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Phase I Archaeological Survey

Lone Lake Park Mountain Bike Trail, City of Minnetonka, Hennepin County, Minnesota

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City of Minnetonka, Hennepin County, Minnesota**
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EXECUTIVE SUMMARY

This report contains the results of a Phase I Archaeological Survey conducted on behalf of the City of Minnetonka for the proposed construction of new mountain bike trails (MBTs) within Lone Lake Park, Minnetonka, Minnesota. Work was completed by archaeologists who meet the *Secretary of the Interior's Professional Qualification Standards in Archeology* and are licensed for archaeological investigations on public lands in Minnesota. The Survey Area includes approximately 50 acres within the 146-acre Park (**Figure 1**). The planned trail length will be approximately 4.7 miles.

Archaeologists were on site on October 9, 14, 16, 17, and 23, 2019, to conduct a visual assessment and subsurface testing, following the guidelines set forth in the OSA and SHPO *Manual for Archaeological Projects in Minnesota*. The research methodology was designed to be responsive to archaeological probability, including reviewing geomorphology, slopes, distance to water, and height above surroundings.

Areas with steep slopes or saturated soils reduce archaeological probability; these types of features account for a large proportion of the Survey Area landscape. Uplands and relatively flat areas near permanent water resources within the Survey Area have much higher probability to contain sites. Archaeological testing was concentrated on these upland areas and areas near open water and wetland resources. Soil profiles revealed in the course of shovel testing evidenced plow-zones, confirming that the area was used for agriculture in the past. No cultural materials were encountered in the course of the survey.

The survey methodology employed for the MBT project was well tailored to the geography of the Survey Area. As previously mentioned sloped and low, wet areas limited areas within the Survey Area appropriate for testing. A standard high probability testing interval (15-meters) was applied to those landforms that merited testing. This survey methodology would have encountered evidence of any potential archaeological resources present within the Survey Area, if sites were in fact present. The MBT project as proposed will not impact known or suspected sites.

ABSTRACT

The following report contains the results of a Phase I Archaeological Survey conducted on behalf of the City of Minnetonka for the proposed construction of new mountain bike trails (MBTs) within Lone Lake Park. The project area includes approximately 50 acres within the 146-acre Park. The planned total trail length will be 4.7 miles. The proposed trails are located in Section 35, T117N, R22W, Hennepin County, Minnesota. The project area is within State Historic Preservation Office (SHPO) Archaeological Region 4s.

The Bolton & Menk, Inc. Cultural Resources Team, led by Austin Jenkins, conducted an archaeological reconnaissance survey on October 9, 14, 16, 17, and 23, 2019. The survey follows the guidelines set forth in the *SHPO* and *OSA Manual for Archaeological Projects in Minnesota*. Phase I fieldwork included the excavation of 49 shovel tests. There is one previously identified archaeological site within one mile of the project area. No cultural materials were encountered in the course of the survey. Bolton & Menk, Inc. recommends no further archaeological investigations for the project, as described herein.

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Mountain Bike Trail Concept

INTRODUCTION

PROJECT INFORMATION

The City of Minnetonka is proposing to develop MBTs within Lone Lake Park (**Figure 1**). The MBT will total 4.7 miles in length, and up to 24 inches in width. There are two potential boardwalks/bridges proposed to accommodate the MBTs. Trails will be built using minimal earth moving with little or no ground disturbance. Although the trail alignment will be field sited, it will approximate the area depicted in the Concept Plan (**Appendix**).

Lone Lake Park is a 146-acre City Park located within the City of Minnetonka. The Park is north of MN Highway 62 and east of Interstate 494. The proposed project is located in Section 35, T117N, R22W, Hennepin County, Minnesota (**Figure 2**). The project will be funded by the City of Minnetonka. The survey included consideration for archaeologically sensitive areas that may need to be protected from trampling and erosion that are possible with mountain bike trails. The project is on public lands and any archaeological impacts would be subject to the Minnesota Field Archaeology Act (MS 138.31-.42).

SETTING

The project is located within Lone Lake Park, which is within the City of Minnetonka. The Park is bounded to the east by Shady Oak Road, to the south by Rowland Road, and to the west by a railroad grade and tracks (**Figure 1**). Surrounding land use is generally residential and businesses. Lone Lake is located 400 feet from the survey area at the nearest point.

GEOLOGICAL & ENVIRONMENTAL CONTEXTS

The Survey Area is within the swell and swale topography of a glacial moraine and surficial deposits range from silty clay loam to loamy sand and gravels formed by ice contact of the Superior lobe (Minnesota Geological Survey 2019). According to the Web Soil Survey, soils in the area are comprised of a variety of types. Kingsley-Gotham complex makes up over 70% of the soils in the Survey Area and is characterized as sandy loam to loamy sand. A typical soil profile is sandy loam/loamy sand transitioning to sand with depth. Parent material is till to glaciofluvial sediment. Angus loam makes up approximately 5% of the Survey Area, and a typical soil profile is below. This soil type is associated with ground moraines and hillslopes, and parent material is fine-loamy till.

- Ap – 0 to 7 inches: loam
- Bt – 7 to 37 inches: clay loam
- BC – 37 to 50 inches: clay loam
- C – 50 to 79 inches: loam

Bedrock within Minnetonka is generally deeply buried by glacial sediment, varying from 100 to 400 feet below the ground surface within the Survey Area. The terrain of the Survey Area is hummocky, made up of glacial moraines providing significant topographic variation. The closest lake to the Survey Area is Lone Lake, located 400 feet from the Survey Area at the nearest point. Within Minnetonka, however, there are many lakes, with a particularly large complex of interconnected bodies of water approximately 5 miles northwest of the Survey Area. The Survey Area also contains several wetlands.

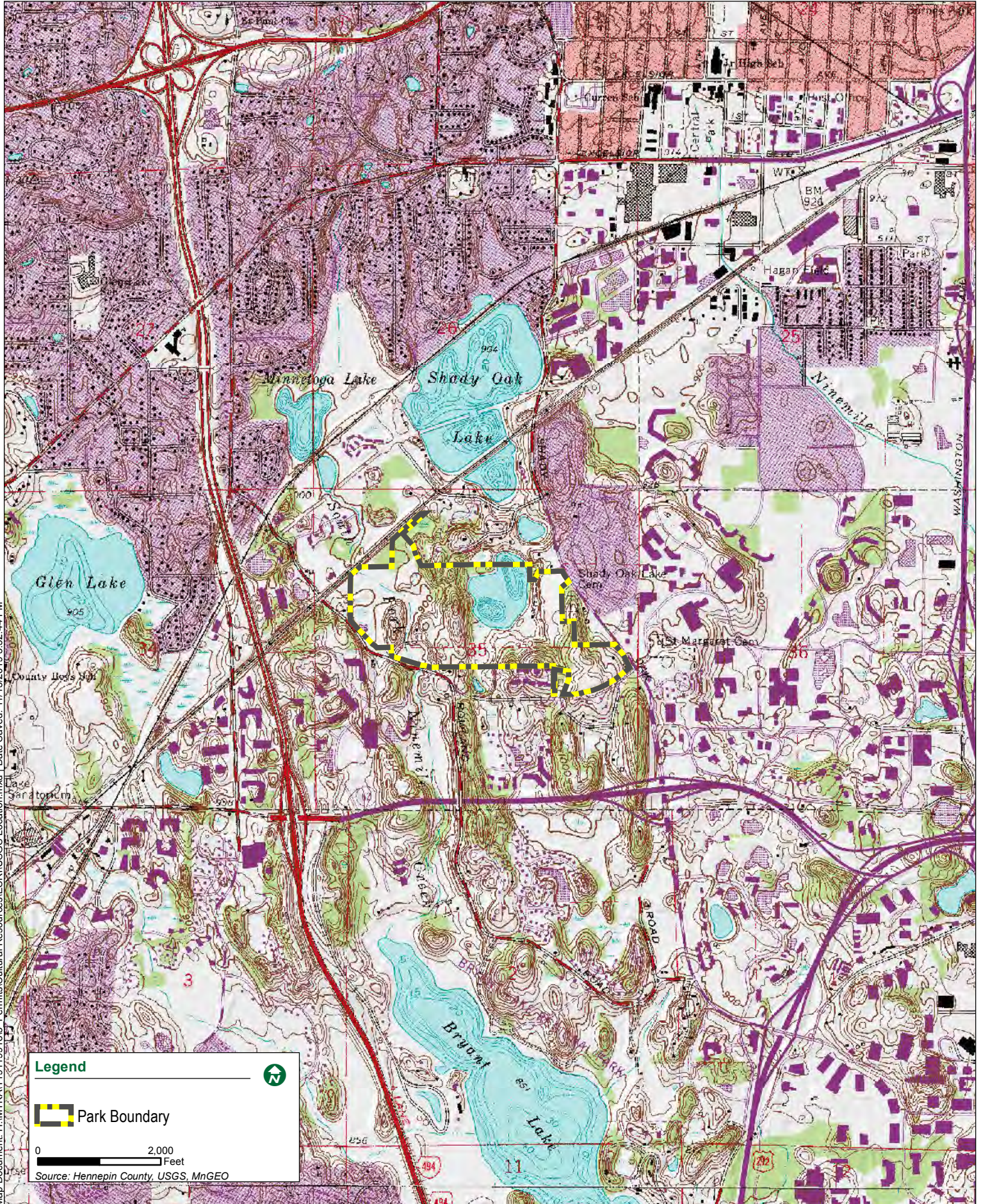
The Survey Area is in SHPO Region 4s Central Lakes Deciduous south. According to the MnModel Phase 4 Historic Vegetation Model (MM4) that draws from digitized GLO map data, historic vegetation for the Survey Area would have been deciduous forest along with permanently and seasonally wet areas associated with the current lake and wetlands (Hobbs 2019). Late Holocene period subsistence resources would have included small herds of large ungulates (elk, deer, and bison) terrestrially, along with other aquatic resources (fish, waterfowl, beaver, and wild rice) (Gibbon et al 2002).

RECENT DISTURBANCE

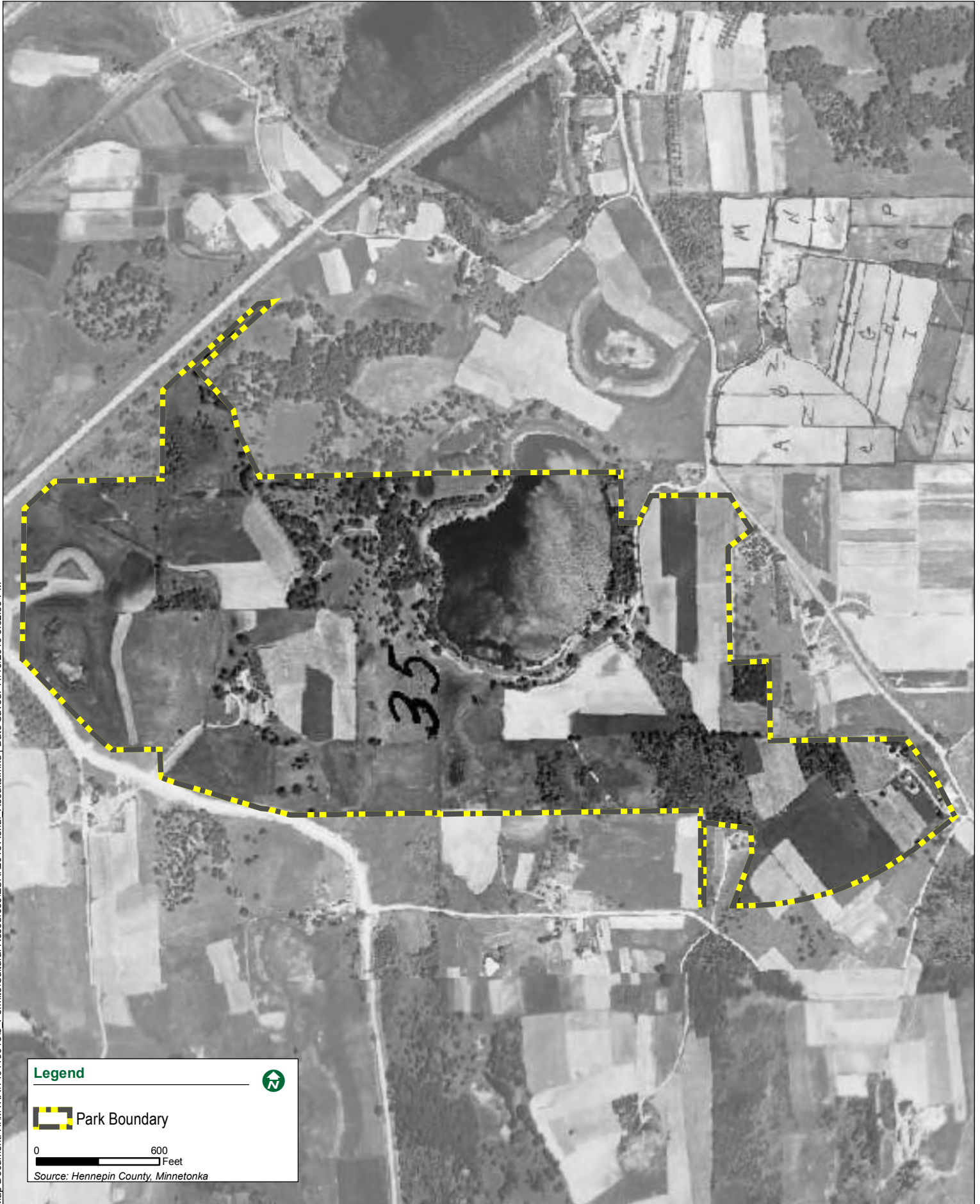
Historic aerial imagery depicts prior agricultural use through at least the 1960s. The amount of tree cover currently present in the area and “natural” (wooded) aesthetic is a relatively recent change since ca. 1990 (**Figures 1, 3, and 4**). Given past agricultural use, the landscape is at least moderately disturbed by these past activities.




Map Document: H:\M\TKAIT\1911991815 Permits\Cultural Resources\ESRI\2018 Aerial Results.mxd | Date Saved: 11/26/2019 2:23:32 PM




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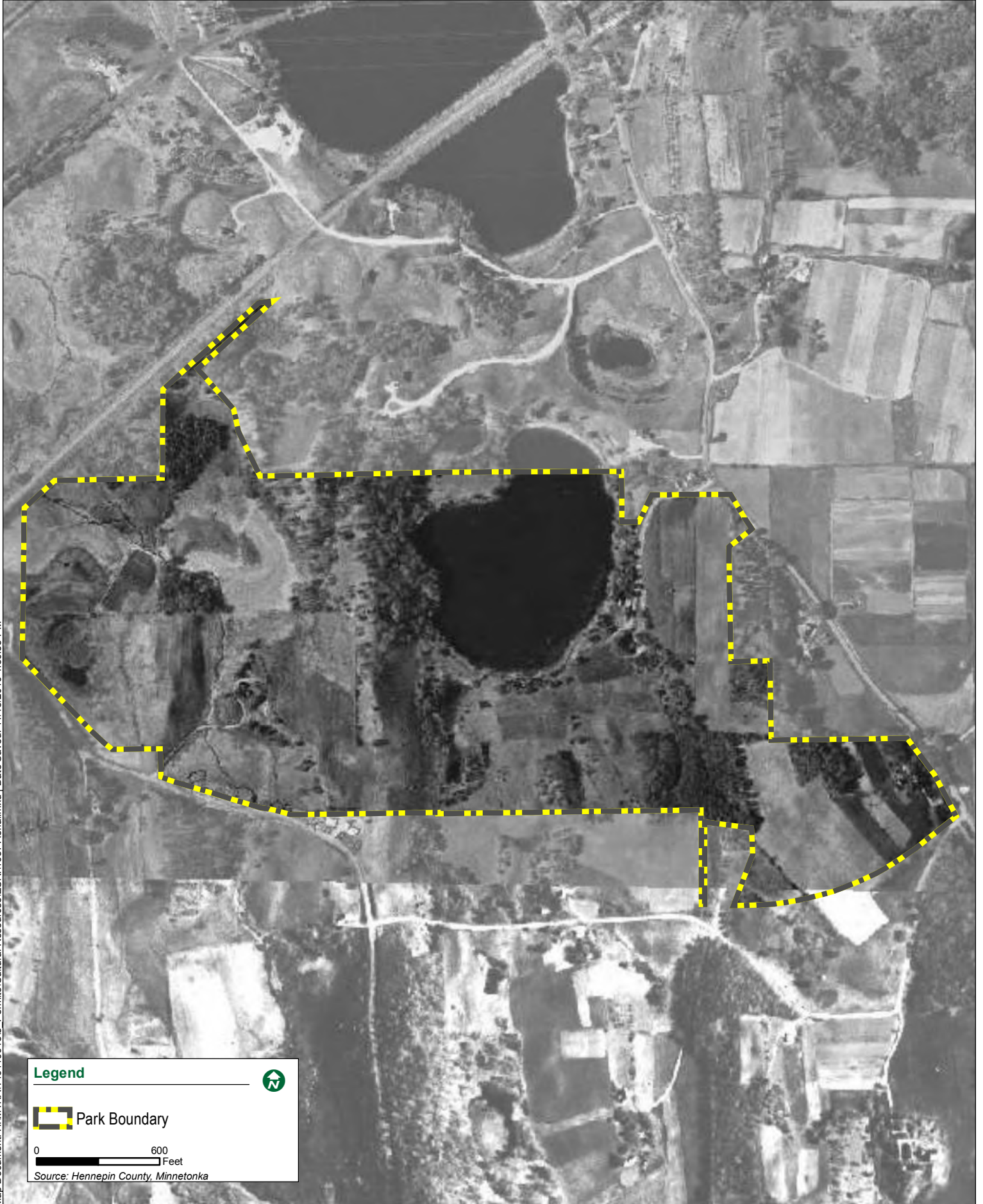
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Legend 

 Park Boundary

0 600
Feet

Source: Hennepin County, Minnetonka



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METHODOLOGY

RECOMMENDED SURVEY AREA

The project is located within an approximately 50-acre area within Lone Lake Park. The Survey Area boundaries follow the boundaries of the proposed MBTs, which are generally in the southern portion of the park, south of the existing bituminous trails and south and west of existing facilities (**Figure 1**, white dashed line). The Survey Area is within hummocky terrain with vegetation comprised of deciduous forest with scattered conifers, along with smaller areas of tallgrasses/shrubs and wetlands (**Figures 5 – 8**). Within the Survey Area there are existing informal footpaths (**Figure 9**). The surrounding landscape is largely residential and businesses (**Figure 1**). Lone Lake is approximately 400 feet from the Survey Area at the nearest point.

LITERATURE SEARCH

Background research was completed to identify archaeological and historical sites documented through October 2019. The OSA Portal was an integral tool in this search. Additional archaeological reports pertinent to the Survey Area were also reviewed.

ARCHAEOLOGICAL FIELD SURVEY & TESTING

The survey follows the guidelines set forth in the OSA and SHPO *Manual for Archaeological Projects in Minnesota* and is responsive to the archaeological probability and geomorphology of the area. Ground surface visibility in the Survey Area was generally poor due to the presence of forest and grasslands and therefore required subsurface testing (shovel tests). Shovel tests were spaced at 15-meter intervals where possible, dependent upon the landform configuration. According to the statewide MnModel Phase 4 Survey Implementation Model (MM4), the Survey Area is High Site Potential/Well Surveyed (Landrum et al 2019). Various factors within the Survey Area both favor and temper archaeological probability. The relatively far distance to open water, proximity to wetlands, elevated land, and potential for moderately undisturbed areas, all combine to give the Survey Area moderate to high probability to contain archaeological sites.

This probability statement is tempered by the fact that much of the Survey Area is steeply sloped and contains a large wetland complex. Slopes greater than 20 degrees have very low probability of containing archaeological sites and are not subject to survey, per OSA and SHPO *Manual for Archaeological Projects in Minnesota* guidelines. Inundated soils, such as those associated with wetlands, are also not surveyed as past human activity distinguishable archaeologically would not have taken place *within* these areas, but rather adjacent to them in areas that would not be flooded. The Survey Area contains a substantial amount of acreage of both sloped terrain and low, wet, inundated areas, which must temper the expectation for sites. While upland areas and areas of relatively flat terrain near permanent water sources appear to have moderate to high probability to contain sites, these features make up far less of the Survey Area than steeply sloped and low, easily saturated areas, which have very low probability to contain sites. Results of the archaeological survey can be found in the **Results – Fieldwork** section below.

Figure 5: Panorama within Survey Area



View from a high point within Survey Area, demonstrating general setting.

Figure 6: Panorama within Survey Area



View of sloping landscape present within Survey Area, limiting archaeological probability.

Figure 7: Project Setting – General



View to the north from southern portion of Survey Area, south of wetland complex present in the central Survey Area.

Figure 8: Project Setting – General



View to the south within the Survey Area, demonstrating tallgrass/shrub present in areas lower topographically.

Figure 9: Existing Informal Trails



View of one of many existing informal trails within Survey Area.

PRE-CONTACT CONTEXTS

PALEOINDIAN TRADITION

The Paleoindian Tradition occurred from approximately 13,500 to 9,000 years before present (BP, present defined as 1950 upon the development of radiocarbon dating methods). The Paleoindian Tradition in Minnesota is primarily known based on isolated finds of projectile points found in the course of uncontrolled surface collection, primarily by non-professional archaeologists (Buhta et al 2011: 15). As Buhta *et al.* (2011: 10) write, very little progress in our understanding of the Paleoindian occupation in Minnesota has taken place since documentation of the Browns Valley burial. This dearth of information is largely due to the fact that systematic sampling has failed to yield single component Paleoindian assemblages of any size (Buhta et al 2011:15).

The Paleoindian Tradition in Minnesota is further divided into two cultural groups which are based primarily on their point typology (Higginbottom 1996). It is divided into early, Llano, and late, Plano. Llano points are fluted, with Clovis being the earliest documented complex (Gibbon 2012). Folsom is the most commonly occurring Paleoindian complex. Many other Paleoindian projectile point types are reported (Buhta et al 2011: 15). Toolkits would have minimally included spear points, scrapers, drills, graters, and hammerstones. It may have also included bone and wooden tools (Mississippi Valley Archaeology Center 2004A).

With little more reported than isolated artifact find spots, the Paleoindian contexts in Minnesota are understood through paleoecological reconstructions and by extending what is known about Paleoindian lifeways elsewhere in North America to the Upper Midwest (Buhta et al 2011: 91-99). Paleoindian subsistence appears to have been reliant upon a combination of large game hunting, including caribou, bison, deer, moose, mammoth, and fish and floral resources (Buhta et al 2011: 91-99). Buhta et al (2011: 80-88) demonstrate that floral resources returned to previously glaciated regions shortly after ice retreated, possibly attracting large grazing animals.

Paleoindian settlement pattern is poorly understood, although it is hypothesized that the hunters and gatherers may have lived in small family groups, traveling to find food and resources for sustenance (Office of the State Archaeologist 2010; Mississippi Valley Archaeology Center 2004B).

There are no excavated archaeological materials that can be definitely attributed to the makers of Clovis or Folsom projectile points in Minnesota. Although there have been a number of finds of woolly mammoth skeletal parts and teeth at Minnesota localities; none has ever been indisputably associated with human activity (Johnson 1988:6). Although parts of Minnesota would have been inhabitable throughout the Wisconsinan glaciation, SHPO Region 4s would have been ice free by 12,000 and inhabitable very soon after (Buhta et al. 2011: 32).

ARCHAIC TRADITION

The time span between the Paleoindian and Woodland encompasses several thousand years which has all been attributed to the Archaic. The Archaic (ca. 9,500 – 2,500 BP) was originally defined based on the lack of distinct materials from the preceding Paleoindian Tradition and the subsequent Woodland Tradition. As the Archaic became better understood, it was also defined in terms of a tradition, based on subsistence and settlement patterns, technological and cultural practices, and other factors that differed from the traditions before and after (McElrath et al. 2009; Emerson & McElrath 2009).

The Archaic occurred during pronounced post-glacial environmental changes, which included the extinction of the large Pleistocene mammals. In Minnesota this period was marked by drastic climatic shifts and corresponding change in vegetation and resources for its occupants. During the early Archaic, forest dominated the landscape and forest resources were utilized by the landscape's occupants. The mid-Holocene saw the expansion of drier conditions and prairie environments expanded to cover even the northernmost extents of Minnesota, eventually giving way to deciduous, and finally conifer, forests (Buhta et al. 2017). The prairie and oak savannas reached their maximum during the mid-Holocene, concurrent and likely intensified by the catastrophic drainage of Lake Agassiz.

The makeup of forests also shifted before and after the prairie period. Before the prairie expansion less fire-resistant forests dominated, while after the prairie's retreat more fire-resistant woodland species dominated (such as oaks and oak savannas). While deer have been and continued to be an important resource, the spreading of grassland environments also made the utilization of bison possible, though the extent to which they were utilized as a resource is not well understood. In addition to climate, fire may have been one of the primary controls on vegetation during the period. Given that humans use fire for hunting and other activities, it is possible that they had considerable influence over vegetation change (Clark et al. 2001; Grimm 1984; Nelson et al. 2006). By the late Archaic, the stabilization of the climate and vegetation to modern conditions (the three distinct biomes of prairie, deciduous forest, and coniferous forest) allowed for the intensified utilization of particular resources, and the development of distinctive lifeways based on these adaptations (Gibbon 2012). Environmental changes and the resultant geographic shifts in biomes have caused changes in the territories between the different Archaic adaptations – and thus overlapping and commingled archaeological deposits.

Known technological changes to occur during the Archaic time period include the development of ground stone and copper tools, as well as early horticulture of plants such as squash. The Archaic also marks a technological shift from larger hafted, bifacially-worked lanceolate artifacts to smaller lithic specimens, namely stemmed and notched points. This shift in lithic usage is thought to be indicative of a technological shift: the application of atlatl technology (Buhta et al. 2017). In aquatic settings throughout the Midwest, the use of seine weights has been observed (Struever and Holton 2000).

Other information regarding changes in subsistence, settlement patterns, demographics, social hierarchy, economic structure, political relationships, and religious practices are largely unknown. Most sites that are affiliated with the Archaic time period are often multi-component, and most of these sites have experienced considerable amounts of mixing due to rodent and agricultural activity. Some of the known Archaic sites are deeply buried, with some even found below the present water table. Few datable and/or diagnostic artifacts have been found within discrete Archaic horizons (Board 2016). Only three single-component Archaic sites that have been excavated in Minnesota have associated radiocarbon dates, and only five sites include both diagnostic artifacts and radiocarbon dates (Buhta et al. 2017).

WOODLAND TRADITION

The Woodland Tradition in Minnesota spans from 1000 BC to AD 1650 (Arzigian 2008; Gibbon 2012). The beginning of this period does not represent a sudden nor drastic change from the preceding Archaic period, but rather intensification of local resource bases and regionalization of peoples on the landscape. The Woodland in Minnesota was once thought to represent the simultaneous adoption of ceramic technology, mound interment, and plant cultivation (Anfinson 1979; Buhta et al. 2014); however, the transition from Archaic to Woodland was more complicated, with societies selectively accepting these practices and technologies at different times (Theler &

Boszhardt 2005). Still, the presence of pottery is generally used to identify Woodland and later contexts (Arzigian 2008).

Also during this period, the use of new resource bases (i.e. cultivation of domesticated crops) led to greater sedentism (Gibbon 2012). Thus, while implements were similar to those of the preceding Archaic complexes, material culture types found in Woodland contexts shifted due to cultural change and regionalization -- modes of resource exploitation specialized for local environments, a trend attributed at least in part to the continued stabilization of local environments.

Projectile points varied more in form than those seen in the Archaic, with stemmed points becoming rare and side- and corner-notched points of several varieties supplanting them. Scrapers, knives, drills, awls, and punches of chipped stone persisted, and as well as ground-stone implements. Ceramics varied in their composition and decoration by complex, but some of the earliest examples in the state come from thick-walled and conical vessels; through time these generally become thinner and more globular. Shell tempering eventually would allow for a more water-tight/less permeable vessel (Arzigian 2008). Copper continued to be used for awls or piercing tools and ornaments, although the frequency of copper articles is lower than in the Archaic.

At the same time this regionalization was taking place on the landscape, contact with peoples from far-removed societies also occurred. This expanded interaction sphere is visible through the occurrence of exotic items such as galena, obsidian, and shark teeth, to name a few, along with changes in ceramic stylistic attributes.

During the late (Terminal) Woodland, after AD 500 or so, the continued intensification of local resources through time led to further regionalization. During the Terminal Woodland, population size increased, as did the size and number of habitation sites. Agricultural societies focused on maize horticulture and residing in associated palisaded villages in southern and western Minnesota (Plains Village cultures). The Effigy Mound complex in the Upper Mississippi River valley, and semi-sedentary villages focused on intensive wild rice harvesting in northern Minnesota (Psinomani Complex).

CONTACT PERIOD

While the territory now known as Minnesota was legally under the control of Spain from 1763 to 1800, French and British presence predated the United States' acquisition of the territory with the Louisiana Purchase in 1803. The French presence in Minnesota began with the exploration of the Great Lakes in the early 1600's (Dobbs 1988). The fur trade served as the major catalyst of the French interest in Minnesota. The French influence in Minnesota essentially ended with the French and Indian War (1760), which is when the presence of the British intensified. The founding of the major fur trade companies (Hudson's Bay and the North West Company) solidified the British interest in Minnesota (Dobbs 1988).

While the United States' political presence in the territory that would become Minnesota began in 1803, it more appropriately began with the first permanent US military presence: the founding of Fort Snelling in 1819 (Dobbs 1988). Zebulon Pike claimed to have secured 100,000 acres from the Dakota in 1805 for the erection of a US fort, and the confluence of the Minnesota and Mississippi Rivers was selected for this purpose. The function of the Fort initially was to secure the control of US interests in the fur trade and to quell hostilities between indigenous groups and the encroaching settlers moving westward (Cassady and DeCarlo 2018).

RESULTS

LITERATURE REVIEW

The OSA Portal was searched for archaeological sites recorded through October 2019, within one mile of the Survey Area. There is one known archaeological site within the search area (**Table 1**). Site 21HE0410 (Highway 62 Overlook) is a lithic scatter on the southern portion of a crest of a pronounced ridge (Site Form 2012). The site is composed of a Prairie Du Chien (PDC) biface, a grey chert secondary flake, and white quartz shatter with use wear. Artifacts were generally recovered 40 to 50 centimeters below the surface (cmbs), though the shatter was found eroding out of a tree root throw.

Sites in the area are generally concentrated near large, permanent water sources (lakes). Densely concentrated recorded sites near the Survey Area are located roughly 5 miles northwest of the Survey Area at the nearest point.

Table 1: Archaeological Sites Within 1 Mile of Survey Area

Site Number	Known Site Acreage	Site Name	Description/ Cultural Affiliation	Distance to Survey Area/ Direction	Potential Effects
21HE0410	0	Highway 62 Overlook	Lithic Scatter (Habitation) / Precontact	0.77 miles (SE)	None

There are no reported archaeological surveys that have included the current project area.

Archaeological probability in the Survey Area appears to be limited by rugged terrain, areas of low points prone to saturation, and areas that are not in close proximity to a large open body of water.

Other recorded archaeological sites in the region are largely clustered on the shores of large lakes – most of which occur in a chain – and along the Minnesota River Valley. Concentrations of large lakes appear to have been more appealing to past inhabitants than areas with smaller, more isolated bodies of water. The fact that there is only one recorded site within 1 mile of the Survey Area somewhat tempers expectations that sites should be present; however, it is common for the lack of sites to represent sampling bias. Within what is now the City of Minnetonka, there are many more “ideal” areas for archaeological sites.

Areas within the Survey Area that have the greatest potential to contain archaeological sites appear to be on uplands near the lake and high areas near wetlands. Subsurface testing focused on these areas.

ARCHAEOLOGICAL FIELD SURVEY

Jammi Ladwig conducted the field survey on October 9, 14, 16, 17, and 23, 2019. The survey began with a thorough visual inspection and walkthrough of the entire Survey Area at roughly 30 meter transect spacing intervals, where possible. The Survey Area is comprised of hummocky terrain and associated steep, sloped surfaces that limited possible areas of testing and may somewhat diminish overall probability (**Figure 6**). The large wetland complex in the central and western portions of the Survey Area similarly limited archaeological potential (**Figure 7**).

In the course of the survey a large (roughly 8 meter by 5 meter) depression was encountered on a hilltop (**Figure 10**). This feature appeared to be of recent origin and is likely related to tree and brush removal within the park, which was obvious in other park areas. In the eastern portion of the survey area a refuse pile was encountered (**Figure 11**). Materials within the refuse included plastics, glass bottles, and aluminum cans, all of recent origin. The refuse concentration was near one of many large cobble/boulder piles noted within the Survey Area. These piles speak both to the glacial formation of the area and past agricultural activities. These stones were likely deposited by glacial activity but were piled in these locations by more recent farming activities.

Shovel tests were conducted on uplands that were level enough to allow for testing, along with areas near the permanent bodies of water present within the Survey Area. Shovel tests varied slightly in terms of soil profiles; however, the majority evidenced a plow-zone, consistent with known past agricultural use of the area (**Figure 12**). In areas where soil profiles had not been subjected to erosion, the upper approximately 20 to 30 centimeters revealed a very dark grayish brown (10YR 3/2) silty sandy loam over a yellowish brown (10YR 5/8) sandy loam to clay with sand. All shovel tests were negative for cultural materials.

No cultural materials were encountered in the course of the survey.

SUMMARY & RECOMMENDATIONS

An archaeological reconnaissance survey was completed on October 9, 14, 16, 17, and 23, 2019, for proposed MBT development within Lone Lake Park. Subsurface testing focused on areas deemed to have the highest probability to contain archaeological sites. Testing was not completed in steeply sloped terrain and low, easily saturated areas with very low archaeological probability. No cultural materials were encountered in the course of the survey that tested areas of moderate to high probability. Bolton & Menk, Inc., recommends no further investigation for the proposed MBT project as proposed.

Figure 10: Depression on Hilltop



Depression on hilltop near shovel test location, likely recent in origin.

Figure 11: Modern Refuse Concentration



Relatively modern refuse/debris concentration noted in eastern portion of Survey Area, with one of many large boulder piles noted on hilltops/slopes.

Figure 12: Typical Soil Profile



Typical soil profile within Survey Area, evidencing past plowing due to agricultural activities.

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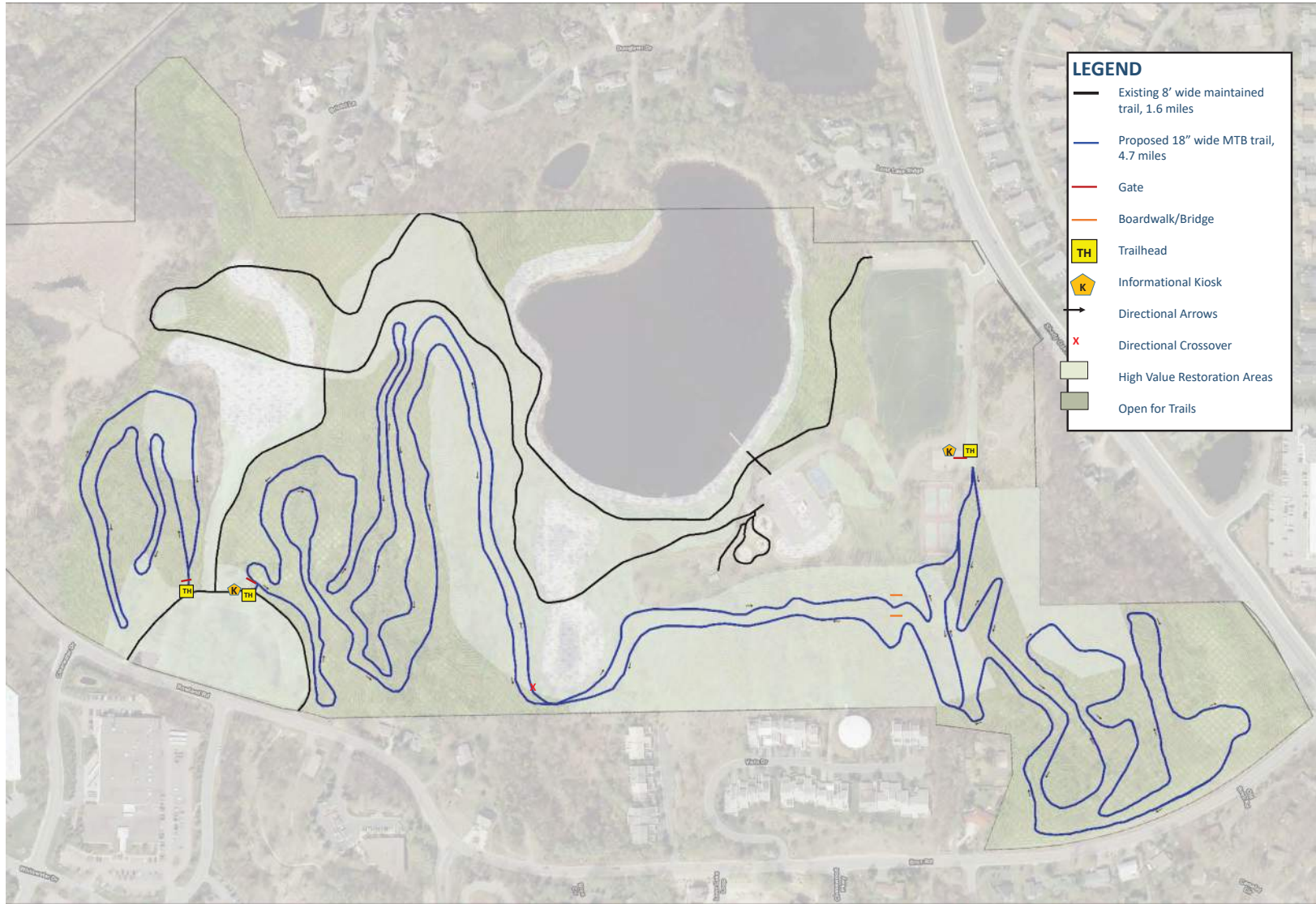
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Appendix

Mountain Bike Trail Concept

Lone Lake Park Mountain Bike Trail Concept Plan



- Lone Lake Park – 146 ac.
- MTB trail – 4.7 miles
- Width of trail – 18" - 24"
- Total area of trail – 1.2 ac.
- Avg. trail slope – 5%
- Designed to support beginner and intermediate level biking
- Final layout to be field sited with Natural Resources staff
- Utilizes sustainable trail building techniques
- To be closed during wet conditions
- Intersects with maintained trail one time at trailhead