



September 6, 2022

Emily Truebner
Vice President, Permitting & Environmental
Savion, LLC
422 Admiral Blvd
Kansas City, MO 64106

Re: Archaeological Survey Report for the Proposed Free State Solar Project, Douglas County, Kansas

Dear Ms. Truebner:

This report describes the results of an archaeological survey for the proposed Free State Solar Project (Project) (Appendix A: Figure A-1). Free State Solar Project, LLC (Free State) retained Burns and McDonnell Engineering Company, Inc. (Burns & McDonnell) to conduct an archaeological survey to identify archaeological resources within the Project Area. Since no agency consultation is anticipated, the survey was completed as a due diligence effort to identify potential archaeological resource constraints to the Project.

The background research and field survey identified 10 areas with sparse scatters of historic-age artifacts within the Project Area; one of these areas included a pre-contact-age isolated find (AG-1 to AG-10; Appendix A: Figure A-3). These locations do not meet Kansas State Historic Preservations Office's criteria for classification of an archaeological site and will not be submitted for inclusion in the Kansas Archaeological Inventory. Burns & McDonnell does not recommend avoidance of these locations.

If Project planning is altered, and additional permitting is required, the Project may involve agency review and concurrence with the findings of the archaeological survey report for this Project. Since this report was a due diligence effort, additional archaeological survey work would be required to meet the standards set by the Kansas Historical Society (KSHS), Kansas State Historic Preservation Office (SHPO), and/or Section 106 of the National Historic Preservation Act (NHPA).

INTRODUCTION

Free State is proposing construction of a solar farm on approximately 1,153 acres (467 hectares [ha]) of land located approximately 1 mile north of the Kansas River and the City of Lawrence, Kansas (Appendix A: Figure A-1). The Project is in Grant Township, Douglas County, Kansas, surrounding the former town of Midland, Kansas at the intersection of U.S. Hwy 59 and Midland Road. Currently, the Project is dominated by row-crop agricultural lands.

The proposed Project includes the construction of a solar collection facility. In addition to the installation of solar panels, this Project may require the construction of access roads, electrical collection lines, and possibly a substation and generator lead line. Proposed construction

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activities associated with the installation of the structures and construction of the access roads include grading, soil storage, equipment storage and placement, access road enhancement, boring, and general compaction from heavy machinery.

DESKTOP REVIEW: METHODS

Prior to the beginning of the field investigations, a background review of archaeological and historical literature relevant to the Project was conducted. The pre-field review included examination of the online Archaeological Inventory database administered by the KSHS for recorded cultural resources within a 1-mile (1.6 kilometer) area around the Project Area (Study Area). The review of known sites in the Study Area provided information about site distribution and the types of resources to be expected during the field investigation. The information was also used to in the evaluation of cultural resources, should they be present. In addition, reports of previous investigations within the Study Area were reviewed. In conjunction with the NRHP significance criteria, the information provided a context by which cultural resources can be evaluated.

In addition to the archaeological site and Project files, several other resources were also consulted during archival research. These sources mainly involved historic maps that show the locations of former residences and towns and literature regarding landscape evolution of the Kansas River landforms. These resources are listed below.

- County plat/ownership maps available online through the Kansas Historical Society online map collections accessible at: <https://www.kansasmemory.org/>
- NRHP (<http://nrhp.focus.nps.gov/natreg/home.do?searchtype=natreg/home>)
- Bureau of Land Management, General Land Office (GLO) records (www.glorerecords.blm.gov)
- U.S. Geological Survey (USGS) Map Locator and Downloader ([http://store.usgs.gov/b2c_usgs/b2c/start/\(xcm=r3standardpitrex_prd\)/.do](http://store.usgs.gov/b2c_usgs/b2c/start/(xcm=r3standardpitrex_prd)/.do))
- The Kansas Historical Society – Kansapedia website (<https://www.kshs.org/kansapedia/kansapedia/19539>)
- Kansas Historic Resources Inventory (KHRI) accessible at: <https://khri.kansasgis.org/>
- Historic Channel Change Maps, Channel Migration Investigation, Kansas River and Tributaries, Bank Stabilization Component by Wakefield Dort et al. 1976
- Holocene and Pleistocene Soils and Geomorphic Surfaces of the Kansas River Valley available online through the Kansas Geological Survey (Sorenson et al. 1987) at: <https://www.kgs.ku.edu/Publications/Bulletins/GB5/Sorenson/index.html>

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DESKTOP REVIEW: RESULTS

The review of the KSHS Archaeological Inventory identified six previously identified archaeological sites within the Study Area (Table 1; Appendix A: Figure A-2). None of these sites are within the Project Area.

Table 1: Previously Recorded Archaeological Sites within the Study Area

Trinomial	Site Age	Site Type	Within Project
14-DO-00081	Pre-contact	Burial	No
14-DO-00094	Late Paleoindian to Middle Woodland	Lithic Scatter	No
14-DO-00095	Late Paleoindian to Late Woodland	Lithic Scatter	No
14-DO-00096	Early/Late Archaic	Lithic Scatter	No
14-DO-00420	Woodland	Lithic Scatter/Mound	No
14-DO-01001	Pre-contact	Lithic Scatter/Mound	No

Source: KSHS 2022

Historic period maps and plats from USGS and KSHS were used to locate areas that historically contained houses, outbuildings, churches, schools, and cemeteries which may be nonextant or unmarked in the present day, within or immediately adjacent to the Project (Appendix A: Figure A-2). Historic maps were digitized and georeferenced into Geographic Information System (GIS) maps of the Project, then the locations of historic structures were given a buffer of 50 meters (m) (164 feet). These buffers are the historic high probability areas (HHPA) and provide an approximate location for potential historic cultural resources, totaling 22 acres (9 ha) (Appendix A: Figure A-3).

A review of the NRHP identified one property within the Study Area listed on the register. The Vermilya-Boener House is located on the northwest corner of N 1900 Rd and E 1400 Rd (Appendix A: Figure A-2). The house was built between 1866-68 by Elijah Vermilya. It was nominated under Criteria B and C for its historical association with the Vermilya and Boener families, and as a significant architectural example of Italian Villa style residence. The property is outside of the Project Area.

A review of the KHRI indicates that no other historic properties are located within the Study Area.

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The review of GLO maps from 1856 found several road segments within the Study Area (Appendix A: Figure A-2). One of these is the Lawrence and Oskaloosa Road, which crosses the Project Area in the western portion.

Five previous archaeological surveys have been conducted within the Study Area. None of these are within the Project Area (Table 2; Appendix A: Figure A-2).

Table 2: Previous Archaeological Surveys within the Study Area

Report	Year	Author	Title
612	1989	Barry Williams	Archeological Survey of f24-44 K-2844-01 in Jefferson County, Kansas
1273	1985	William Lees	Results of a Phase II Cultural Resources Survey and Evaluation, Secondary Road Project 23-c-2124-01, Mud Creek Drainage, Douglas County, Kansas
1539	1984	Adair, et al.	Volume I Cultural Resources and Urban Development: The Kansas City—Topeka Corridor Project
1613	1983	Brad Logan	Archaeological Investigations in the Stranger Creek, Buck Creek, and Mud Creek Drainage Systems, Northeast Kansas
1927	1996	Ritterbush and Hesse	Douglas County (Kansas) Archaeological Survey: 1995-1996
3169	No date	Larry Zimmerman	Archeological Survey of the Lower Mud Creek Basin Part II, Douglas and Jefferson Counties, Kansas
5740	2015	McLean, et al.	Intensive Phase II Archeological Survey and Geoarcheological Investigations of Proposed Improvements at the Lawrence Municipal Airport, City of Lawrence, Douglas County, Kansas

Source: KSHS 2022

KANSAS RIVER VALLEY LANDFORMS

The Project is situated in the Kansas River valley. In this area, three main alluvial terraces have been described: Holliday, Newman, and Buck Creek (Sorenson et al. 1987). The Project would be built predominately on the Newman Terrace; however the southernmost portions include the

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Holliday (Figure A-2). These terraces formed as the river moved laterally and downcut. This created a new floodplain and these former floodplains stabilized into broad surfaces that were utilized by past populations. Some of the surfaces stabilized 10s or 100s or even thousands of years and then were buried by flood sediments. These buried surfaces have a higher likelihood to contain archaeological sites because they represent quasi-stable surfaces that may have been utilized by past populations before being encapsulated or buried by sediments.

The Holliday Terrace is approximately 2 meters (m) above the modern Kansas River floodplain and separated by a small natural levee. Meander scrolls and abandoned channels characterize the terrace surface. It began forming in the late Holocene (perhaps 3 thousand years ago) and still receives sediment during large flood events (e.g. 1903, 1951).

The Newman terrace is broad and flat and bordered by natural levees. There is an approximately 2-3 m scarp separating the Holliday and Newman terrace. Based on radiocarbon dates in the Newman terrace fills, it began to form in late Pleistocene and likely stabilized by approximately four thousand years ago. There are a series of buried soils in the Newman terrace fills. The uppermost buried soils in the Newman terrace at this portion of the Kansas River occur approximately 3 m to 4 m beneath the surface and deeper buried soils can be located between 5 and 9 m below the surface (Sorenson et al. 1987). As noted, archaeological sites have been recorded in these buried surfaces (buried soils) in this valley and its tributaries.

The Buck Creek terrace is sparsely preserved, typically at the mouths of small creeks entering into the Kansas River valley. It is approximately 11-12 m above the modern floodplain and could date to as early as the middle Pleistocene (more than 500 thousand years ago). No remnants of this surface were recorded in the Project Area; however it has been recorded to the north of the Project area (Sorenson et al 1987).

FIELD SURVEY: METHODS

Various field methods can be utilized to identify archaeological resources and to obtain data needed to identify age, function, and other characteristics of each site investigated. Pedestrian survey with limited shovel and auger testing was selected based on the research design, environmental conditions, landscape geomorphology, and limited scope of work required by the Project. The lack of previous archaeological surveys within the Project Area and numerous HHPAs necessitated that the whole of the Project should be subjected to field survey. The Survey Area is therefore identical to the Project Area (Appendix A: Figure A-3).

A pedestrian field survey was accomplished by a systematic examination of the ground surface at 15-meter (m) intervals. The examination included visual inspection of the ground surface, any visible cut banks, animal burrows, trails, road cuts, ridge slopes, two-track roads, push piles, and borrow pits. Shovel testing was used to investigate subsurface components of sites. Shovel tests

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were excavated 30 cm in diameter to a depth of 50 cm below the surface or 10 cm below cultural levels. All soil was screened through ¼" hardware cloth and the holes were backfilled upon completion. Auger tests were conducted within two of the artifact scatters to better understand the vertical extent of the scatters and to determine the geologic potential for deeply buried cultural materials in the Newman Terrace to approximately 2.5 meters below the surface. This approach helped determine the presence or absence of archaeological resources and provided the investigators insight into the environmental characteristics of the Project.

FIELD SURVEY: RESULTS

Archaeological field survey was conducted July 6-14, 2022, by Burns & McDonnell archaeologists Michael Davis, Andrew Gottsfield, John Topi, Abby Vaughn, Thane Reid, and Cambria Haley. Agricultural fields dominated the Project. These fields consisted of corn or soybeans, with the corn having reached 10 feet in height on average and the soybeans at about one foot. The ground surface visibility (GSV) within the Survey Area ranged from 40-100 percent, with the vast majority being over 60 percent GSV (Appendix B). Small swales and channels drain the fields in a generally north to south direction, towards the Kansas River. In general, these have been heavily modified and channelized for ease of agricultural practices.

Ten areas with historic artifact scatters were identified during the field survey and investigated as potential archaeological sites (AG-1 to AG-10; Appendix A: Figure A-3). All ten of these new sites consist of sparse scatters of historic-age artifacts on the surface with occasional subsurface artifacts. Artifacts observed at each site were domestic ceramic sherds, shards of various glass vessels and bottles, and window glass shards. An isolated find of a chert flake was found at site AG-5 (Appendix A: Figure A-3). This tertiary flake does not have diagnostic characteristics to provide temporal or cultural affiliation. Eight of the sites were located within or adjacent to an HHPA, providing a direct context for each of those sites. Sites AG-2 and AG-3 were not in proximity to an identified historic farmstead location, and it is assumed from the linear distribution of artifacts along the edge of the field that these are likely historic dump sites.

Hand augers were excavated at sites AG-1 and AG-5. Both sites are located on the Newman Terrace. The intent was to determine the depth of the surface deposit and whether buried soils are within the upper 2.6 m of sediment in the Newman Terrace. The hand augers extended to 2.6 m below the surface. No buried soils or deeply buried cultural materials were found at these locations.

None of these 10 sites meet the criteria of KSHS for inclusion in the Kansas Archaeological Inventory. As such, they are ineligible for inclusion in the NRHP and Burns & McDonnell does not recommend avoidance of these locations by the Project.

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SUMMARY

The primary objectives of the archaeological survey for the Project were (1) to identify existing cultural resources or areas with the potential for archaeological resources, and (2) to provide recommendations for avoidance or minimization of impacts to archaeological resources, if extant.

Nine new locations with historic artifacts and one location with both historic artifacts and a pre-contact artifact were identified throughout the field survey. None of these meet the criteria for inclusion in the Kansas Archeological Inventory. They are also recommended as ineligible for inclusion on the NRHP. Burns & McDonnell does not recommend avoidance for any of these locations. There is potential for deeply buried archaeological sites within the Project Area. The potential is highest in the buried soils of the Newman Terrace. If present, the soils are typically buried between 5 and 9 meters below the surface in this section of the Kansas River valley. If the Project will have impacts to below 5 meters, it is recommended that an archaeologist evaluate those locations for the presence or absence of deeply buried cultural materials.

Although state and Federal review of historic resources is not currently required for the Project, if permitting ultimately requires such consultation, the NRHP eligibility of all recorded resources and the Project's potential to adversely affect historic (NRHP-listed or eligible) properties would require agency review and concurrence. Since this report was a due diligence effort additional archaeological survey work would be required to meet the standards set by KSHS, SHPO, and/or Section 106 of the National Historic Preservation Act (NHPA).

If you have any questions or require additional information, please feel free to contact me by telephone at (816) 800-9319 or by e-mail at mdavis2@burnsmcd.com.

Sincerely,



Michael H. Davis, M.A.
Staff Cultural Resources Specialist, Archaeologist

cc: Justin Bailey, Burns & McDonnell