square earthen mounds may reflect Cahokian socio-religious belief systems. In Minnesota, the manifestation of this interaction is called the Silvernale Phase (Gibbon 2012).

A widespread cultural complex called Oneota in Minnesota is concurrent with the regional influences of Cahokia, lasting from approximately 950 B.P. until the time of French contact (Gibbon 2012). These mobile groups shared Middle Mississippian traits that included corn horticulture and shell-tempered ceramics (e.g., globular vessels with high rims), but lacked permanent structures, such as burial mounds. Oneota is manifested in different types called Orr (southeastern Minnesota), Blue Earth (south-central Minnesota), and Ogechie (central Minnesota). Siouan languages were spoken at the time of French contact (OSA 2019).

Plains Village groups from the region of the Missouri River in the Dakotas began to interact with the Oneota in western Minnesota after 950 B.P. (Anfinson 1997; Ahler and Kay 2007). These groups hunted bison, practiced corn horticulture, and lived within earth-lodges protected within palisaded forts (e.g., Double Ditch Site in North Dakota). Globular shaped ceramic jars with crushed rock temper are a hallmark technology of this period. Important Plains Village ceramic complexes in western Minnesota include Cambria, Great Oasis, and Big Stone (OSA 2019).

Psinomani groups are believed to be the ancestors of the modern Dakota people, who lived in east central Minnesota (Gibbon 2012). The principal ceramic type associated with this group is Sandy Lake, whose form is more similar to a bowl rather than the globular jars of Oneota varieties. There is evidence of blended ceramic styles with Oneota Native Americans.

4.2.5 Contact Period and Post-Contact (A.D. 1650 to Present)

The Fur Trade in Minnesota involving Europeans and Native Americans first started in the early 1600s and marked the beginning of contact between these two populations. The historical implications of this interaction were felt in numerous ways both economically and with great social consequence (e.g., smallpox). The major players in this arena of interaction were first the French followed by the British, and much later the Americans. French explorers Marquette and Joliet were among the first Europeans to reach the headwaters of the Mississippi entering Minnesota in 1673 (Kellogg 1917).

By the time of European Contact in the 1600s, the Dakota and Ojibwe peoples were the primary occupants of present-day Minnesota. The area that became Dodge County was "common hunting and combat ground for Mdewakanton Sioux who often battled the Sauk and Fox Indians" (Hill 1884; Dodge County n.d.). Early historical accounts document abundant timber, springs, and game in the area, including buffalo, elk, and antelope (Hill 1884, 60-61; Dodge County n.d). Migration into the region by white settlers increased following the completion of the Erie Canal [1825] and the conclusion of the Black Hawk War [1832] (Hill 1884; Upham 1920). At Fort Snelling in 1837, Henry Dodge, governor of the Wisconsin Territory entered a treaty with the Ojibwe people to cede pine and agricultural lands in the present states of Wisconsin and Minnesota (Upham 1920:171). As white settlers migrated into the region, interaction and subsequent tensions with Native peoples increased. In the following years, tribes were removed from their ancestral lands with growing force from the U.S. government.

Throughout this early period up until the 1850s, fur drove much of the European exploration of Minnesota, leading to the establishment of American settlements, including the important Fort Snelling in 1824 (Hansen 1918). This ultimately led to Minnesota becoming a territory in 1849, later achieving statehood on May 11, 1858. In the 1860s, intensive agriculture and ever-increasing European settlements displaced numerous Native Americans groups. These tensions culminated in the Dakota Conflict of 1862 (Carley 1976).

The period after the 1860s, Minnesota became an epicenter for the agriculture, lumber, and mining industries. Agriculture was prevalent in the southern and western parts of the state, while lumber was cut and iron mined in the northeastern areas. The Mesabi, Cuyuna, and Vermilion Iron Ranges were focal points in the procurement of iron, historically employing thousands of people (Upham 1920). Railroad lines were also economically important in Minnesota, making Minneapolis/St. Paul a focal point in transcontinental railways of the 19th and 20th centuries.

History of Dodge and Olmsted Counties

European Settlement and Incorporation

The Project is located in southeastern Minnesota, primarily in Canisteo and Mantorville Townships in the southeast portion of Dodge County, and a small portion falls in Kalmar Township in southwest Olmsted County. The nearest towns are Kasson to the west, and Mantorville to the northwest, and Byron to the east.

Dodge County was incorporated from neighboring Rice County and other unorganized territory (Upham 1920, 171; Dodge County n.d.; Hill 1884). It was named after Henry Dodge, the Territorial Governor of Wisconsin [1836-1841; 1845-1848] (U.S. Senate Historical Office n.d.). Canisteo is one of twelve townships in the county and is recognized as one of the earliest settled areas in Minnesota (H.H. Hill 1884; Genealogy Trails). Migrants from Canisteo, New York first settled Canisteo Township in 1854 and it was organized in 1858 (Upham 1920, 172). The first maps of the region platted by Government Lands Office (GLO) recorded 171 land patents in 1854. An 1855 census recorded about 100 white residents (Hill 1884; Dodge County n.d). Mantorville Township was also settled in 1854, was incorporated in 1857, and organized in 1858. The village of Mantorville was platted in 1856 "by Peter Mantor, H.A. Pratt, and others, and in 1857 it was designated [...] to be the county seat" (ibid 173).

Olmsted County was established in 1855. It was named for David Olmsted, who served as the first mayor of St. Paul and retired to neighboring Winona County. Kalmar Township was organized in 1858. Byron, first known as Bear Grove, was established as a railroad village in Kalmar Township; it was platted in 1864 and incorporated in 1873 (Upham 1920, 385-388). Byron was the New York hometown of S.W. VanDusen, an investor who purchased land and platted the town on the rail line (Byron n.d.).

The first wave of Euro-American settlers were predominately Yankees, who relocated from New York and New England (Dodge County Historical Society n.d.). Following the forced removal of Indian tribes and the introduction of the railroad in the second half of the nineteenth century, emigrants from Germany, Sweden, and Norway added to the ethnic socio-cultural makeup of the region. These settlers primarily knew the Minnesota territory through engagement with fur trading, logging, and early agricultural, mineral extraction, and eventually railroad and other transportation development (Hill 1884; Dodge County n.d.; Upham 1920, 171). These activities and resources defined much of Dodge County's economic development in the late nineteenth and into the twentieth century. While the northern portion of Dodge County had high and rolling lands with "considerable timber," the southern townships were "destined to become the most fertile part" of the county. The land was "rather flat and wet, and admirably adapted to grazing and stock raising. The soil is rich, dark loam [...] and yields large crops" (Dodge County n.d.).

Dodge County had a population of 4,130 in 1857, 6,222 in 1865, and 11,344 in 1881 (Dodge County n.d.). It reached 13,000 residents by 1900 and hovered around that number through the 1970s. The county has seen its population grow in each decade since 1980, when it had 14,773 residents. Its estimated 2019 population was 20,934 (US

Census). Due in large part to the economic strength of the city of Rochester, Olmsted County's population saw much more sustained growth through the twentieth century. Its population was 9,524 in 1860 and more than doubled to 19,793 in 1870. It surpassed 20,000 residents before 1900 and 35,000 by 1930. Its population continued to grow in subsequent decades and had an estimated population of 158,293 in 2019 (US Census).

Economic and Transportation Development

Railways contributed significantly to the growth of the region. Their introduction not only facilitated more migration but expanded the trade networks from local farms. In 1865, the Winona and St. Peter (WSP) rail line (now the Chicago and Northwestern) entered Dodge County and connected Rochester west to Kasson, and then onto Owatonna in 1866. A spur from Kasson to Mantorville was built in 1890 and decommissioned in 1932. In 1865, a rail station was constructed in the community of Bear Grove (now Byron) along the WSP line. A rail station and post office opened in the town of Kasson in 1866 (Upham 1920, 173). The "railroad became the lifeline of the Village [of Byron and surrounding areas] and at one time there were at least eight passenger trains stopping daily in Byron" (Byron n.d.)

Beginning in the 1860s, Dodge County's primary economic potential focused on agricultural production of various grains (Hill 1884; Dodge County n.d.). Wheat was the primary cash crop, but corn, oats, barley, and potatoes were also produced commercially (Dodge County n.d.). By the 1880s, falling market prices led to a decline in wheat production. In response, farming diversified; dairying and other crops such as hay, alfalfa, corn, and flax gained popularity in the 1890s. Cheese and creamery production in the area became highly lucrative (ibid). Today, Dodge County produces more dairy cattle than any other county in Minnesota. Soybean production also increased to make Dodge County the 3rd largest producer in the State (ibid).

5.0 Literature Review

Westwood updated the literature review for the Project originally completed January 2, 2019 and first updated May 2020. On November 2, 2020, Westwood Cultural Resource Manager Ryan Grohnke requested a database search from the SHPO. Additionally, he reviewed the Minnesota state archaeological site files available via the online Portal maintained by the MN OSA to obtain a list of previously recorded archaeological sites and historic structures located within the proposed Project area.

Due to precautions required by the Minnesota Governor's Stay Safe MN orders placed in response to the COVID-19 pandemic, in person review at SHPO and OSA was not allowed. This limited Westwood's ability to review previous survey reports and other materials housed on-site at these locations. Westwood Architectural Historian, Sara Nelson, assisted in requesting materials from staff at the SHPO offices.

5.1 Previous Surveys

Westwood was unable to review previous reports housed at SHPO or OSA for the 2020 literature review. Based on the literature review dated January 2, 2019, one previous survey occurred in a very limited portion of the Project area. Previous research had not divulged any previous surveys in the Project area.

5.2 Previously Recorded Archaeological Resources

The Project area is located in the Southeast Riverine west (3w) Archaeological Region of Minnesota (Anfinson 1990). Archaeological properties related to American Indian occupation and activities are usually found along lakes and streams, or by former large permanent bodies of water on prominent topographic features (i.e., uplands or terraces).

No previously recorded archaeological sites are within the Project area or within a one-mile buffer of the Project (Exhibit 2).

5.3 Previously Recorded Architectural Resources

Nine historic/architectural resources have been previously inventoried within one mile of the Project area (Exhibit 2). One linear resource is located in the Project area. Trunk/U.S. Highway 14 corridor (SHPO ID # XX-ROD-016, OL-ROD-001) bisects both the northern third of the Project boundary and one-mile buffer. The historic corridor will not be physically impacted by the Project, nor will it be adversely impacted by views of the Project. The resources have not been evaluated for the National Register of Historic Places (NRHP); not all SHPO inventory forms could be located to confirm their eligibility.

Table 5.1. Previously Recorded Historic/Architectural Resources

SHPO ID	Name	Address	NRHP Eligibility	Project/ Buffer
DO-CAN-002	George W. Gleason Farmstead	S side 660th St east of 270th Ave	Unevaluated	Buffer
DO-CAN-003	Charles Van Allen House	W side 270th Ave south of 660th St	Unevaluated	Buffer
DO-CAN-005	School	NE corner 655th St & 270th Ave	Unevaluated	Project
DO-CAN-006	Canisteo Town Hall	NE corner Co Hwy 8 & Co Hwy 13	Unevaluated	Buffer
DO-CAN-009	Bridge No. L5500	Carries unpaved TR over an unnamed stream	Unevaluated	Buffer
OL-KAL-025	Farmstead	1645 4th St NW	Unevaluated	Buffer
OL-KAL-026	House	1643 4th St NW	Unevaluated	Buffer
OL-SLM-012	Farmhouse	3031 110th Ave SW	Unevaluated	Buffer
XX-ROD-016 OL-ROD-001	Trunk/U.S. Highway 14	Trunk/U.S. Highway 14	Unevaluated	Project/ Buffer

Key: SHPO ID = designation applied by SHPO; Name = unofficial name or resource type as listed on inventory form; Address = location as listed on inventory form, verified in GIS if possible; National Register of Historic

Places (NRHP) Eligibility = eligibility or listing status in the NRHP; Project/Buffer = location within in project area or one-mile buffer.

5.4 Other Sources

An Illustrated Historical Atlas of the State of Minnesota (Andreas 1874) shows several historic resources in the Project area, which covers portions of Canisteo and Mantorville Townships in Dodge County and Kalmar Township in Olmsted County. No residences are indicated within the Project boundaries in Mantorville (Township 107, Range 16) or Byron (Township 107, Range 15). In Canisteo (Township 106, Range 16), the G.W. Gleason and A. Seeverts residences are shown in the north half of Section 13. A schoolhouse and several residences are located adjacent to the Project boundaries. A railroad corridor runs east between the towns of Kasson and Byron; running alongside a portion of the Project boundary in Sections 35 and 36 in Mantorville and Section 31 in Kalmar. Roads, a creek, and wetlands are also shown in the Project area.

Historic Trygg Maps (1969) developed from the original township land surveys indicate the Project area consisted primarily of prairie with a river in proximity.

A review of 1938 and 1953 historic aerial photographs indicate the Project area was predominantly cultivated agricultural land. No potential cultural resources were observed.

6.0 Field Investigations

6.1 Archaeology

Westwood Archaeological Principal Investigator Rigden Glaab, Cultural Resources Manager, Ryan P. Grohnke, Permit Lead Dean T. Sather, and Archaeological Technicians Sara Nelson and Daniel Schneider, conducted the field investigations October 30 through November 12, 2020 and May 5–7, 2021.

Topography throughout the APE is generally level to rolling hills. The land is entirely agricultural with a mix of corn and soybeans. Field conditions generally comprised recently harvested and/or disced fields with ground surface visibility ranging from 25–95%, which enabled the use of pedestrian survey.

Shovel tests were performed in one portion of the Project. This location had low ground surface visibility and was located on level ridge near a stream; therefore, it was of higher potential for unrecorded archaeological resources (Exhibit 3 and Exhibit 4). All but one of the 53 tests returned negative results. One small, modern animal bone was identified near the surface in one test (ST #10). Representative photographs of the Project area can be viewed in Appendix A. Shovel test results can be examined in Appendix B.

A single isolated find, Site #21DO0020 (Field # Byron-PRE-1F), was identified during the survey (Exhibit 3).

Site #21DO0020

This isolated find consisted of an isolated prehistoric utilized flake. The find was observed during pedestrian survey of the APE. This quartzite flake was 3 x 2.5 x .6 cm and utilized on left margin (2.6 cm Long). Observed were five ventral scars and three dorsal scars, lateral snap distal break, and a bifacially worked utilized edge. The area around the artifact was surveyed with close interval transects and no other artifacts were found. Due to the paucity of artifacts, we are recommending the find not eligible for listing in the NRHP. No avoidance or further work is recommended.

7.0 Summary and Recommendations

The current archaeological survey for the Byron Solar Project identified a single archaeological isolated find. An isolated find is not considered significant, and no avoidance is necessary. It is recommended that no additional cultural resources investigations are warranted in the current APE, and that the Project be allowed to proceed as planned.

Westwood stresses that if construction plans are altered to include areas not previously surveyed, those locations must be examined for cultural resources. Although an archaeological survey was completed, the possibility of unidentified resources remains. If unrecorded archaeological sites are discovered during construction, all ground-disturbing activities in the area should stop and archaeologists at Westwood should be contacted. Further, if human remains are encountered during construction activities, all ground disturbing activity must cease, and local law enforcement must be notified. *Minnesota Statute 307.08, the Private Cemeteries Act, prohibits the intentional disturbance of human burials.*

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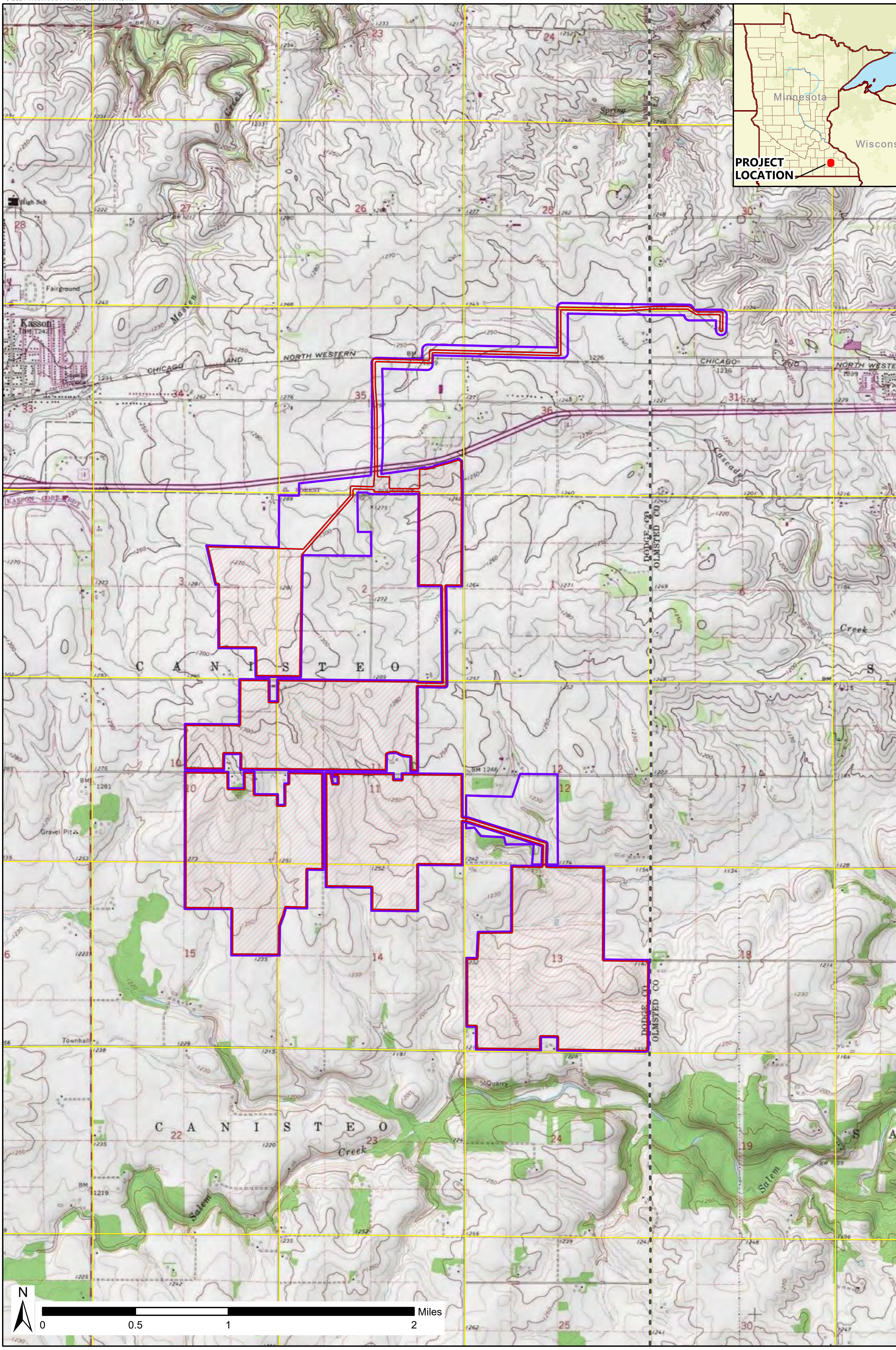

Area of Archaeological Survey
Solar Project Boundary (3/31/21)
County Boundary
Section Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Location

EXHIBIT 1

Westwood

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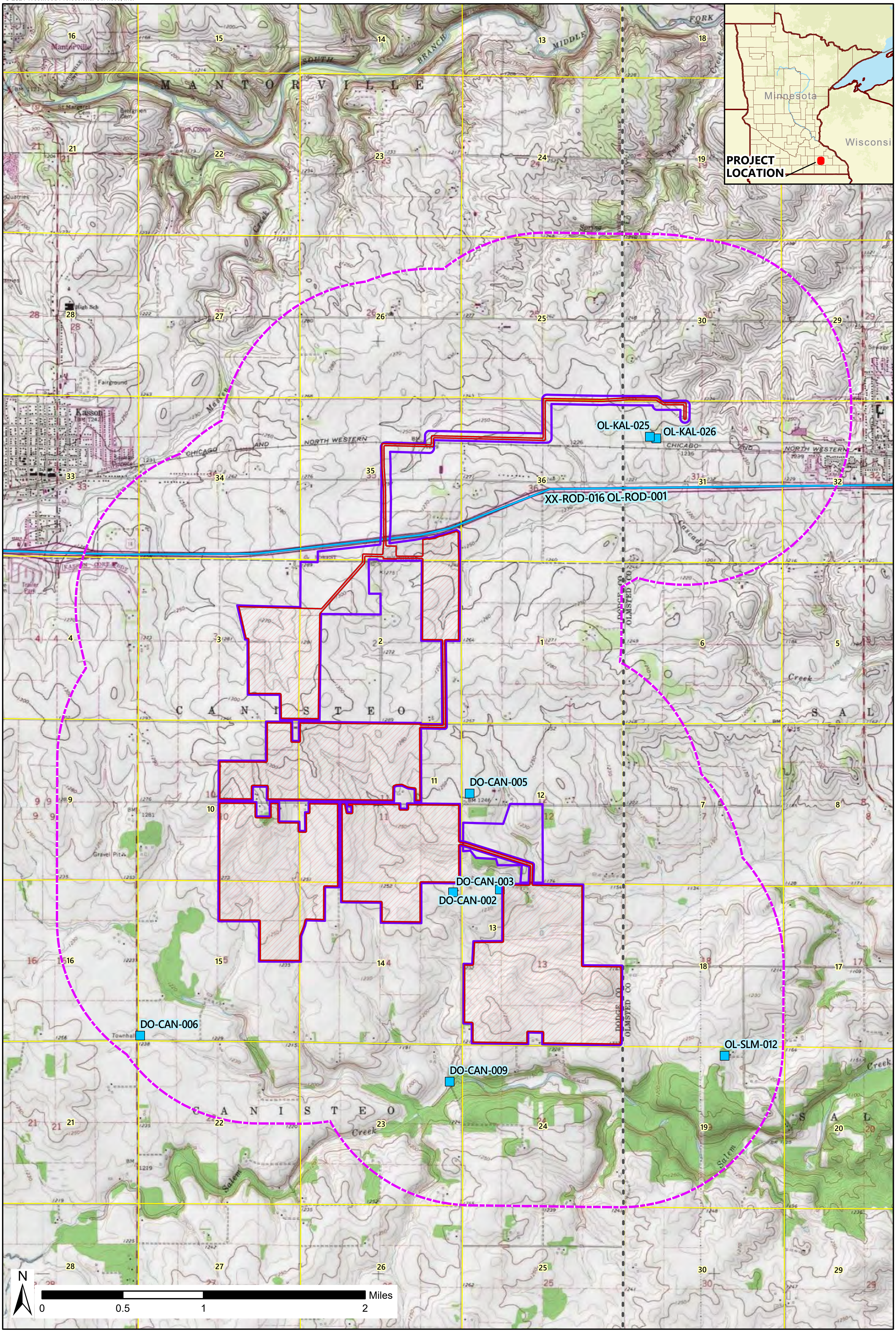

Area of Archaeological Survey
Solar Project Boundary (3/31/21)
1-Mile Buffer
County Boundary
Section Boundary
Historic/Architectural Resource
Historic Linear Resource

NOTE: There are no previously recorded archaeological sites located within the Survey Area or the 1-mile buffer.

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Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Previously Recorded Cultural Resources in Vicinity of Project

EXHIBIT 2

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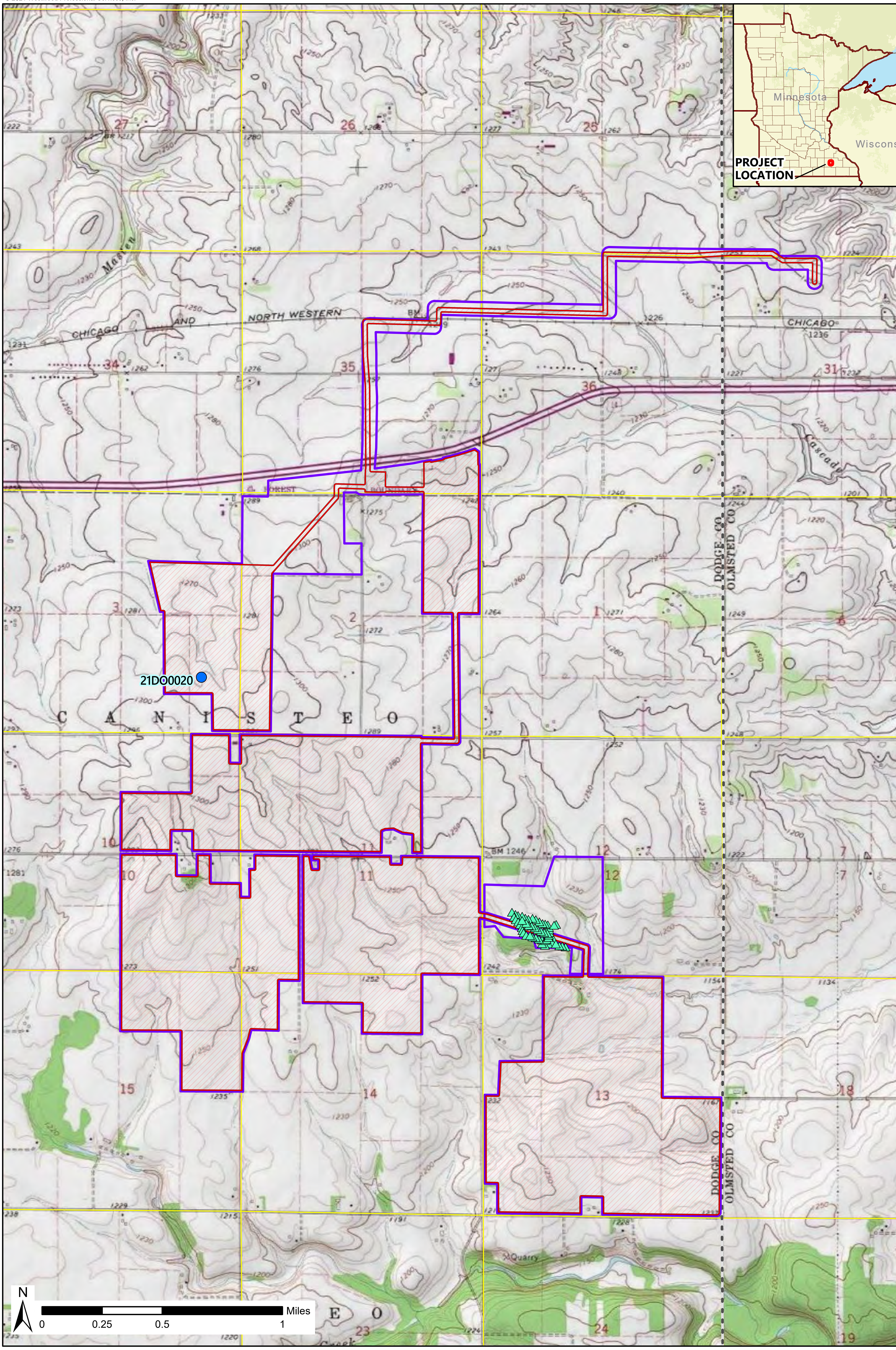

Area of Archaeological Survey
Solar Project Boundary (3/31/21)
County Boundary
Section Boundary
Isolated Find (21DO0020)
Shovel Test (Negative)

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Survey Results Map

EXHIBIT 3

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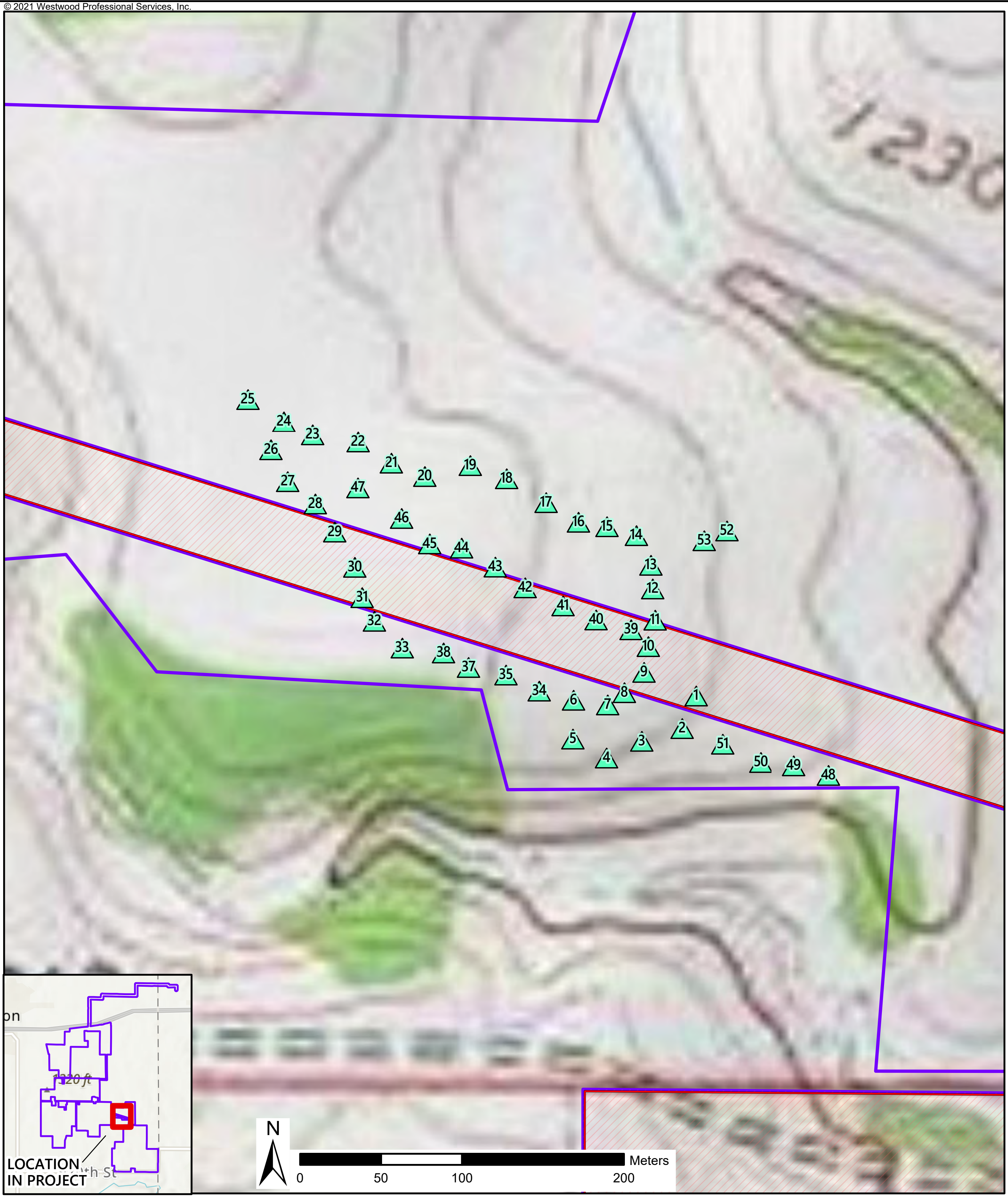

Area of Archaeological Survey

Solar Project Boundary (3/31/21)

Shovel Test (Negative)

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Shovel Tests

EXHIBIT 4

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APPENDIX A:
Photographs of Project Area

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Photo 1. Facing northeast toward APE from western boundary on 655th Street.	
Photo 2. Facing north in northern portion of APE, just west of 270th Ave.	

Photo 3. Facing east in central portion of APE on 655th Street.	
Photo 4. Facing north in central portion of APE on 655th Street.	

Photo 5. Facing east in central portion of APE on 655th Street.	
Photo 6. Facing north in west-central portion of APE, south of 655th Street and west of 262nd Ave.	

Photo 7. Facing east in west-central portion of APE, south of 655th Street and west of 262nd Ave.	
Photo 8. Facing south in west-central portion of APE, south of 655th Street and west of 262nd Ave.	

Photo 9. Facing west in west-central portion of APE, south of 655th Street and west of 262nd Ave.	
Photo 10. Facing east in east-central portion of APE, south of 655th Street and west of 270th Ave.	

Photo 11. Facing east near eastern edge of APE, south of 655th Street and east of 270th Ave. In area of shovel tests.	
Photo 12. Facing south toward creek bed near eastern edge of APE, south of 655th Street and east of 270th Ave. In area of shovel tests.	

Photo 13. Facing west toward 270th Ave near eastern edge of APE, south of 655th Street. In area of shovel tests.	
Photo 14. Facing north near eastern edge of APE, south of 655th Street and east of 270th Ave. In area of shovel tests.	

Photo 15. Facing west toward agricultural buildings in southeastern portion of APE, east of 660th Street.

Photo 16. Facing north from southwestern boundary of APE.

Photo 17. Representative Shovel Test pit (ST #6).

Photo 18. Representative Shovel Test pit (ST #50). Note higher concentration of limestone near base.

Photo 19. Representative Shovel Test pit (ST #10).	
Photo 20. Modern bone fragment identified in Shovel Test pit (ST # 10).	

APPENDIX B:

Shovel Test Results Table

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Shovel Test #	Depth (cmbs)	Soil Description	Soil Color	Results	Comments
ST #1	0-30	Silty loam, transition to slightly sandy loam	5YR 3/1	Negative	Along slightly elevated landform/ridge
	30-32		5YR 3/2		
	Base of Excavation				
ST #2	0-31	Silty loam, transition to slightly sandy loam	5YR 3/1	Negative	Along slightly elevated landform/ridge
	31-36		5YR 3/2		
	Base of Excavation				
ST #3	0-22	Silty loam, transition to slightly clay loam	5YR 3/2	Negative	Along slightly elevated landform/ridge. Near pathway, compressed from vehicular weight.
	22-29		5YR 2.5/1		
	Base of Excavation				
ST #4	0-19	Silty loam, transition to slightly sandy loam	5YR 3/1	Negative	Along slightly elevated landform/ridge. Near pathway, compressed from vehicular weight.
	19-26		5YR 3/2		
	Base of Excavation				
ST #5	0-27	Silty loam, transition to slightly clay loam	5YR 3/1	Negative	Along slightly elevated landform/ridge. Near pathway, compressed from vehicular weight.
	27-32		5YR 2.5/1		
	Base of Excavation				
ST #6	0-22	Silty loam, transition to slightly sandy loam	5YR 3/1	Negative	Along slightly elevated landform/ridge
	22-35		5YR 3/2		
	Base of Excavation				
ST #7	0-20	Silty loam, transition to slightly clay loam, with increasing concentration of clay	5YR 3/1	Negative	Along slightly elevated landform/ridge
	20-28		5YR 2.5/1		
	Base of Excavation				
ST #8	0-24	Silty loam, transition to slightly clay loam, with increasing concentration of clay	5YR 3/1	Negative	Along slightly elevated landform/ridge
	24-34		5YR 2.5/1		
	Base of Excavation				
ST #9	0-23	Silty loam, transition to slightly clay loam, with increasing and mottled concentration of clay	5YR 3/1	Negative	Along slightly elevated landform/ridge
	23-32		5YR 2.5/1		
	Base of Excavation				
ST #10	0-36	Silty loam, transition to slightly sandy loam	5YR 3/1	Negative	Along slightly elevated landform/ridge. Modern animal bone found near surface; not a cultural artifact.
	36-40		5YR 3/2		
	Base of Excavation				
ST #11	0-32	Silty loam, transition to slightly sandy loam. Few cobbles (2cm), rock at base.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	32-40		5YR 3/2		

Shovel Test #	Depth (cmbs)	Soil Description	Soil Color	Results	Comments
	Base of Excavation				
ST #12	0-22	Silty loam, slightly clay, transitions to slightly sandy loam. Few cobbles (2cm)	5YR 3/1	Negative	Along slightly elevated landform/ridge
	22-30		5YR 3/2		
	Base of Excavation				
ST #13	0-23	Clear transition from silty clay loam to sandy clay	5YR 3/1	Negative	Along slightly elevated landform/ridge
	23-38		5YR 3/2		
	Base of Excavation				
ST #14	0-34	Slightly silty clay loam, transition to sandy clay. No cobbles.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	34-42		5YR 3/2		
	Base of Excavation				
ST #15	0-26	Slightly silty clay loam, transition to sandy clay with 10% concentration cobbles (3cm)	5YR 3/1	Negative	Along slightly elevated landform/ridge
	26-38		5YR 3/2		
	Base of Excavation				
ST #16	0-35	Silty loam, transition to slightly sandy clay loam. No cobbles.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	35-45		5YR 3/2		
	Base of Excavation				
ST #17	0-38	Silty loam, transition to slightly sandy clay loam. No cobbles.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	38-45		5YR 3/2		
	Base of Excavation				
ST #18	0-20	Silty loam, transition to sandy clay loam. 5% concentration cobbles (<2cm) in bottom layer	5YR 3/1	Negative	Along slightly elevated landform/ridge
	20-37		5YR 3/2		
	Base of Excavation				
ST #19	0-41	Silty loam to slightly sandy clay loam	5YR 3/1	Negative	Along slightly elevated landform/ridge
	41-56		5YR 3/2		
	Base of Excavation				
ST #20	0-42	Silty loam, gradual and mottled transition to sandy loam.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	42-52		5YR 3/2		
	Base of Excavation				
ST #21	0-35	Silty loam, transition to sandy loam, slightly clay. Few cobbles (6cm) at base.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	35-40		5YR 3/2		
	Base of Excavation				
ST #22	0-26		5YR 3/1	Negative	Along slightly elevated landform/ridge

Shovel Test #	Depth (cmbs)	Soil Description	Soil Color	Results	Comments
	26-39	Silty loam, transition to sandy loam, slightly clay.	5YR 3/2		
	Base of Excavation				
ST #23	0-32	Silty loam, transition to sandy loam, slightly clay.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	32-48		5YR 3/2		
	Base of Excavation				
ST #24	0-28	Silty loamy clay, gradual and mottled transition to sandy loam, slightly clay. No cobbles or gravels.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	28-36		5YR 3/2		
	Base of Excavation				
ST #25	0-27	Silty loamy clay, gradual and mottled transition to sandy clay. No cobbles or gravels.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	27-45		5YR 3/2		
	Base of Excavation				
ST #26	0-22	Silty loam to slightly sandy clay. No gravels or cobbles.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	22-37		5YR 3/2		
	Base of Excavation				
ST #27	0-39	Silty loam to sandy clay. 5% concentration cobbles (<2cm) in lower layer	5YR 3/1	Negative	Along slightly elevated landform/ridge
	39-42		5YR 3/2		
	Base of Excavation				
ST #28	0-35	Silty loam, transition to sandy clay loam	5YR 3/1	Negative	Along slightly elevated landform/ridge
	35-43		5YR 3/2		
	Base of Excavation				
ST #29	0-28	Silty loam, transition to sandy clay loam	5YR 3/1	Negative	Along slightly elevated landform/ridge
	28-41		5YR 3/2		
	Base of Excavation				
ST #30	0-40	Silty loam, transition to sandy clay loam	5YR 3/1	Negative	Along slightly elevated landform/ridge
	40-51		5YR 3/2		
	Base of Excavation				
ST #31	0-27	Slightly clay silty loam, mottled transition to sandy clay. Very few gravels.	5YR 3/1	Negative	Along slightly elevated landform/ridge
	27-38		5YR 3/2		
	Base of Excavation				
ST #32	0-28	Silty loam, gradual and mottled transition to sandy slightly clay loam	5YR 3/1	Negative	Along slightly elevated landform/ridge
	28-40		5YR 3/2		

Shovel Test #	Depth (cmbs)	Soil Description	Soil Color	Results	Comments
	Base of Excavation				
ST #33	0-42	Silty loam, mottled transition to sandy clay. 5% concentration cobbles (5cm) in lower layer	5YR 3/1	Negative	Along treeline, north of creekbed
	42-50		5YR 3/2		
	Base of Excavation				
ST #34	0-28	Silty loam mottled transition to sandy slightly loamy clay. 10% concentration granite cobbles in transition.	5YR 3/1	Negative	Along bisecting line between elevated landforms/ridges
	28-45		5YR 3/2		
	Base of Excavation				
ST #35	0-27	Silty loam, gradual mottled transition to sandy clay. 5% concentration of cobbles (<4cm) in lower layer	5YR 3/1	Negative	Along bisecting line between elevated landforms/ridges
	27-36		5YR 3/2		
	Base of Excavation				
ST #37	0-22	Silty loam, gradual and mottled transition to sandy clay	5YR 3/1	Negative	Along bisecting line between elevated landforms/ridges
	22-38		5YR 3/2		
	Base of Excavation				
ST #38	0-42	Silty loam, gradual and mottled transition to sandy clay	5YR 3/1	Negative	Along bisecting line between elevated landforms/ridges
	42-51		5YR 3/2		
	Base of Excavation				
ST #39	0-32	Silty loam, transition to sandy clay	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	32-44		5YR 3/2		
	Base of Excavation				
ST #40	0-27	Silty loam, gradual and mottled transition to sandy clay	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	27-38		5YR 3/2		
	Base of Excavation				
ST #41	0-25	Silty loam, transition to slightly sandy clay	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	25-35		5YR 3/2		
	Base of Excavation				
ST #42	0-34	Silty loam, gradual and mottled transition to slightly clay sandy loam	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	34-46		5YR 3/2		
	Base of Excavation				
ST #43	0-42	Silty loam, transition to slightly clay, then gradual transition to sandy clay.	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	42-56		5YR 3/2		
	Base of Excavation				

Shovel Test #	Depth (cmbs)	Soil Description	Soil Color	Results	Comments
ST #44	0-32	Silty loam, transition to slightly clay, then gradual transition to sandy clay.	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	32-48		5YR 3/2		
	Base of Excavation				
ST #45	0-28	Silty loam, transition to sandy clay	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	28-42		5YR 3/2		
	Base of Excavation				
ST #46	0-48	Silty loam, transition to silty clay loam, to sandy clay base	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	48-58		5YR 3/2		
	Base of Excavation				
ST #47	0-28	Silty loam, transition to sandy clay	5YR 4/2	Negative	Along bisecting line between elevated landforms/ridges
	28-38		5YR 3/2		
	Base of Excavation				
ST #48	0-42	Silty loam gradually more clay to sandy clay. 10% concentration of limestone/sediment blobs	5YR 3/2	Negative	Along slight ridge, north of creek bed
	42-50		5YR 3/1		
	Base of Excavation				
ST #49	0-19	Silty loam, transition to sandy loam with 25-50% concentration limestone intrusions.	5YR 3/2	Negative	Along slight ridge, north of creek bed
	19-29		5YR 3/1		
	Base of Excavation				
ST #50	0-15	Silty loam to sandy loam with 75% concentration limestone intrusions.	5YR 3/2	Negative	Along slight ridge, north of creek bed
	15-28		5YR 3/1		
	Base of Excavation				
ST #51	0-20	Silty loam to sandy loam with granite/rock intrusions (<8cm). Bottomed out at rock.	5YR 3/2	Negative	Along slight ridge, north of creek bed
	20-28		5YR 3/1		
	Base of Excavation				
ST #52	0-16	Silty loam to sandy slightly clay loam. Intrusions of limestone/sedimentary rock (<3cm)	5YR 3/2	Negative	Slightly raised landform
	16-29		5YR 4/2		
	Base of Excavation				
ST #53	0-20	Silty loam, gradual transition with increasing clay, to sandy clay	5YR 3/2	Negative	Slightly raised landform
	20-28		5YR 4/2		
	Base of Excavation				

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Shovel Test Pit # 1	
Shovel Test Pit # 2	

Shovel Test Pit # 3	
Shovel Test Pit # 4	

Shovel Test Pit # 5	
Shovel Test Pit # 6