COMMONWEALTH OF KENTUCKY
BEFORE THE KENTUCKY STATE BOARD ON ELECTRIC GENERATION AND TRANSMISSION SITING

In the Matter of:

Electronic Application of Golden Solar, LLC for Certificate of Construction for an Approximately 100 Megawatt Merchant Electric Solar Generating Facility in Golden County, Kentucky	))))	Case No. 2020-00243

Notice of Filing per 9/16/2022 Order

Please take notice that Golden Solar, LLC herewith submits publicly filed documents in accordance with paragraph 11 of the Siting Board's September 16, 2022 Order ("9/16/2022 Order") for which material denied confidential treatment is not redacted. The submitted documents have bee prepared in accordance with 9/16/22 Order (p.4) paragraph 3.

- Application Exhibit H, Attachment H – Phase 1 Environmental Site Assessment
- Application Exhibit H – Attachment I – KARST Survey

Respectfully submitted,

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Attachment H
Phase I Environmental Site Assessment

Phase I Environmental Site Assessment

Golden Solar Site • Fredonia, Kentucky

June 4, 2020

Cardno®

Phase I Environmental Assessment (ESA) Report

Golden Solar Site
Fredonia, Kentucky

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Table of Contents

Commonly Used Acronyms

AAI	All Appropriate Inquiry
ABCA	Analysis of Brownfield Cleanup Alternatives
ACM	Asbestos Containing Material
AST	Aboveground Storage Tank
ASTM	American Society for Testing & Materials
BFA	Brownfield Agreement
BLS	Below Land Surface
Cardno	Cardno Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CREC	Controlled Recognized Environmental Condition
EP	Environmental Professional
ERNS	Emergency Response Notification System
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ESI	Expanded Site Inspection
FOIA	Freedom of Information Act
FIRM	Flood Insurance Rate Map
Historical	Historical Recognized Environmental Condition
IC	Institutional Controls
LBP	Lead-Based Paint
LUST	Leaking Underground Storage Tank
MSL	Mean Sea Level
NFRAP	No Further Remedial Action Plan
NPL	National Priority List
PA/SI	Preliminary Assessment/Site Inspection
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PPB	Parts per Billion
PPM	Parts Per Million
PRG	Preliminary Remediation Goal
RACM	Regulated Asbestos Containing Material
RBC	Risk Based Concentrations
RBSL	Risk Based Screening Level
RCRA	Resource Conservation and Recovery Act
RCRA CORRACT	RCRA Information Systems
RCRA GEN	RCRA System Generators
RCRA TSD	RCRA Treatment, Storage, and Disposal Facilities
REC	Recognized Environmental Condition
ROD	Record of Decision
SHWS	State Hazardous Waste Site
SWL	Solid Waste Facilities List
TAL	Target Analyte List
TMS	Tax Map Serial

USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank

1 Executive Summary

At the request of **Golden Solar, LLC**, **Cardno Inc**. (**Cardno**) has conducted a Phase I Environmental Site Assessment (*ESA*) of approximately 1,500 acres of farmland known as the Golden Solar Site (Site). The Site is located in western Caldwell County in Kentucky.

This Phase I ESA was performed in accordance with American Society for Testing & Materials (*ASTM*) Practice E-1527-13 "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" developed by ASTM Subcommittee E50.02 for Commercial Real Estate Transactions. ASTM E-1527-13 also meets the All Appropriate Inquiries (AAI) standards set forth by the United States Environmental Protection Agency (*EPA*) in 40 CFR Part 312. Any exceptions to, or deletions from, this practice are described in *Sections 2.4* and *9.0* of this report.

The objective of this Phase I ESA was to identify Recognized Environmental Conditions (*RECs*) as defined in ASTM Practice E-1527-13 with regard to the subject property and to evaluate potential future liability associated with past or current practices on the subject property.

This Phase I ESA included the following types of investigation:

> A records review of all pertinent regulatory agency databases and applicable local records;
  - A **Environmental Risk Information Services (*ERIS*)** environmental database search report;
  - Aerial photographs obtained from Google Earth depicting the site and surrounding areas dated 1998, 2004, 2008, 2010, 2011, 2013, 2015, and 2019 were reviewed;
  - ERIS Aerial photographs from 1952, 1967, 1983, 1998, 2006, 2008, 2010, 2014 and 2018 were reviewed;
  - ERIS Historical Sanborn® Fire Insurance maps were not available for the Site; and
  - ERIS Historical topographical maps dated 1908, 1910, 1928, 1931, 1936, 1954, 1955, 1967, and 2016;

> A review of site background and other available information for the subject property to evaluate present and past land use; and

> Reconnaissance to inspect the Site for evidence of RECs conducted by Mr. George Robertson of Cardno on April 14, 2020.

Cardno has performed this Phase I ESA in conformance with the scope and limitations of ASTM Practice E 1527-13. Any exceptions to, or deletions from, this practice are described in *Sections 2.4* and *9.0* of this report.

This assessment has revealed evidence of the following REC in connection with the Site:

> Petroleum stained soil around a 55-gallon grease drum and a 55-gallon oil drum located in the woods on the east side of County Road 1346.

The following non-ASTM concerns were identified for the Site:

> An open dump including tires, construction debris and trash appears to be located on the east side of County Road 1346 at the Site.

Conclusions and opinions presented in this assessment are based solely on the information derived from the study sources and references cited in this document and are to the limitations of the sources and methods employed. Except as specified herein, this Phase I ESA report is for the exclusive use of the Client, its officers, directors, employees, and authorized representatives.

2 Introduction

Cardno conducted a Phase I Phase I Environmental Site Assessment (*ESA*) of land tracts totaling approximately 1,500 acres known as the Golden Solar Site (Site). The Site is located in western Caldwell County, Kentucky and is largely comprised of farmland.

2.1 Purpose

The purpose of this Phase I ESA is to identify to the extent possible any RECs, Controlled RECs, or Historical RECs on the property.

Recognized Environmental Condition (REC) - The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.

Controlled Recognized Environmental Condition (CREC) – A recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Historical Recognized Environmental Condition (HREC) – A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

This assessment is completed with respect to the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. As such, this practice is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner defense to CERCLA liability; that is, the practices that constitute 'all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice' as defined in 42 USC§9601(35(B)).

2.2 Detailed Scope of Services

The Phase I ESA is a general characterization of possible RECs present on a property. This ESA was completed in accordance with ASTM E-1527-13 "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process." ASTM E-1527-13 meets the standard set forth by the USEPA in the AAI Rule. The services provided are detailed below:

- Review of federal and state lists of environmentally regulated sites to determine if the subject property or nearby properties are listed as having a present or past environmental problem, are under investigation, or are regulated by state or federal environmental regulatory agencies;
- Review of site background information, including aerial photographs, title records, and interviews with persons familiar with the subject property to evaluate present and past land uses;
- Physical inspection and photographic documentation of the subject property and adjacent properties to identify obvious indications of present or past activities that have or could have environmentally impacted the subject property; and
- Development of a report documenting Cardno's findings.

2.3 Significant Assumptions

No significant assumptions were made prior to the initiation of this Phase I ESA.

2.4 Limitations and Exceptions

The findings of this assessment are based on the following inherent limitations and/or exceptions:

- The representations contained herein are based on the available data and on the contracted scope of the work. Cardno and the Environmental Professional (E.P.) make no representations or conclusions on information beyond the scope of this assessment.
- Cardno derived the data in this report primarily through visual inspections, examination of records in the public domain, and interviews with informed individuals about the subject property. The passage of time, manifestation of latent conditions, or the occurrence of future events may require further study at the subject property, analysis of the data, and revaluation of the findings, observations, and conclusions in the report.
- The data reported and the findings, observations, and conclusions expressed in this report are limited by the scope of work prescribed by ASTM E-1527-13.
- No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon site conditions in existence at the time of the investigation.
- Cardno presents professional opinions and findings of a scientific and technical nature. The report shall not be construed to offer legal opinion or legal representations as to the requirements of, nor compliance with, environmental laws, rules, regulations, or policies of federal, state, or local governmental agencies. Any use of the Phase I ESA report constitutes acceptance of the limits of Cardno's liability. Cardno's liability extends only to its client and not to any other parties who may obtain the Phase I ESA Report.
- The conclusions presented in this report are professional opinions based on data described in this report. They are intended only for the purpose, site location, and the project indicated. This report is not a definitive study of contamination at the subject property and should not be interpreted as such. An evaluation of the subsurface soil and groundwater conditions was not performed as part of this investigation. No sampling or chemical analyses of structural material or other media was completed as part of this study unless explicitly stated.
- This report is based, in part, on unverified information supplied to Cardno by third party sources. While efforts have been made to substantiate this third party information, Cardno cannot guarantee its completeness or accuracy.

2.5 Special Terms and Conditions

Cardno performed this assessment for the users as part of their environmental due diligence on the Site.

2.6 User Reliance

This report, including supporting field data and notes (collectively referred to hereinafter as "information"), was prepared or collected by Cardno for the benefit of the user, Golden Solar, LLC. The report is not intended for use by any other party.

3 Site Description

3.1 Site Location and Description

The Site consists of approximately 1,500 acres of largely farmland known as the Golden Solar Site and is located southeast of Fredonia in western Caldwell County, Kentucky. A Site Location Map, consisting of the relevant portions of the United States Geological Survey (*USGS*) topographic maps, Crider and Fredonia Quadrangles, Kentucky is included as *Figure 1.* The aerial layout of the Site and surrounding properties is depicted on *Figure 2*.

3.2 Site and Vicinity General Characteristics

The Site is located southeast of Fredonia in western Caldwell County, Kentucky. The Site and surrounding area is primarily farm and forested land. According to Caldwell County administration there are no zoning restrictions for the County.

Caldwell County was formed in 1809 from Livingston County. During the late 1800s, Princeton (located approximately six miles east of the Site) became a junction for the Illinois Central and Louisville & Nashville railroads. The Illinois Central railroad track currently passes along the southern border of the Site. The County experienced an agricultural boom in the 1900s and its economy remains largely based in agriculture. Caldwell County's population appears to be slightly decreasing and according to the University of Louisville, Urban Studies Center Population Research Unit, it is projected to decrease an additional 9% by 2050.

3.3 Current Use of the Site

The Site is currently used for farming with some undeveloped forest land. Site photos of the current condition are included in *Appendix D*.

3.4 Descriptions of Structures, Roads, Other Improvements on the Site

Most of the Site is currently developed as farmland with three agricultural silos and no other apparent structures. The Site is accessed via generally east-west trending Marion and Hulker Roads. Goodsprings, Coleman-Crider and County Road 1346 Roads provide access north and south of Marion Road.

3.5 Current Uses of the Adjoining Properties

North	Agricultural, forest and residential
South	Agricultural, residential and some commercial
East	Agricultural, forest and residential
West	Agricultural, residential and some commercial

C&C AG Enterprises, LLC (*AGenterprises*) is located adjacent to the south side of the Site at 15002 Marion Road. AGenterprises is an agricultural retail and construction business specializing in the design, sale, and construction of grain drying, handling and storage facilities in central and west Kentucky and Tennessee. AGenterprises was started in 2006 and is a branch of C&C Farms, a 4th generation farm that has been part of the Kentucky area for over 100 years. The complex appears to include large agricultural silos, a barn, stables, equipment sheds, warehouse/stores and a rectangular-shaped pond.

C&J Welding is located adjacent to the south side of the Site at 15348 Marion Road. According to Manta.com, this company was established in 1988. This facility appears to include a welding shop, storage trailers and parking lot with some equipment/material laydown area. A residence with a garage, shed and small water supply well pump house is located west of the welding shop.

4 User Provided Information

4.1 Title Records

The user did not provide Cardno with current title records, and Cardno did not review a chain-of-title in conjunction with this assessment.

4.2 Environmental Liens or Activity and Use Limitations

A liens search was not conducted as part of this assessment. Cardno did not identify any environmental liens or use restrictions (other than zoning) for the Site.

4.3 Specialized Knowledge

The user has no specialized knowledge about the Site.

4.4 Commonly Known or Easily Ascertainable Information

The Site was used for agricultural cropland.

4.5 Valuation Reduction for Environmental Issues

No opinion or knowledge was provided regarding environmental issues causing a reduction in property value.

4.6 Owner, Property Manager, and Occupant Information

The user did not provide Cardno with current ownership records, and Cardno did not review property records at the Caldwell County Courthouse.

4.7 Reason for Performing Phase I ESA

This Phase I ESA was performed for the users as part of environmental due diligence at the Site in preparation for property development.

4.8 AAI User Questionnaire

Due its size, a knowledgeable person for the Site was not located and an All Appropriate Inquiry (*AAI*) User Questionnaire was not completed. A copy of the blank questionnaire is included in *Appendix A*.

4.9 Other

No other User provided information was utilized for this assessment.

5 Records Review

5.1 Standard Environmental Record Sources

Records were obtained and reviewed to help identify RECs in connection with the Site. Federal and state regulatory databases were reviewed to further identify any known sources of contamination on or within designated research radii of the subject property. The federal records searched during this assessment included sites which handle or dispose of hazardous materials and sites which otherwise have been identified to have air, soil, or groundwater contamination. The state records reviewed included hazardous waste sites, landfills, and sites with registered or leaking underground storage tanks (*USTs*).

Cardno contracted with **Environmental Risk Information Services (*ERIS*)** to perform the regulatory review (*Appendix B*). The results are discussed below and the regulatory databases reviewed and corresponding research distances are summarized in the report in *Appendix B*. Review of the federal and state databases was conducted according to ASTM E-1527-13 and AAI standards for Phase I ESAs. Figures illustrating the locations of the sites identified during the database search (relative to the site and depicting the appropriate designated research radii corresponding to each database) are also included in *Appendix B*.

Federal and state reporting lists are summarized in the following table. Listings requiring further discussion are described below.

Federal Reporting Lists	Listings Reported
National Priority List (NPL)	0
National Priority List Delisted (NPL Delisted)	0
Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) - SEMS	0
SEMS LIEN	0
Facility Registration System (*FRS*) – Formerly FINDS List	1
RCRA Corrective Action Facilities (*RCRAC*)	0
RCRA Treatment, Storage, and Disposal Facilities (*TSD*)	0
RCRA Conditionally Exempt Small Quantity Generator (*CESQG*)	0
RCRA Generator (*GEN*)	0
Polyfluorinated alkyl substance (*PFAS*) NPL	0
PFAS Toxic Release Inventory (*TRI*)	0
Toxic Release Inventory System (*TRIS*)	0
Toxic Substances Control Act (*TSCA*)	0
Hist. TSCA	0
Federal Fungicide and Toxic Substances (*FTTS*)	0
Potentially Responsible Party (*PRP*)	0
FED DRYCLEANERS	0
Delisted FED DRY	0
Formerly Used Defense Sites (*FUDS*)	0
Material Licensing Tracking Systems (*MLTS*)	0
Mines	0
ALT FUELS	0
Section Seven Tracking System (*SSTS*)	0
Polychlorinated Biphenyl (*PCB*)	0
Hist. MLTS	0
Hazardous Materials Information Resource System (*HMIRS*)	0
Federal Brownfields	0

Emergency Response Notification System (*ERNS*)	0
Integrated Compliance Information System (*ICIS*)	0
Superfund Enterprise Management System (*SEMS*) Archive	0
Federal Engineering and Institutional Controls (*IC/EC*)	0
State/Local/Tribal Reporting Lists	**Listings Reported**
State/Tribal Hazardous Waste Sites (*SHWS*)	0
State Spills	1
State/Tribal (SWF/LF)	0
Leaking Underground Storage Tank (*LUST*) “Ky. Petroleum Storage Tank Fund”	0
Voluntary Cleanup Program (*VCP*)	0
State/Tribal Underground Storage Tank (*UST*)/ Aboveground Storage Tank (*AST*)	0
State/Tribal Delisted Storage Tank	0
State/Tribal LUST	0
State/Tribal Brownfields	0
State Other	0
State Department of Solid and Hazardous Waste (*DSHW*)	0
State ENG	0
State INST	0
Brownfields INV	0
Tribal ILST	0
Tribal IUST	0

5.1.1 Database Listings at the Site

Two Site locations were identified in the ERIS database as follows:

> The ERIS database indicated that Caldwell County Area Vocational Center is identified in the FRS (Registry ID #110008361771) as a “stationary, unspecified universe” at a map location on the north side of Marion Road, east of the intersection of Pleasant Valley Road. ERIS lists this address as Route 1 Marion Road, Princeton, Kentucky 42445. No other details were provided in the ERIS database. A FRS zip code search on May 6, 2020, indicated no facilities were identified at the Site; however, a search using the FRS identification number led to the same location map identified by the ERIS database. A link from the FRS to the Enforcement and Compliance History On-line (*ECHO*) database indicated that this location was issued a written informal violation on April 12, 2016, during an on-site RCRA compliance evaluation inspection. This location is identified as RCRA Facility KYD981476419. A compliance evaluation schedule was issued on June 20, 2016. Quarterly inspections conducted between July 2017 and May 2020 found no violations. The detailed ECHO facility report contained no other information. As discussed in *Section 6.2*, Cardno observed no indication of environmental impact at this location on April 14, 2020 (*Photo 22*). As discussed in *Section 5.2*, the actual location of the Caldwell County Area Vocational Center appears to be at 130 Vocational School Road, Princeton, Kentucky, which is approximately six miles southeast of the Site. As discussed in *Section 7*, Cardno contacted the Caldwell County Area Vocational Center regarding

an informal written violation. No response was received. Based observations during the field inspection, and Kentucky Department of Environmental Protection (*KDEP*) information showing that this facility is not located near the Site, this incident is not considered a REC.

> SPILLS is a list of incidents reported to the KDEP where hazardous materials may have been spilled or otherwise released. The ERIS database indicated that Feagan's Furniture is identified in the SPILLS (AI ID #98342, Incident ID #2266664) for an apparent Air Program incident involving fine particulate (≤10 microns) on October 24, 2007. The case was handled by the KDEP Paducah Regional Office. The incident status is listed as closed. The ERIS database cites that the EPA received a complaint for open burning of Styrofoam at night at 20685 Marion Road. However, the ERIS database indicates that the source address was not specified and that it may have been at the furniture store and not at the home address. As discussed in *Section 5.2*, KDEP documents indicate that routine burning of furniture packing materials occurred at 20685 Marion Road in Fredonia, Kentucky and not at the Site. As discussed in *Section 6.2*, Cardno observed no visible ashes, Styrofoam, staining, stressed vegetation or other visual indication of an environmental concern at this location on April 14, 2020. Based on the release actually occurring at a location away from the Site and no visible trace of environmental impact at the Site, this incident is not considered a REC.

5.1.2 Database Listings Surrounding the Site

The ERIS database lists one SPILLS result (H.T. Hackney, Incident ID #2424992) at a location adjoining the Site. A release of approximately 250 gallons of diesel fuel occurred in a truck accident at the intersection of Marion and Skinframe Creek Roads on April 28, 2017. According the to the SPILLS database, the location was restored and the environmental case was closed. As described in *Section 6.2*, Cardno conducted an inspection of the fuel release site on April 14, 2020. No visual indication of a release (i.e. staining or stressed vegetation) was observed. This historical release does not appear to represent REC for the subject property.

5.1.3 Database Listings Near the Site and Orphans

One of five unplottable "orphan" facilities, Caldwell County Area Vocational Center, was identified at the Site and was discussed in *Section 5.1.1*. None of the other unplottable "orphan" sites were identified at or adjoining the Site.

5.2 Additional Environmental Records

In accordance with the Freedom of Information Act (*FOIA*) on May 6, 2020, Cardno requested any information regarding violations for the Caldwell County Area Vocational Center, (EPA ID #KYD981476419). According to the July 8, 2011 inspection of the Caldwell County Area Vocational Center at "County Road 1 Marion Road, Princeton, Kentucky 42445 (EPA ID # KYD981476419, Agency Interest/Permit ID #47320)", no hazardous waste was observed. According to July 8, 2011 documentation by lead investigator, Curtis Scott of the KDEP Division of Waste Management, a drum of used antifreeze and spent solvent from a parts washer was observed at the Caldwell County Area Vocational Technology Center at Route 1 Marion Road. This same facility (RCRA Facility KYD981476419), was reported in the FRS and ECHO databases as being located in a corn stubble field at Latitude 37.164835, Longitude -87.992262. The actual location of the Caldwell County Area Vocational Center appears to be 130 Vocational School Road, Princeton, Kentucky, which is approximately six miles southeast of the Site.

In accordance with FOIA on May 6, 2020, Cardno requested available information from the KDEP regarding Feagan's Furniture (AI ID #98342, Incident ID #2266664) for an apparent Air Program incident involving fine particulate (≤10 microns) on October 24, 2007. Documentation received from the KDEP Division for Air Quality shows that the routine burning of furniture packing materials occurred at 20685 Marion Road in Fredonia, Kentucky and not at the Site.

5.3 Physical Setting

5.3.1 Topography

Cardno has reviewed the most current USGS Topographic Maps covering the subject property (*Figure 1*). The purpose of this review is to evaluate the hydraulic conditions at the Site and surrounding properties. It is not the purpose of this report to evaluate the geotechnical condition of the subject property; therefore, no geotechnical documents were examined.

The Kentucky Almanac shows that Caldwell County is within the Pennyroyal Plateau region of Kentucky. The terrain features rolling hills, caves and karst topography. According to the USGS topographic maps (Crider and Fredonia, Kentucky Quadrangles), local topography appears to be rolling with upland areas across the north side of the Golden Solar Site. Topography generally slopes to the south. Unnamed intermittent tributaries of Skinframe Creek flow south and southwestward from the central and western areas of the Golden Solar Site. An unnamed intermittent tributary of Black Creek flows eastward from the northeast corner of the Golden Solar Site.

5.3.2 Local Geology

Local geology is summarized based on an examination of the William B. Rogers and R.D. Trace, Geologic Map of the Crider Quadrangle, Caldwell County, Kentucky and the William B. Rogers and W.H. Hayes, Geologic Map of the Fredonia Quadrangle, Western Kentucky. The Golden Solar Site is underlain primarily by the Late Mississisippian Period, Meramecian Series, Fredonia Limestone Member of the Ste. Genevieve Limestone Formation. The Fredonia Limestone Member typically consists of light gray and light to medium gray finely crystalline, commonly dolomitic, limestone, occasionally oolitic, with rare chert nodules. Its basal unit is composed of cherty limestone that weathers to reddish brown. Minor Quaternary alluvium occurs along an unnamed intermittent creek in the northeast corner of the Site.

According to E. Glynn Beck, Generalized Geologic Map for Land-Use Planning: Caldwell County, Kentucky, the Golden Solar Site is in an area underlain by limestone prone to karst development. Planning guidance indicates that, depending on topography, this area has slight to moderate limitations for light industrial development. The area is characterized as excellent for foundations, severely limited for septic systems, with locally fast drainage through fractures and danger of groundwater contamination. Locally, the upper few feet may be rippable and sinkholes are possible.

5.3.3 Hydrogeology

According to the Groundwater Atlas of the United States and the USGS, the Interior Low Plateaus aquifers and confining units are sandstone and limestone aquifers in rocks of Pennsylvanian age, limestone aquifers in rocks of Mississippian age, and limestone and dolomite aquifers in rocks of Devonian, Silurian, and Ordovician age. A large part of the Interior Low Plateaus Province is underlain by limestone aquifers in Mississippian rocks. These aquifers have been called the Mississippian Plateau aquifers in Kentucky and the Highland Rim aquifer system in Tennessee. They are present in limestone that is either flat lying or gently dipping and are capped by a layer of regolith that varies greatly in thickness. In general, the limestone aquifers that yield the largest quantities of water to wells and springs are the Upper Mississippian Ste. Genevieve, and the underlying St. Louis Limestones.

In most places, the Mississippian aquifers are covered by regolith, which mostly consists of weathered material, or residuum. This material consists of clay, silt, sand, and pebble-sized particles of limestone or chert, which are derived mostly from weathering of the underlying bedrock. In the southwestern part of central Tennessee, the regolith might consist mostly of chert left from the weathering of the Fort Payne Formation. Where thick and saturated, this chert rubble constitutes a productive local aquifer. The regolith can store large quantities of water that subsequently percolate slowly downward to recharge aquifers in the underlying consolidated rock.

Precipitation infiltrates the land surface and percolates downward to the water table, which marks the top of the zone of saturation. The water moves through intergranular spaces in the unconsolidated material of the regolith. However, in the underlying limestone bedrock, the water moves through zones of secondary permeability created by dissolution enlargement of bedding planes and fractures by the slightly

acidic water. The solution openings store and transmit most of the water that moves through the limestone and discharges to streams, springs, and wells. Little water passes through the blocks of limestone between the bedding planes and fractures. Freshwater circulates through the limestone aquifers to depths as great as 500 feet below land surface. However, most of the circulation is at depths of less than 300 feet. All other factors being equal, the freshwater circulation is deepest where the local topographic relief and attendant hydraulic gradients are greatest.

The altitude of the potentiometric surfaces in the Ste. Genevieve and the St. Louis Limestone ranges from less than 400 feet above sea level in the west to more than 900 feet above sea level in three small areas in the east. However, little, if any, regional ground-water flow occurs. Most of the flow is local, toward springs and the few streams that drain the area. An escarpment that bounds the aquifer on the north is aptly named the "Dripping Springs Escarpment" because of the many small seeps and springs that discharge water along it. The water locally moves along fractures and bedding planes that might be nearly perpendicular to one another. Consequently, the arrows that show ground-water flow direction indicate only the general direction of water movement in a complex flow system that has many local horizontal and vertical components.

The hydraulic characteristics of the Mississippian aquifers vary greatly over short distances. For example, the ability of limestone with large, interconnected solution openings to transmit and yield water is several orders of magnitude greater than that of the almost impermeable blocks of limestone between solution openings, fractures, and bedding planes. These large differences are reflected in the yield and specific capacity of wells completed in the limestone aquifers and the discharges of springs that issue from these aquifers.

Site-specific groundwater information is not available. Data concerning the direction of groundwater flow at the site are not available; however, groundwater is expected to mimic the surface topography.

According to the Water Resource Development Commission by the Kentucky Geological Survey's Groundwater Resources of Caldwell County, Kentucky, water in Caldwell County is obtained from Mississippian through Pennsylvanian sedimentary rocks and from unconsolidated Cretaceous and Quaternary sediments.

5.3.4 Soils

According to the National Cooperative Soil Survey, Site soils consist of approximately 54% Crider silt loam that is well drained, with moderately low runoff potential when the soil is thoroughly wet. Approximately 11% is Lowell-Faywood complex that is well drained, with moderately high runoof potential. Approximately 7% is Nicholson Silt Loam that is moderately well drained with moderately high runoff potential. Approximately 7% is Nolin Silt Loam that is moderately well drained with moderately low runoff potential. Approximately 9% is Zanesville Silt Loam that is moderately well drained with moderately high runoff potential. Approximately 4% is Blackford Silt Loam that is moderately well drained with moderately low runoff potential. Small percentages of silt loam soils are also present.

5.3.5 Wetlands and Floodplains

According to the U.S Fish and Wildlife Service National Wetlands Inventory, 0.70 acres of Freshwater Forested/Shrub Wetland (PFO1A), 0.36 acres of Freshwater Emergent Wetland (PEM1A) and six freshwater ponds totaling 2.74 acres, occur on the eastern side of the Site. A copy of the National Wetlands Inventory maps is included in *Appendix F*.

According to the Federal Emergency Management Agency (*FEMA*) Flood Insurance Rate Map (*FIRM*) Numbers 21033C0150D (effective 04/19/2019) and 21033C0125D (effective 04/19/2019), the Site is located almost entirely in Zone X, an area of minimal flooding. Copies of the FEMA maps are included in *Appendix F*.

5.4 Historical Use Information on the Site and Adjoining Properties

The following sources of information were reviewed to determine the historical use of the Site: historic topographic maps, aerial photographs. The Eris Database searched for Sanborn® Fire Insurance maps; however, coverage was not provided. Historical research documentation is included in *Appendix C*.

5.4.1 Historic Topographic Maps

Topographic maps of the Crider and Fredonia Quadrangles dated 1908, 1910, 1928, 1931, 1936, 1954, 1955, 1967, and 2016 were reviewed. The 1908 and 1910 maps show the Illinois Central railroad track across the south side of the Site. The primary east-west thoroughfare (now Marion Road) appears to be south of its current location. Goodsprings and Coleman Crider Roads appear established across the eastern areas of the Site. Hulker Road extends west from Goodsprings Road and continues along the south side of a topographic ridge until bending to the south-southwest across the west side of the Site. Bethlehem Cemetery is located north of the intersection of Goodsprings and Hulker Roads. Bethlehem school is located east of Goodsprings Road on the northeast side of the Site. Residential and commercial structures appear developed at Crider on the south side of the Site near the Illinois Central railroad crossing at Goodsprings Road. White Sulphur Creek appears to flow southwestward near the southeast corner of the Site.

The 1928 and 1931 maps show only the west side of the Site. These maps show that Marion Road has been constructed north of the Illinois Central railroad tracks. There appear to be two buildings at Charline, where unimproved dirt roads intersect at the railroad track. No detail is shown on the 1936 map.

The 1954 map shows Marion Road on the south and southeast sides of the Site has been constructed north of the Illinois Central railroad tracks. Skinframe Creek (formerly named White Sulphur Creek) appears to flow southwestward near the southeast corner of the Site. A southwest to northeast electrical power line extends across the Site. Between 1910 and 1954, Bethlehem School was removed from the northeast side of the Site. Hulker Road dead ends to the west and a trail continues from the end of Hulker Road westward along the edge of the topographic ridge located north of the Site. An unimproved dirt road remains where a former road extended south-southwest across the west side of the Site. A private landing field appears to be located on the southwest side of the Site between Marion Road and the Illinois Central railroad track. Dalton Road appears to be an unimproved dirt road extending along the northwest border of the Site.

Between 1954 and 1967, a northwest to southeast electrical transmission line was constructed across the Site. Between 1954 and 2016 the private landing field was removed from the west side of the Site. No potential RECs were identified based on the information provided on the maps.

5.4.2 Aerial Photographs

Aerial photographs obtained from Google Earth depicting the site and surrounding areas dated 1998, 2004, 2008, 2010, 2011, 2013, 2015, and 2019 were reviewed. Later provided ERIS aerial photographs for 1952, 1967, 1983, 1998, 2006, 2008, 2010, 2014 and 2018 were also reviewed.

The 1952 photo shows the current road pattern already established with Marion Road extending from northwest to southeast across the Site. From Marion Road, Dalton Road extends northeastward close to the northwest boundary of the Site, Goodsprings and Coleman Crider Roads extend south to northeast across the eastern side of the Site, a dirt road extends northward near the center of the Site and County Road 1346 extends southwestward on the southwest side of the Site. From Goodsprings Road, Hulker Road extends westward along the north side of the Site and Grey Road extends eastward.

Large electrical transmission lines extending northwest to southeast and southwest to northeast were constructed across the Site between 1952 and 1967. An electrical substation was constructed between 2008 and 2010 on the west side of Goodsprings Road, on the north side of the Site.

Agricultural barns, sheds and other structures appear present on the southeast side of the Site, north of Marion Road, northwest of the intersection of Skinframe Creek and Marion Roads. Except for a single silo remaining northwest of the intersection of Skinframe Creek and Marion Roads, other agricultural structures appear to have been removed from this area of the Site between 1983 and 1998. Trees were removed from around this Silo between 2011 and 2013

The AGenterprises complex is present in the 1998-2019 photos on the South side of the Site, north of Marion Road. AGenterprises is described in Section 3.5. Livestock feeding appears to have been

removed from the west side of the complex between 2011 and 2013. Two long, side-by-side buildings were removed from the complex between 1998 and 2004. Remnants of an orchard were removed and apparently replaced by cultivated fields on the west side of the complex between 1952 and 1967. A barn located west of houses at the AGenterprise complex, was removed between 2004 and 2006.

A house and sheds were constructed north of Marion Road on the south side of the Site between 1967 and 1983, next to the present day location of C&J Welding. C&J Welding is described in Section 3.5. The C&J Welding shop was constructed between 1983 and 1998. Remodeling of the welding shop appears to have occurred between 2008 and 2010.

A dirt road extending north from Marion Road, near its intersection with Pleasant Valley Road, is present in all photos (1952-2019). Farm structures (a barn, a shed and possibly a house) are visible in the 1952 photograph at this location on the north side of Marion Road. Except for the barn, the farm structures appear to have been removed between 1952 and 1967. The barn remains located the field, west of the dirt road, north of Marion Road.

The 1952 photo shows a building (possibly a small barn) was located in a field, north of the intersection of Marion Road and County Road 1346, on the northwest side of the Site. This feature was removed between 2008 and 2010.

The 1952 photo shows a farm including houses, barns, sheds and chicken houses are located on the southwest side of the Site, east of County Road 1346 and south of Marion Road. The large house located south of the bend in County Road 1346, appears to have been abandoned before 1952. Foundation remnants of this house remain in the woods on the southeast side of County Road 1346. Based on the appearance of scrub vegetation, most of the farm structures appear abandoned between 1998 and 2004. A large house located east of County Road 1346 was razed between 2011 and 2013. Between 2013 and 2015, wood debris, possibly derived from the demolition of the former house, appear in the woods located east of County Road 1346. Tires appear to have been piled in the woods on the east side of County Road 1346 between 2015 and 2019. The surface dumping of tires is considered a REC for the Site. The two silos located at the south end of County Road 1346 appear to have been constructed between 1967 and 1983. Based on their appearance in photos, the two Silos were abandoned between 1998 and 2004. Foundations and rubble from former sheds, barns, stables and chicken houses appear to remain at the on the east side of County Road 1346.

Except for debris and possible open dumping on the east side of County Road 1346, no potential RECs were identified based on the information provided on the photographs.

5.4.3 Sanborn® Fire Insurance Maps

Sanborn® Fire Insurance maps were not available for the Site and surrounding area (*Appendix C*).

6 Site Reconnaissance

A primary objective in a site inspection for a Phase I ESA is to determine if there is any obvious evidence of hazardous substances or petroleum products that were disposed of or used on the subject property at any time in the past that may create potential liability for an owner of the property. This evidence can be circumstantial, such as the observation of stressed vegetation, staining, unlabeled or suspicious containers or structures, unidentified oily substances, pooled liquids, and/or odors.

6.1 Methodology and Limiting Conditions

On April 14, 2020, Mr. George Robertson of Cardno, performed a site reconnaissance of the Site and surrounding properties. The observations made during the site reconnaissance are provided in the following sections. This Phase I ESA did not include sampling or screening of any materials. Photographs of the subject property taken during the site visit are included in *Appendix D*.

6.2 Site Visit/Reconnaissance

This section discusses general observations made during Site reconnaissance. The Site was developed as agricultural cropland. Except for diesel tank contained in the small emergency generator at the Caldwell County Water District Pump #3, no ASTs or USTs appear to be located at the Site. Except for three agricultural silos, no structures appear to be located at the Site.

On-Site:

- Brush piles were observed along the edge of the woods on the north side of Marion Road, north of the Silo near the southeast corner of the Site (*Photo 2*).
- No visible staining, stressed vegetation or other visual indication of an environmental concern was observed in the corn stubble field at Latitude 37.164835, Longitude -87.992262 (*Photo 22*). Healthy grass was observed in the ditch adjacent to Marion Road. This location was identified in the FRS database as the Caldwell County Area Vocational Center.
- No visible ashes, Styrofoam, staining, stressed vegetation or other visual indication of an environmental concern was observed in the corn stubble field at Latitude 37.171194, Longitude -88.004056. Healthy grass, shrubs and trees were observed in the ditch adjacent to Marion Road. This location was identified in the SPILLS database as an open burning air incident for Feagan's Furniture.
- Open dumping appeared to be occurring on the east side of County Road 1346 (*Photos 28 – 31*). A 55-gallon grease drum, a 55-gallon oil drum and empty quart-size oil containers were observed in the woods on the east side of County Road 1346. Both 55-gallon drums were dented, rusty, on their side and leaking. Stained soil was observed around the drums. As spills of petroleum products of 25 gallons or more are reportable to the KDEP, the stained soil around the two 55-gallon drums is considered a REC. Debris including wooden boards, utility poles, tin, rusty nails, polyvinyl chloride piping, and brush were observed in the woods on the east side of County Road 1346. Piles including approximately 50 large tractor and automotive tires were also observed in the woods. An empty two gallon plastic gasoline can, traffic cones, scrap wood, plastic and aluminum drink containers, boots, empty quart-size oil containers and other debris were observed in a grass area near the two abandoned agricultural silos at the end of County Road 1346.
- Remains of buildings and stables were observed in the woods, east and southeast of County Road 1346 (*Photos 32 and 33*).
- Two large rusty, apparently abandoned, agricultural silos were observed at the end of County Road 1346 on the southwest side of the Site (*Photo 34*).
- No stained soil, stained surfaces or stressed vegetation were observed at the Caldwell County Water District Pump #3 on the east side of Dalton Road (*Photo 37*). An emergency diesel generator was present at this Station adjacent to the west side of the Site.
- Except for a diesel tank contained in the small emergency generator at the Caldwell County Water District Pump #3, no ASTs were observed (see *Section 6.6*).

Off-Site:

- No petroleum staining or stressed vegetation was observed at the location of the April 28, 2017, H.T. Hackney, Incident ID #2424992, near the intersection of Marion and Skinframe Creek Roads (*Photo 3*). This location adjoins the southeast side of the Site.
- No hazardous materials or visual evidence of a spill were observed at the KU electrical substation on the west side of Goodsprings Road, roughly along the east border of the Site (*Photo 9*).

- No staining, stressed vegetation or other unusual conditions were observed around large agricultural silos, a barn, stables, equipment sheds, warehouse/stores and a rectangular-shaped pond around AGenterprises at 15002 Marion Road.
- No staining, stressed vegetation or other unusual conditions were observed at C&J Welding at 15348 Marion Road (*Photo 21*).

6.3 Hazardous Substances in Connection with Identified Uses

A review of Federal and Kentucky regulatory databases revealed no violations for the use of agricultural chemicals (i.e. fertilizer, herbicides and pesticides) at the Site. No other hazardous substances were observed in use at the Site.

6.4 Petroleum Products and Containers

Except for the AST described in *Section 6.6* and containers observed at the surface dump described in *Section 6.2*, no petroleum containers were observed.

6.5 Unidentified Substance Containers

Two unlabeled grease and oil drums are described in *Section 6.2*. No other unidentified containers were observed at the Site.

6.6 Storage Tanks – USTs / ASTs

A small diesel AST was located as part of an emergency generator at Caldwell County Water District Pump Station 3 on the southeast die of Dalton Road along the west border of the Site. Based on the appearance of the emergency generator, the AST is believed to have a capacity of approximately 34 gallons.

6.7 Solid Waste Disposal

As discussed in *Section 6.2*, open dumping of tires, and other materials was observed along the east side of County 1346. No other indications of permitted solid waste disposal were identified on the Site.

6.8 Evidence of Polychlorinated Biphenyls

Three pole-mounted transformers belonging to **Kentucky Utilities Company (*KU*)** were observed at or adjacent to the Site. The pole mounted transformers were observed north of Marion Road near the silo at the southeast side of the Site, adjacent to the Site at the Caldwell County Water District Pump Station on the east side of Dalton Road, and adjacent to the Site near a silo on the south side of Coleman Crider Road. Blue non-PCB stickers were not visible on any of the pole-mounted transformers. All of the pole-mounted transformers appeared to be in good condition with no staining on the utility pole or surrounding surfaces.

6.9 Floor Drains / Sumps

No buildings were entered and no drains or sumps were observed at the Site.

6.10 Other Environmental Concerns

No other environmental conditions were observed at the Site.

7 Interviews

On May 6, 2020, Mr. George Robertson, of Cardno, contacted a representative of the Caldwell County Area Vocational Center regarding written informal violations and ongoing quarterly compliance inspections at Route 1 Marion Road. The representative recorded details and stated that they would have someone return the call. At the time of this report, there has been no response from the Center. However, based on information obtained from the KDEP, this violation did not occur at or surrounding the Site, and this is not considered a data gap.

8 Conclusions

Cardno has performed this Phase I ESA in conformance with the scope and limitations of ASTM Practice E 1527-13. Any exceptions to, or deletions from, this practice are described in *Sections 2.4* and *9.0* of this report.

This assessment has revealed evidence of the following REC in connection with the Site:

> Petroleum-stained soil around a 55-gallon grease drum and a 55-gallon oil drum located in the woods on the east side of County Road 1346.

The following non-ASTM concerns were identified for the Site:

> An open dump including tires, construction debris and trash appears to be located on the east side of County Road 1346 at the Site. The tires appear to have been dumped between 2015 and 2019.

Conclusions and opinions presented in this assessment are based solely on the information derived from the study sources and references cited in this document. Conclusions drawn from the results of this assessment should be made while recognizing the limitations of the sources and methods used. Except as specified herein, this Phase I Environmental Site Assessment report was produced for the exclusive use of the Client, its officers, directors, employees, and authorized representatives as well as its insurers and lenders.

9 Deviations

No significant deviations or deletions were made to the scope as defined by ASTM E-1527-13.

10 Significant Data Gaps

Cardno did not encounter any significant data gaps during this assessment.

11 Additional Services

No additional services were provided for this assessment.

12 References

American Society for Testing and Materials International (*ASTM*) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation: E1527-13.

American Society for Testing and Materials International (*ASTM*) Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process, Designation: E1528-06.

Beck, E. Glynn, D.A. Williams, and D.I. Carey, Generalized Geologic Map for Land-Use Planning: Caldwell County, Kentucky.

Flood Insurance Rate Map Numbers 21101C0370E (effective 02/20/2013), 21101C0365E (effective 2/20/13), 21233C0040C (effective 12/17/13) and 21233C0045C (effective 12/17/13). FEMA. <http://gis1.msc.fema.gov/Website/newstore/Viewer.htm>.

Groundwater Atlas of the United States. February 9, 2009. United States Geological Survey. <http://pubs.usgs.gov/ha/ha730/index.html>.

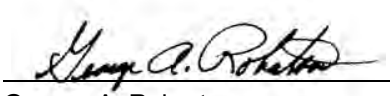
National Wetlands Inventory. October 6, 2011. U.S. Fish & Wildlife Service. <http://www.fws.gov/wetlands/Data/Mapper.html>.

USEPA, Standards and Practices for All Appropriate Inquiries; Final Rule. 40 Code of Federal Regulations, Part 312. Federal Register Volume 70, Number 210. December 23, 2008.

13 Signature of Environmental Professional

This Phase I ESA was overseen and/or performed by Cardno Senior Project Manager, Mr. George Robertson, a Professional Geologist (P.G.) with over 30 years of experience in environmental practice. He has managed and/or otherwise been directly involved in hundreds of environmental site assessments during this period (*Appendix E*).

I declare that, to the best of my professional knowledge and belief, I meet the definition of an Environmental Professionals (EP) as defined in 40 CFR § 312.10. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312 and ASTM 1527-13.



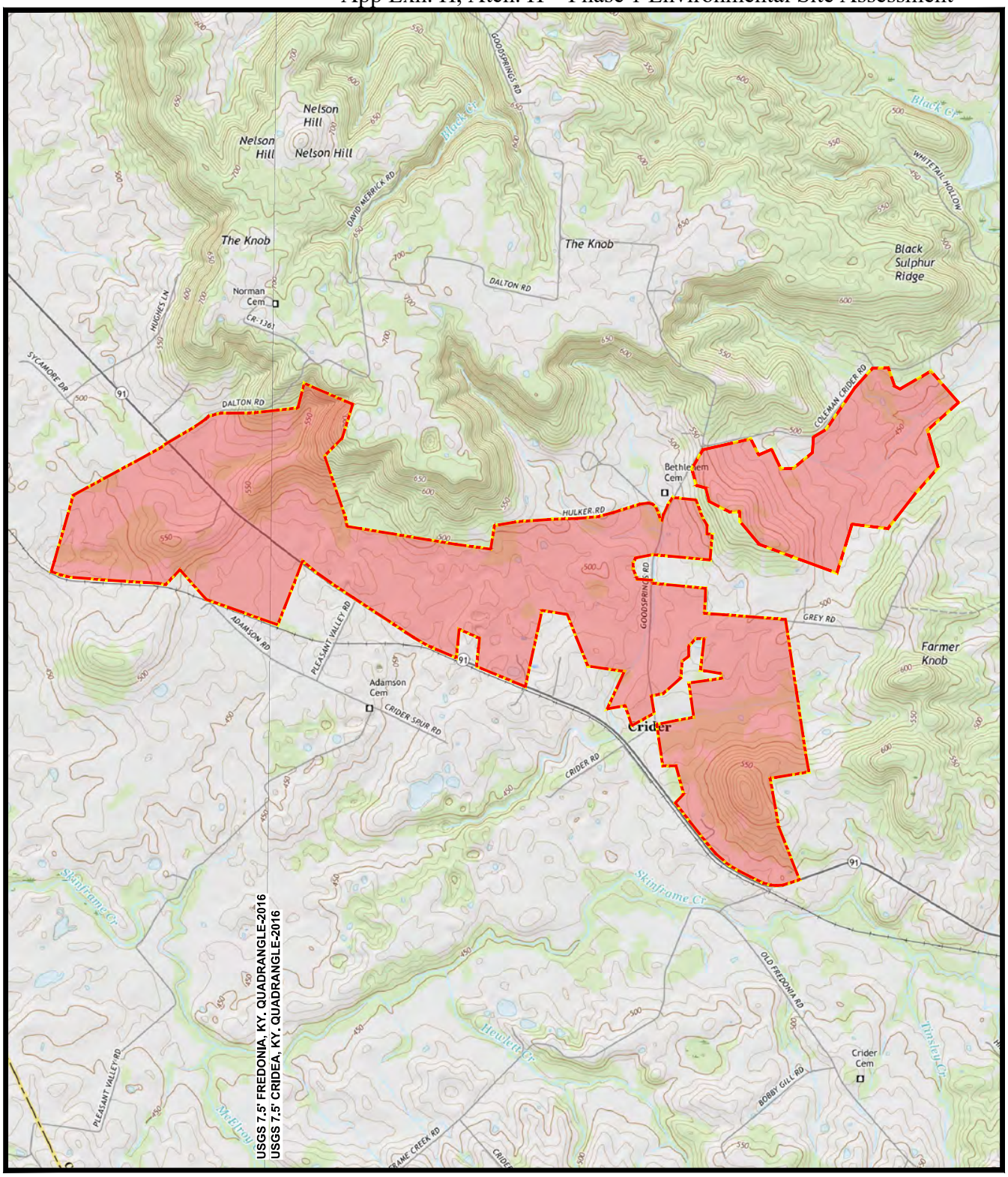
06/04/2020

George A. Robertson
Senior Project Manager

Date

Phase I Environmental Site Assessment Golden Solar Site Fredonia, Kentucky

FIGURES
SITE LOCATION MAP – TOPO
AERIAL SITE LAYOUT

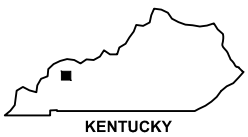


GOLDEN SOLAR, LLC
GOLDEN SOLAR SITE
FREDONIA, KENTUCKY

Cardno

2,000' 0 2,000'

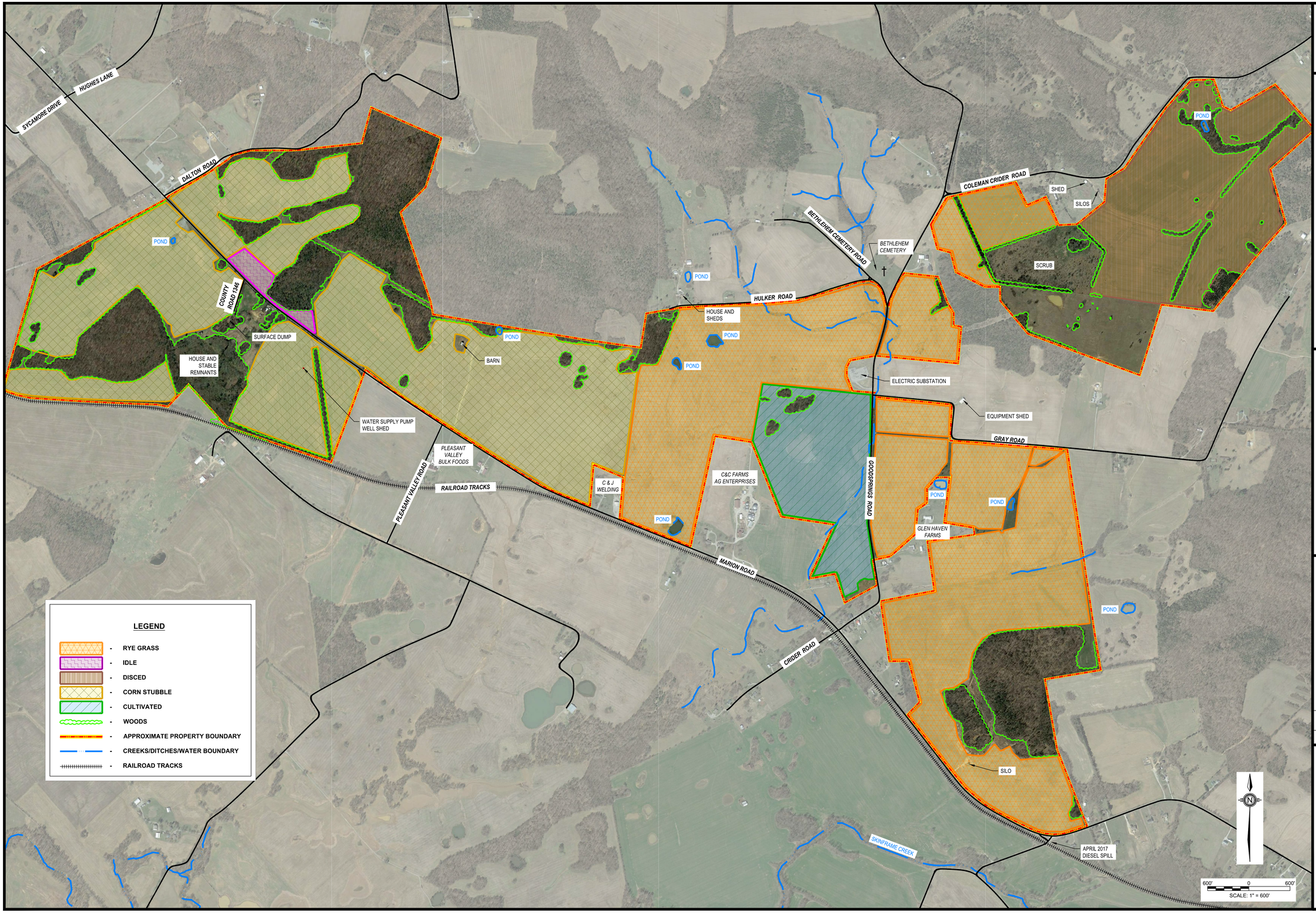
SCALE 1:24,000



E320201200
5/15/2020
Bluefield, Virginia

Topographic Property Location Map

FIGURE 1



FIGURE

2

GOLDEN SOLAR, LLC

GOLDEN SOLAR SITE
FREDONIA, KENTUCKY

Cardno

NO.	DATE	REVISION

DESIGNED:	GR
DRAWN:	DJD
CHECKED:	GR
DATE:	5/15/2020
SCALE:	1" = 600'
FILE NO.:	ECOPLEXUS
PROJECT NO.:	E3202012200-0400 AR
OFFICE LOC.:	BLUEFIELD, VA

Appendices A through F of this document were omitted to reduce file size. These appendices include the AAI user questionnaire, ERIS radius report, historic research documentation, site photographs, resume of environmental professional, and other information.

Phase I Environmental Site Assessment

Golden Solar Site Additional Areas
Fredonia, Kentucky

August 20, 2021

Cardno®

Phase I Environmental Assessment (ESA) Report

Golden Solar Site Additional Areas
Fredonia, Kentucky

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Date: August 20, 2021

Cardno Project #: E320201000-04-AR

Table of Contents

Figures

1. Topographic Site Location Map
2. Site Map

Appendices

A. ERIS Radius Report
B. Historical Research Documentation
C. Site Photographs
D. Resume of Environmental Professional (EP)
E. Other Information

Commonly Used Acronyms

AAI	All Appropriate Inquiry
ABCA	Analysis of Brownfield Cleanup Alternatives
ACM	Asbestos Containing Material
AST	Aboveground Storage Tank
ASTM	American Society for Testing & Materials
BFA	Brownfield Agreement
BLS	Below Land Surface
Cardno	Cardno Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CREC	Controlled Recognized Environmental Condition
EP	Environmental Professional
ERNS	Emergency Response Notification System
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ESI	Expanded Site Inspection
FOIA	Freedom of Information Act
FIRM	Flood Insurance Rate Map
Historical	Historical Recognized Environmental Condition
IC	Institutional Controls
LBP	Lead-Based Paint
LUST	Leaking Underground Storage Tank
MSL	Mean Sea Level
NFRAP	No Further Remedial Action Plan
NPL	National Priority List
PA/SI	Preliminary Assessment/Site Inspection
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PPB	Parts per Billion
PPM	Parts Per Million
PRG	Preliminary Remediation Goal
RACM	Regulated Asbestos Containing Material
RBC	Risk Based Concentrations
RBSL	Risk Based Screening Level
RCRA	Resource Conservation and Recovery Act
RCRA CORRACT	RCRA Information Systems
RCRA GEN	RCRA System Generators
RCRA TSD	RCRA Treatment, Storage, and Disposal Facilities
REC	Recognized Environmental Condition
ROD	Record of Decision
SHWS	State Hazardous Waste Site
SWL	Solid Waste Facilities List
TAL	Target Analyte List
TMS	Tax Map Serial

USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank

1 Executive Summary

At the request of **Golden Solar, LLC**, **Cardno Inc**. (**Cardno**) has conducted a Phase I Environmental Site Assessment (*ESA*) of approximately 409.4 acres of farmland known as the Golden Solar Site Additional Areas (Site). The Site is located in western Caldwell County in Kentucky.

This Phase I ESA was performed in accordance with ASTM Practice E1527-13 "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" developed by ASTM Subcommittee E50.02 for Commercial Real Estate Transactions. ASTM E1527-13 also meets the All Appropriate Inquiries (AAI) standards set forth by the United States Environmental Protection Agency (*EPA*) in 40 CFR Part 312. Any exceptions to, or deletions from, this practice are described in *Sections 2.4* and *9.0* of this report.

The objective of this Phase I ESA was to identify Recognized Environmental Conditions (*RECs*) as defined in ASTM Practice E1527-13 in connection with the subject property.

This Phase I ESA included the following types of investigation:

> A records review of pertinent regulatory agency databases and applicable local records;
  - An **Environmental Risk Information Services (*ERIS*)** environmental database search report;
  - ERIS Aerial photographs from 1952, 1967, 1983, 1998, 2004, 2006, 2008, 2014, and 2020 were reviewed;
  - ERIS Historical Sanborn Fire Insurance maps were not available for the Site; and
  - ERIS Historical topographical maps dated 1908, 1910, 1954, 1967, and 2016;

> A review of site background and other available information for the subject property to evaluate present and past land use; and

> Reconnaissance to assess the Site for evidence of RECs conducted by Mr. George Robertson of Cardno on July 14, 2021.

Cardno has performed this Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527-13. Any exceptions to, or deletions from, this practice are described in *Sections 2.4* and *9.0* of this report.

This assessment has revealed no evidence of RECs in connection with the Site.

The following non-ASTM concerns were identified for the Site:

> Open dumping of brush, large stumps, metal, and polyvinylchloride pipes were observed along the edge of the woods on the south side of Brown Hill Road on the northwest border of the North Area of the Site.

> Open dumping of an empty, approximately 220-gallon polyethylene tote, canvas, an empty polyethylene drum, scrap metal, wood, and plastic debris in a small wooded topographic depression southwest of Coleman Crider Road on the east side of the North Area of the Site.

Conclusions and opinions presented in this assessment are based solely on the information derived from the study sources and references cited in this document and are subject to the limitations of the sources and methods employed. Except as specified herein, this Phase I ESA report is for the exclusive use of the Client.

2 Introduction

Cardno conducted a Phase I Environmental Site Assessment (*ESA*) of land tracts totaling approximately 409.4 acres known as the Golden Solar Site Additional Areas (Site). The Site is located in western Caldwell County, Kentucky, and is largely comprised of farmland.

2.1 Purpose

The purpose of this Phase I ESA is to identify to the extent possible any RECs, Controlled RECs, or Historical RECs on the property.

Recognized Environmental Condition (REC) - The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.

Controlled Recognized Environmental Condition (CREC) – A recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Historical Recognized Environmental Condition (HREC) – A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

This assessment is completed with respect to the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. As such, this practice is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner defense to CERCLA liability; that is, the practices that constitute 'all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice' as defined in 42 USC§9601(35(B)).

2.2 Detailed Scope of Services

The Phase I ESA is a general characterization of possible RECs present on a property. This ESA was completed in accordance with ASTM E1527-13 "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process." ASTM E1527-13 meets the standard set forth by the USEPA in the AAI Rule. The services provided are detailed below:

- Review of federal and state lists of environmentally regulated sites to determine if the subject property or nearby properties are listed as having a present or past environmental problem, are under investigation, or are regulated by state or federal environmental regulatory agencies;
- Review of site background information, including aerial photographs, title records, and interviews with persons familiar with the subject property to evaluate present and past land uses;
- Physical inspection and photographic documentation of the subject property and adjacent properties to identify obvious indications of present or past activities that have or could have environmentally impacted the subject property; and
- Development of a report documenting Cardno's findings.

2.3 Significant Assumptions

No significant assumptions were made prior to the initiation of this Phase I ESA.

2.4 Limitations and Exceptions

The findings of this assessment are based on the following inherent limitations and/or exceptions:

- The representations contained herein are based on the available data and on the contracted scope of the work. Cardno and the Environmental Professional (EP) make no representations or conclusions on information beyond the scope of this assessment.
- Cardno derived the data in this report primarily through visual assessment, examination of records in the public domain, and interviews with informed individuals about the subject property. The passage of time, manifestation of latent conditions, or the occurrence of future events may require further study at the subject property, analysis of the data, and revaluation of the findings, observations, and conclusions in the report.
- The data reported and the findings, observations, and conclusions expressed in this report are limited by the scope of work prescribed by ASTM E1527-13.
- No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon site conditions in existence at the time of the investigation.
- Cardno presents professional opinions and findings of a scientific and technical nature. The report shall not be construed to offer legal opinion or legal representations as to the requirements of, nor compliance with, environmental laws, rules, regulations, or policies of federal, state, or local governmental agencies. Any use of the Phase I ESA report constitutes acceptance of the limits of Cardno's liability. Cardno's liability extends only to its client and not to any other parties who may obtain the Phase I ESA Report.
- The conclusions presented in this report are professional opinions based on data described in this report. They are intended only for the purpose, site location, and the project indicated. This report is not a definitive study of contamination at the subject property and should not be interpreted as such. An evaluation of the subsurface soil and groundwater conditions was not performed as part of this investigation. No sampling or chemical analyses of structural material or other media was completed as part of this study unless explicitly stated.
- This report is based, in part, on unverified information supplied to Cardno by third party sources. While efforts have been made to substantiate this third party information, Cardno cannot guarantee its completeness or accuracy.

2.5 Special Terms and Conditions

Cardno performed this assessment for the users as part of their environmental due diligence on the Site and no additional terms and conditions are specified.

2.6 User Reliance

This report, including supporting field data and notes (collectively referred to hereinafter as "information"), was prepared or collected by Cardno for the benefit of the user, Golden Solar, LLC. The report is not intended for use by any other party.

3 Site Description

3.1 Site Location and Description

The Site consists of approximately 409.4 acres of largely farm and forest land known as the Golden Solar Site Additional Areas and is located east of Fredonia in western Caldwell County, Kentucky. A Topographic Site Location Map, consisting of the relevant portions of the United States Geological Survey (*USGS*) topographic map, Crider Quadrangle, Kentucky, is included as *Figure 1.* The aerial layout of the Site and surrounding properties is depicted on *Figure 2*.

3.2 Site and Vicinity General Characteristics

The Site is located east of Fredonia in western Caldwell County, Kentucky. The Site and surrounding area is primarily farm and forest land. According to Caldwell County administration there are no zoning restrictions for the County.

Caldwell County was formed in 1809 from Livingston County. During the late 1800s, Princeton (located approximately six miles east of the Site) became a junction for the Illinois Central and Louisville & Nashville railroads. The Illinois Central railroad track currently passes south of the Site. The County experienced an agricultural boom in the 1900s and its economy remains largely based in agriculture.

3.3 Current Use of the Site

The Site is currently used for farming with some undeveloped forest land. Most of the North Area is developed as crop land with some forest near its north boundary. In contrast to the North Area, most of the South Area is undeveloped forest land, with some crop land on its west side. Site photos of the current condition are included in *Appendix C*.

3.4 Descriptions of Structures, Roads, Other Improvements on the Site

The North Area of Site is almost entirely developed as agricultural cropland. A house and garage are located on the west side of the North Area of the Site. The Watson Farm Complex (house, barn, stable, sheds, and silo) is located on the east side of the North Area of the Site. The North Area of the Site is accessed via Coleman Crider and Brown Hill Roads.

The majority of the South Area of the Site is forested land on the eastern side of the Site. Less than half of the land area of the South Area of the Site is used as cropland. A small silo located in the corn field south of Grey Road appears to the only structure observed in the South Area of the Site. The South Area of the Site is accessed via Grey Road.

3.5 Current Uses of the Adjoining Properties

North Area of Site

North	Agricultural and forest
South	Agricultural and forest
East	Agricultural
West	Agricultural, forest and residential

South Area of Site

North	Agricultural, forest and residential
South	Agricultural and forest
East	Agricultural and forest
West	Agricultural and forest

4 User Provided Information

4.1 Title Records

The user did not provide Cardno with current title records, and Cardno did not review a chain-of-title in conjunction with this assessment.

4.2 Environmental Liens or Activity and Use Limitations

A liens search was not conducted as part of this assessment. Cardno did not identify any environmental liens or use restrictions for the Site.

4.3 Specialized Knowledge

The user has no specialized knowledge about the Site.

4.4 Commonly Known or Easily Ascertainable Information

The Site was used for agricultural cropland.

4.5 Valuation Reduction for Environmental Issues

No opinion or knowledge was provided regarding environmental issues causing a reduction in property value.

4.6 Owner, Property Manager, and Occupant Information

The user did not provide Cardno with current ownership records, and Cardno did not review property records at the Caldwell County Courthouse.

4.7 Reason for Performing Phase I ESA

This Phase I ESA was performed for the users as part of environmental due diligence at the Site in preparation for property development.

4.8 AAI User Questionnaire

The client verbally communicated Site information and an All Appropriate Inquiry (*AAI*) User Questionnaire was not completed.

4.9 Other

No other User provided information was utilized for this assessment.

5 Records Review

5.1 Standard Environmental Record Sources

Records were obtained and reviewed to help identify RECs in connection with the Site. Federal and state regulatory databases were reviewed to further identify any known sources of contamination on or within designated research radii of the subject property. The federal records searched during this assessment included sites that handle or dispose of hazardous materials and sites that otherwise have been identified to have air, soil, or groundwater contamination. The state records reviewed included hazardous waste sites, landfills, and sites with registered or leaking underground storage tanks (*USTs*).

Cardno contracted with **Environmental Risk Information Services (*ERIS*)** to perform the regulatory review (*Appendix A*). The results are discussed below and the regulatory databases reviewed and corresponding research distances are summarized in the report in *Appendix A*. Review of the federal and state databases was conducted according to ASTM E1527-13 and AAI standards for Phase I ESAs. Figures illustrating the locations of the sites identified during the database search (relative to the Site and depicting the appropriate designated research radii corresponding to each database) are also included in *Appendix A*.

Federal and state reporting lists are summarized in the following table. Listings requiring further discussion are described below.

Federal Reporting Lists	Listings Reported
National Priority List (NPL)	0
National Priority List Delisted (NPL Delisted)	0
Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) - SEMS	0
SEMS LIEN	0
Facility Registration System (*FRS*) – Formerly FINDS List	0
RCRA Corrective Action Facilities (*RCRAC*)	0
RCRA Treatment, Storage, and Disposal Facilities (*TSD*)	0
RCRA Conditionally Exempt Small Quantity Generator (*CESQG*)	0
RCRA Generator (*GEN*)	0
Polyfluorinated alkyl substance (*PFAS*) NPL	0
PFAS Toxic Release Inventory (*TRI*)	0
Toxic Release Inventory System (*TRIS*)	0
Toxic Substances Control Act (*TSCA*)	0
Hist. TSCA	0
Federal Fungicide and Toxic Substances (*FTTS*)	0
Potentially Responsible Party (*PRP*)	0
FED DRYCLEANERS	0
Delisted FED DRY	0
Formerly Used Defense Sites (*FUDS*)	0
Material Licensing Tracking Systems (*MLTS*)	0
Mines	0
Mineral Resource Data System (*MRDS*)	**6**
ALT FUELS	0
Section Seven Tracking System (*SSTS*)	0
Polychlorinated Biphenyl (*PCB*)	0
Hist. MLTS	0
Hazardous Materials Information Resource System (*HMIRS*)	0

Federal Reporting Lists	Listings Reported
Federal Brownfields	0
Emergency Response Notification System (*ERNS*)	0
Integrated Compliance Information System (*ICIS*)	0
Superfund Enterprise Management System (*SEMS*) Archive	0
Federal Engineering and Institutional Controls (*IC/EC*)	0
State/Local/Tribal Reporting Lists	**Listings Reported**
State/Tribal Hazardous Waste Sites (*SHWS*)	0
State Spills	**1**
State/Tribal (SWF/LF)	0
Leaking Underground Storage Tank (*LUST*) "Ky. Petroleum Storage Tank Fund"	0
Voluntary Cleanup Program (*VCP*)	0
State/Tribal Underground Storage Tank (*UST*)/ Aboveground Storage Tank (*AST*)	0
State/Tribal Delisted Storage Tank	0
State/Tribal LUST	0
State/Tribal Brownfields	0
State Other	0
State Department of Solid and Hazardous Waste (*DSHW*)	0
State ENG	0
State INST	0
Brownfields INV	0
Tribal ILST	0
Tribal IUST	0

5.1.1 Database Listings at the Site

One Site location was identified in the ERIS database as follows:

> The Walker Fluorspar Mine was identified in Mineral Resource Data System (*MRDS*) as being located southwest of Coleman Crider Road on the east side of the North Area of the Site (*Figure 2*). The mine produced from the Mississippian St. Genevieve Limestone Formation and the mine is not identified in any other database. No other listings were identified in the ERIS database at the Site. Based on field observations discussed in *Section 6.2*, Walker Mine is not considered a REC for the Site.

5.1.2 Database Listings Adjoining the Site

Two adjoining locations were identified in the ERIS database as follows:

> The ERIS database lists one SPILLS result (Caldwell County Water District, Incident ID #2289863) at a location along Grey Road adjoining the northeast corner of the South Area of the Site (*Figure 2*). A drinking water line break or leak occurred on January 21, 2009. The incident was closed on January 23, 2009.

> The Schwench Mine was identified in MRDS adjacent to the northwest boundary of the North Area of the Site (*Figure 2*). The mine produced from the Mississippian St. Genevieve Limestone Formation. The mine is not identified in any other database. No other listings were identified in the ERIS database at the Site. Based on field observations discussed in *Section 6.2*, Schwench Mine is not considered a REC in connection with the Site.

5.1.3 Database Listings Near the Site and Orphans

Three nearby locations were identified in the ERIS database as follows:

> The Gilbert Williamson Deposit was identified in MRDS near the east boundary of the North Area of the Site. The prospect was in the Mississippian St. Genevieve Limestone Formation. The mine is not identified in any other database and no other listings were identified at the Site. Based on the distance and intervening topography, the Gilbert Williamson Deposit is not considered a REC in connection with the Site.

> The Warren Fluorspar Mine was identified in MRDS near the east boundary of the North Area of the Site. The mine produced from the Mississippian St. Genevieve Limestone Formation. The mine is not identified in any other database and no other listings were identified at the Site. Based on the distance and intervening topography, the Warren Mine is not considered a REC in connection with the Site.

> The Eddie Crowder Mine was identified in MRDS near the east boundary of the North Area of the Site. The mine produced from the Mississippian St. Genevieve Limestone Formation. The mine is not identified in any other database and no other listings were identified at the Site. Based on the distance and intervening topography, the Eddie Crowder Mine is not considered a REC for the Site.

No unplottable “orphan” facilities were identified at, adjoining, or near the Site.

5.2 Additional Environmental Records

No additional environmental records were reviewed.

5.3 Physical Setting

5.3.1 Topography

Cardno has reviewed the most current USGS Topographic Maps covering the subject property (*Figure 1*). The purpose of this review is to evaluate the hydraulic conditions at the Site and surrounding properties. It is not the purpose of this report to evaluate the geotechnical condition of the subject property; therefore, no geotechnical documents were examined.

The Kentucky Almanac shows that Caldwell County is within the Pennyroyal Plateau region of Kentucky. The terrain features rolling hills, caves, and karst topography. According to the USGS topographic map (Crider, Kentucky Quadrangle), local topography appears to be rolling with wooded upland areas across the east side of the South Area and north side of the North Area of the Site. Topography in the North Area of the Site generally slopes to the northeast toward Black Creek. Topography in the South Area of the Site generally slopes east toward an unnamed intermittent tributary of Skinframe Creek.

5.3.2 Local Geology

Local geology is summarized based on an examination of the William B. Rogers and R.D. Trace, Geologic Map of the Crider Quadrangle, Caldwell County, Kentucky. The Golden Solar Site Additional Areas are underlain primarily by the Late Mississisippian Period, Meramecian Series, Fredonia Limestone Member of the St. Genevieve Limestone Formation. The Fredonia Limestone Member typically consists of light gray and light to medium gray finely crystalline, commonly dolomitic, limestone, occasionally oolitic, with rare chert nodules. Its basal unit is composed of cherty limestone that weathers

to reddish brown. Quaternary alluvium occurs along Black Creek in the North Area of the Site. The Tabb Fault System extends across the north side of the North Area of the Site.

According to E. Glynn Beck, Generalized Geologic Map for Land-Use Planning: Caldwell County, Kentucky, the Golden Solar Site is in an area underlain by limestone prone to karst development. Planning guidance indicates that, depending on topography, this area has slight to moderate limitations for light industrial development. The area is characterized as excellent for foundations, severely limited for septic systems, with locally fast drainage through fractures and danger of groundwater contamination. Locally, the upper few feet may be rippable and sinkholes are possible.

5.3.3 Hydrogeology

According to the Groundwater Atlas of the United States and the USGS, the Interior Low Plateaus aquifers and confining units are sandstone and limestone aquifers in rocks of Pennsylvanian age, limestone aquifers in rocks of Mississippian age, and limestone and dolomite aquifers in rocks of Devonian, Silurian, and Ordovician age. A large part of the Interior Low Plateaus Province is underlain by limestone aquifers in Mississippian rocks. These aquifers have been called the Mississippian Plateau aquifers in Kentucky. They are present in limestone that is either flat lying or gently dipping and are capped by a layer of regolith that varies greatly in thickness. In general, the limestone aquifers that yield the largest quantities of water to wells and springs are the Upper Mississippian Ste. Genevieve, and the underlying St. Louis Limestones.

In most places, the Mississippian aquifers are covered by regolith, which mostly consists of weathered material, or residuum. This material consists of clay, silt, sand, and pebble-sized particles of limestone or chert, which are derived mostly from weathering of the underlying bedrock.

Precipitation infiltrates the land surface and percolates downward to the water table, which marks the top of the zone of saturation. The water moves through interstitial spaces in the unconsolidated material of the regolith. However, in the underlying limestone bedrock, the water moves through zones of secondary permeability created by dissolution enlargement of bedding planes and fractures by the slightly acidic water. The solution openings store and transmit most of the water that moves through the limestone and discharges to streams, springs, and wells. Little water passes through the blocks of limestone between the bedding planes and fractures. Freshwater circulates through the limestone aquifers to depths as great as 500 feet below land surface. However, most of the circulation is at depths of less than 300 feet. All other factors being equal, the freshwater circulation is deepest where the local topographic relief and attendant hydraulic gradients are greatest.

The altitude of the potentiometric surfaces in the Ste. Genevieve and the St. Louis Limestone ranges from less than 400 feet above sea level in the west to more than 900 feet above sea level in three small areas in the east. However, little, if any, regional ground-water flow occurs. Most of the flow is local, toward springs and the few streams that drain the area. An escarpment that bounds the aquifer on the north is aptly named the "Dripping Springs Escarpment" because of the many small seeps and springs that discharge water along it. The water locally moves along fractures and bedding planes that might be nearly perpendicular to one another. Consequently, the arrows that show ground-water flow direction indicate only the general direction of water movement in a complex flow system that has many local horizontal and vertical components.

The hydraulic characteristics of the Mississippian aquifers vary greatly over short distances. For example, the ability of limestone with large, interconnected solution openings to transmit and yield water is several orders of magnitude greater than that of the almost impermeable blocks of limestone between solution openings, fractures, and bedding planes. These large differences are reflected in the yield and specific capacity of wells completed in the limestone aquifers and the discharges of springs that issue from these aquifers.

Site-specific groundwater information is not available. Data concerning the direction of groundwater flow at the site are not available; however, groundwater is expected to mimic the surface topography.

According to the Water Resource Development Commission by the Kentucky Geological Survey's Groundwater Resources of Caldwell County, Kentucky, water in Caldwell County is obtained from

Mississippian through Pennsylvanian sedimentary rocks and from unconsolidated Cretaceous and Quaternary sediments.

5.3.4 Soils

According to the National Cooperative Soil Survey, Site soils consist of approximately 35% Crider silt loam that is well drained, with moderately low runoff potential when the soil is thoroughly wet. Approximately 25% is Lowell-Faywood complex that is well drained, with moderately high runoff potential. Approximately 3% is Nicholson Silt Loam that is moderately well drained with moderately high runoff potential. Approximately 2% is Nolin Silt Loam that is moderately well drained with moderately low runoff potential. Approximately 3% is Zanesville Silt Loam that is moderately well drained with moderately high runoff potential. Approximately 5% is Blackford Silt Loam that is moderately well drained with moderately low runoff potential.

5.4 Historical Use Information on the Site and Adjoining Properties

The following sources of information were reviewed to determine the historical use of the Site: historic topographic maps and aerial photographs. The ERIS Database searched for Sanborn Fire Insurance maps; however, coverage was not provided. Historical research documentation is included in *Appendix B*.

5.4.1 Historic Topographic Maps

Topographic maps of the Crider Quadrangle dated 1908, 1910, 1954, 1967, and 2016 were reviewed. The 1908 and 1910 maps show the Illinois Central railroad track south of the Site. Goodsprings, Grey, Coleman Crider and Brown Hill Roads appear established. A road across the northwest side of the South Area of the Site appears to connect between Grey Road and White Sulphur Road. A building (possible barn) is appears located on the hillside located on the east side of the South Area of the Site. Black Sulphur School appears to be located along Brown Hill Road on the north side of the North Area of the Site. A building (possible house) is located along Coleman Crider Road on the east side of the North Area of the Site.

Between 1910 and 1954, Coleman Crider Road appears reconfigured to intersect with Brown Hill Road. Two inactive Walker Mines and one inactive Black Sulphur Mine appear in the North Area of the Site. Other Black Sulphur Mines appear largely near the northwest edge of the North Area of the Site. In the South Area of the Site, the connecting road between Grey and White Sulphur Roads appears to remain only as a trail. An active mine appears near the northeast side of the South Area of the Site.

Between 1954 and 1967, the trail connecting Grey and White Sulphur Roads appears entirely removed. A barn appears to remain on the hillside on the east side of the South Area of the Site. No trace of mining activity appears to remain at or surrounding the Site. A lake has been constructed along Black Creek, north of the North Area of the Site.

Less detail is shown on the 2016 map. No RECs were identified based on the information provided on the maps.

5.4.2 Aerial Photographs

ERIS provided aerial photographs for 1952, 1967, 1983, 1998, 2004, 2006, 2008, 2014 and 2020 were reviewed.

The 1952 photo shows the current road pattern of Grey, Coleman Crider and Brown Hill Roads already established across the Site. A small farm complex appears along Coleman Crider Road near the east side of the North Area of the Site. Apparently active small scale mining activity appears on the north side of the North Area of the Site. A building (possible barn) is located on the east side of the South Area of the Site

Between 1952 and 1967, a small farm complex (house, barn, and shed) appears adjacent to the South Area along Grey Road. Mine workings at the North Area of the Site appear to be reclaimed.

Between 1967 and 1983, the building (possible barn) on the east side of the South Area of the Site appears to have been removed and only a small silo appears south of the small farm complex along Grey Road. Off-site mining appears to have ended adjacent to the northwest boundary of the North Area of the Site.

Relative to the previous photograph, no significant changes were apparent on the 1998 photograph. Between 1998 and 2004, a house and barn or shed were constructed along Coleman Crider Road on the west side of the North Area of the Site. Relative to the 2004 photograph, no significant changes were apparent on the 2008, 2014, and 2020 photographs. No potential RECs were identified based on the information provided on the photographs.

5.4.3 Sanborn Fire Insurance Maps

Sanborn Fire Insurance maps were not available for the Site and surrounding area (*Appendix B*).

6 Site Reconnaissance

The objective of Site reconnaissance is to obtain information indicating the likelihood of RECs in connection with the Site. This evidence can be circumstantial, such as the observation of stressed vegetation, staining, unlabeled or suspicious containers or structures, unidentified oily substances, pooled liquids, and/or odors.

6.1 Methodology and Limiting Conditions

On July 14, 2021, Mr. George Robertson of Cardno, performed a site reconnaissance of the Site and surrounding properties. The observations made during the Site reconnaissance are provided in the following sections. This Phase I ESA did not include sampling or screening of any materials. At the time of the reconnaissance, it was not possible to enter the interiors of some of the Site structures. However, exterior assessments of structures did not appear to indicate staining, stressed vegetation, tank fill ports or vents, or other similar features indicative of potential RECs. Photographs of the subject property taken during the site visit are included in *Appendix C*.

6.2 Site Visit/Reconnaissance

This section discusses general observations made during Site reconnaissance. While almost the entire extent of the North Area of the Site was developed as agricultural cropland, less than half of the South Area appears developed for crops. The undeveloped areas of the Site appear to remain undeveloped forest.

Except for a discarded, empty, approximately 220-gallon, polyethylene tote located in the wooded depression noted as “Walker Mine” in the North Area of the Site, no ASTs or USTs appear to be located at the Site. A house and garage are located on the west side of the North Area of the Site. The Watson Farm Complex (house, barn, stable, sheds, and silo) is located on the east side of the North Area of the Site. A small silo located in the corn field south of Grey Road appears to the only structure in the South Area of the Site.

On-Site:

- Brush piles, large burnt stumps and metal and polyvinylchloride (PVC) pipes were observed along the edge of the woods on the south side of Brown Hill Road (*Photos 15 and 16*). No staining or stressed vegetation was observed at this location. These debris are not considered an REC.
- No staining, stressed vegetation or other visual indication of an environmental concern was observed at the former Walker Mine in the small wooded topographic depression southwest of Coleman Crider Road on the east side of the North Area of the Site. However, surface dumping was observed beneath the undergrowth in the wooded location of the former Walker Mine. An empty, approximately 220-gallon polyethylene tote that formerly contained herbicide was observed (*Photo 12*). Other debris

observed included canvas, an empty unmarked polyethylene drum, scrap metal, wood, and plastic (*Photo 13*). These debris are not considered an REC.

- A small agricultural silo remains in a small wooded area in the corn field located south of Grey Road (*Photo 5*).

Off-Site:

- No staining, stressed vegetation or other visual indication of an environmental concern was observed at the off-site location of the former Schwench Mine in the woods north of Brown Hill Road. This location is on a wooded ridge near the northwest boundary of the North Area of the Site.

6.3 Hazardous Substances in Connection with Identified Uses

A review of Federal and Kentucky regulatory databases revealed no violations for the use of agricultural chemicals (i.e., fertilizer, herbicides, and pesticides) at the Site. No other hazardous substances were observed in use at the Site.

6.4 Petroleum Products and Containers

No petroleum containers were observed.

6.5 Unidentified Substance Containers

No unidentified containers were observed at the Site.

6.6 Storage Tanks – USTs / ASTs

Except for a discarded, empty, approximately 220-gallon, polyethylene tote located in the wooded depression noted as “Walker Mine” in the North Area of the Site, no ASTs or USTs appear to be located at the Site.

6.7 Solid Waste Disposal

As discussed in *Section 6.2*, open dumping of metal, wood, and plastic materials was observed along the south side of Brown Hill Road and at the former Walker Mine location. No other indications of solid waste disposal were identified on the Site.

6.8 Evidence of Polychlorinated Biphenyls

Pole-mounted transformers belonging to **Kentucky Utilities Company (*KU*)** were observed along Coleman Crider Road on the west and east sides of the North Area of the Site. Blue non-PCB stickers were not visible on the pole-mounted transformers. The pole-mounted transformers appeared to be in good condition with no staining on the utility pole or surrounding surfaces.

6.9 Floor Drains / Sumps

No buildings were entered and no drains or sumps were observed at the Site.

6.10 Other Environmental Concerns

No other environmental conditions were observed at the Site.

7 Interviews

On July 14, 2021, 2020, Mr. George Robertson, of Cardno, interviewed Mr. Benjamin Slusser, adjacent property owner, regarding land use, structures, and possible hazardous materials and petroleum. Mr.

Slusser was not aware of the presence of any storage tanks, hazardous materials, or petroleum products at the Site. Mr. Slusser offered advice on how to safely access remote areas of the Site.

8 Conclusions

Cardno has performed this Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527-13. Any exceptions to, or deletions from, this practice are described in *Sections 2.4* and *9.0* of this report.

This assessment has revealed no evidence of RECs in connection with the Site.

The following non-ASTM concerns were identified for the Site:

> Open dumping of brush, large stumps, metal and PVC pipes were observed along the edge of the woods on the south side of Brown Hill Road on the northwest border of the North Area of the Site.

> Open dumping of an empty, approximately 220-gallon polyethylene tote, canvas, an empty polyethylene drum, scrap metal, wood, and plastic debris in a small wooded topographic depression southwest of Coleman Crider Road on the east side of the North Area of the Site.

Conclusions and opinions presented in this assessment are based solely on the information derived from the study sources and references cited in this document. Conclusions drawn from the results of this assessment should be made while recognizing the limitations of the sources and methods used. Except as specified herein, this Phase I Environmental Site Assessment report was produced for the exclusive use of the Client.

9 Deviations

As noted in Section 6.1, it was not possible to enter the interiors of some Site structures. No other deviations or deletions were made to the scope as defined by ASTM E1527-13.

10 Significant Data Gaps

Cardno did not encounter any significant data gaps during this assessment.

11 Additional Services

No additional services were provided for this assessment.

12 References

American Society for Testing and Materials International (*ASTM*) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation: E1527-13.

American Society for Testing and Materials International (*ASTM*) Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process, Designation: E1528-06.

Beck, E. Glynn, D.A. Williams, and D.I. Carey, Generalized Geologic Map for Land-Use Planning: Caldwell County, Kentucky.

Miller, James A., 1999, Groundwater Atlas of the United States.

Kentucky Geological Survey, 2005, Groundwater Resources of Caldwell County, Kentucky, County Report 17, Series XII.

Rogers, W.B., and Hays, W.H. 1967, Geologic Map of the Fredonia Quadrangle, western Kentucky, USGS Quadrangle Map GQ-607.

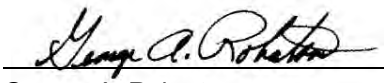
Rodgers, W.B., and Trace, R.D., 1976, Geologic map of the Crider Quadrangle, Caldwell County, Kentucky: USGS Geologic Quadrangle Map GQ-1283.

USEPA, Standards and Practices for All Appropriate Inquiries; Final Rule. 40 Code of Federal Regulations, Part 312. Federal Register Volume 70, Number 210. December 23, 2008.

13 Signature of Environmental Professional

This Phase I ESA was overseen and/or performed by Cardno Senior Project Manager, Mr. George Robertson, a Professional Geologist (P.G.) with over 30 years of experience in environmental practice. He has managed and/or otherwise been directly involved in hundreds of environmental site assessments during this period (*Appendix D*).

I declare that, to the best of my professional knowledge and belief, I meet the definition of an Environmental Professional (EP) as defined in 40 CFR § 312.10. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312 and ASTM E1527-13.



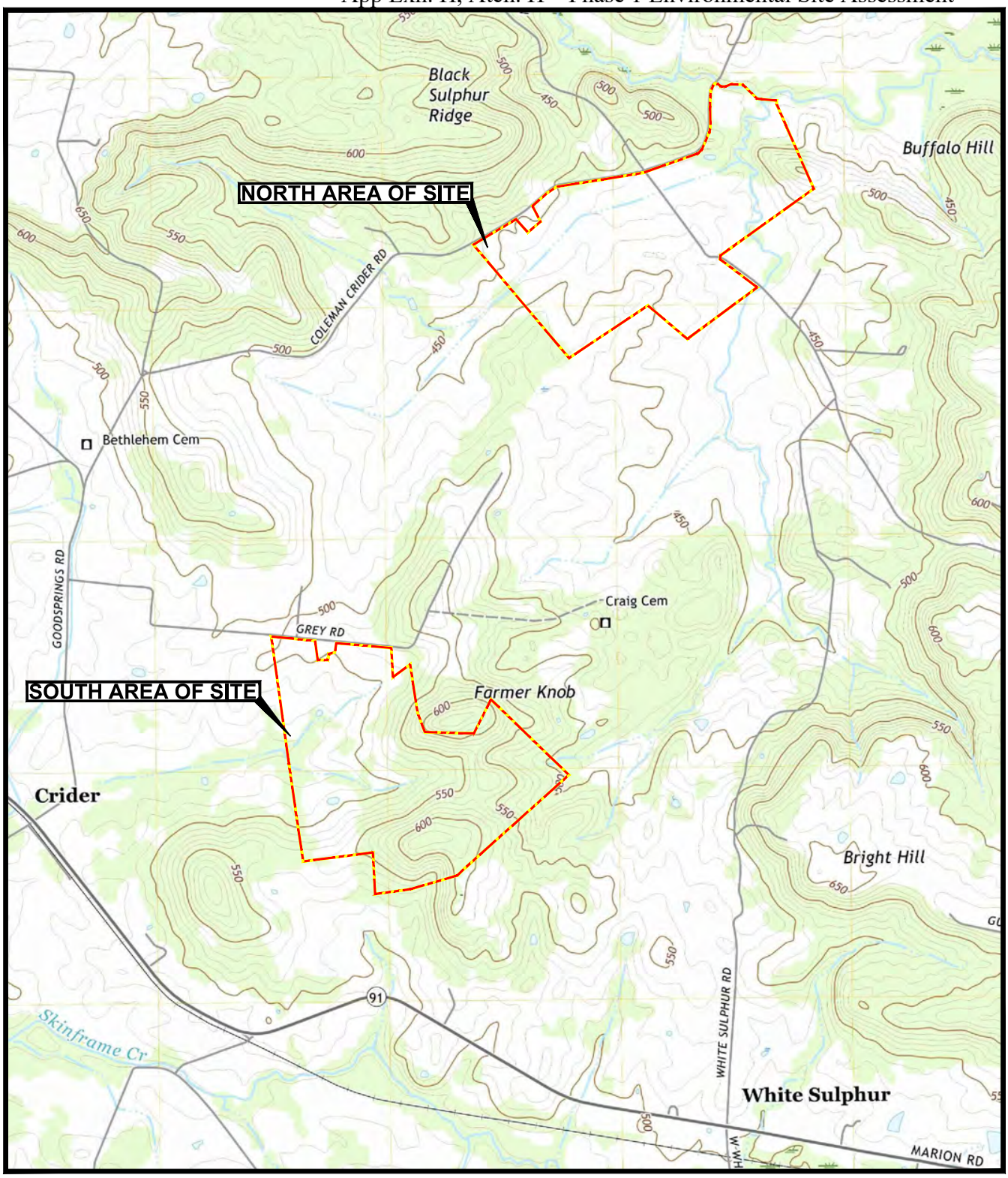
08/20/2021

George A. Robertson
Senior Project Manager

Date

Phase I Environmental Site Assessment Golden Solar Site Additional Areas Fredonia, Kentucky

FIGURES
TOPOGRAPHIC SITE LOCATION MAP
SITE MAP

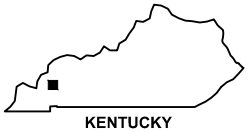


GOLDEN SOLAR, LLC
GOLDEN SOLAR SITE ADDITIONAL AREAS
FREDONIA, KENTUCKY

Cardno

2,000' 0 2,000'

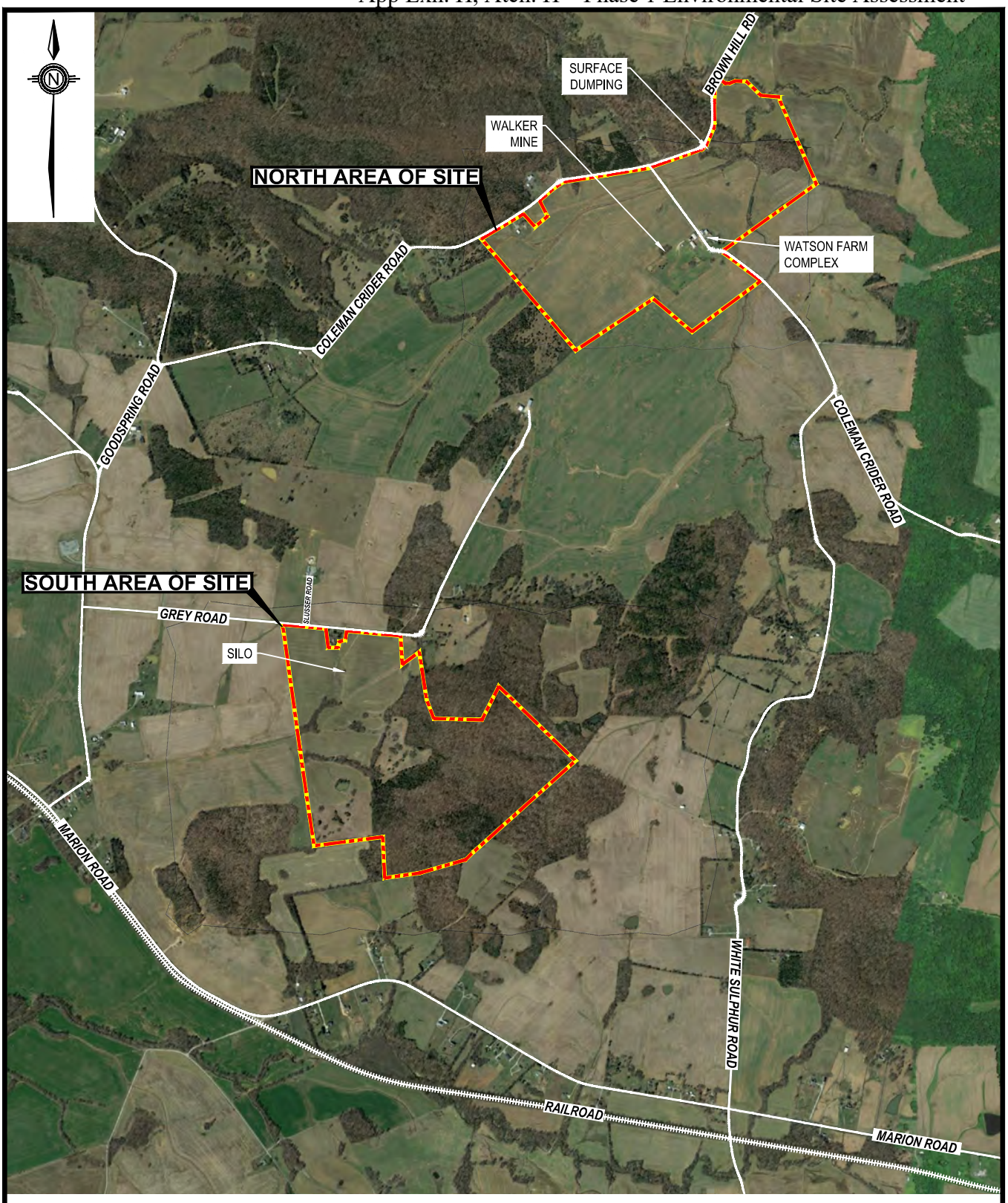
SCALE 1:24,000



E320201000-04
7/21/2021
Bluefield, Virginia

Topographic Site Location Map

FIGURE 1



Cardno Bluefield	Drawn: DJD Checked: GR Date: 7/21/2021 Scale: 1"=2000' Project No.: E320201000-04 File No.N:CPF:OHIO\GOLDEN	GOLDEN SOLAR, LLC GOLDEN SOLAR SITE ADDITIONAL AREAS FREDONIA, KENTUCKY	Figure 2 SITE MAP

Appendices A through E of this document were omitted to reduce file size. These appendices include the ERIS radius report, historical research documentation, site photographs, resume of environmental professional, and other information.

Attachment I
Karst Survey

January 14, 2021

National Grid Renewables
8400 Normandale Lake Boulevard
Bloomington, Minnesota 55437

Attn: Mr. John Strom, P.E.
E: jstrom@nationalgridrenewables.com

Re: Golden Solar Karst Survey and Assessment
Golden Solar, LLC
Princeton, Caldwell County, Kentucky
Terracon Project No. 57205095

Dear Mr. Strom:

As requested, Terracon Consultants, Inc. (Terracon) is submitting this report summarizing the karst survey and assessment at the proposed Golden Solar site in northern Golden County, Kentucky.

1.0 PROJECT INFORMATION

The proposed Golden Solar site in Caldwell County, Kentucky was assessed for potential karst geohazards at the property. The objective of the desktop review was to identify, locate, and characterize existing karst features with particular emphasis on open throat and/or active sinkhole development which could impact development of the proposed solar arrays, access roadways, and supporting infrastructure. The entire site, measuring approximately 1,500 acres, is underlain by soluble carbonate bedrock forming a regional karst terrain (i.e. a landscape characterized by the presence of sinkholes, caves, sinking and losing streams, and a highly irregular "pinnacled" overburden/bedrock interface).

2.0 SCOPE OF SERVICES

Our karst survey and assessment services were performed in two phases: 1) a desktop data review phase, and 2) a field reconnaissance phase. Terracon assessed the properties indicated on files provided to us (Golden Solar.kmz, 11/18/2020; Caldwell-Golden-PIDs.pdf, 11/19/2020), hereinafter referred to as the Area of Interest (AOI).

Specifically, Terracon provided the following services:

- Terracon's karst geologists performed a desktop review of readily available resources to identify suspected or documented karst features (e.g., sinkholes and areas of soil subsidence, cave entrances, closed depressions, and sinking and

losing streams) within the AOI, and any features within 0.25 miles of the AOI that were inferred to receive drainage from the AOI.

§ Based on the results of the data review, Terracon's karst geologists located and delineated visible surface karst features (e.g., sinkholes and subsidences, cave entrances, closed depressions, and sinking and losing streams) within the proposed AOI, with particular emphasis on features that were inferred to have direct communication with the phreatic zone such as "open-throat" sinkholes, karst windows, cave entrances, abandoned wells, and sinking streams; and areas of high karst activity that could indicate development of pinnacled bedrock. Field observations were made by walking the AOI. A detailed map of the AOI we evaluated is included as Map 1, Appendix A.

§ Terracon delineated zones of karst terrain based on the surface karst feature assessment.

§ The findings and conclusions of the data review and field study have been summarized in this report. The report includes recommendations on the feasibility of the planned construction in karst areas, indicates higher or lower risk areas within the AOI, and provides recommendations regarding additional studies or investigations for site specific karst features identified during the survey.

2.1 Methods and Procedures

Desktop Data Review

Potential karst features were identified remotely, prior to being located and characterized in the field. This process is intended to significantly reduce the amount of time spent in actual field observation and survey tasks. The review of the existing feature locations within the AOI was accomplished by examining data from the following sources:

1. The Cave Database of the Kentucky Speleological Survey (KSS);
2. Maps of selected karst features available from the United States Geological Survey (USGS) and the Kentucky Geological Survey GIS Sinkhole Database (https://www.uky.edu/KGS/gis/sinkpick.htm);
3. Two-foot contour interval maps for the AOI and surrounding to within 0.25 miles, in order to determine the presence of surface features not included in the above listed databases based on the presence of closed, descending contours or other suspect karst "fingerprint" features;
4. Digital Elevation Models (DEMs) and LIDAR Data[1];

[1] KyFromAbove (https://kyfromabove.ky.gov/)

5. Aerial photographs (both recent and historical); and
6. USGS Topographic 7.5-minute topographic quadrangles.

In addition, Terracon reviewed readily available geological literature for bedrock and structural characteristics. We relied upon the KGS 1:24,000 Geology Maps that existed for the AOI. Each feature was assigned a unique identifier.

Field Survey

Upon completion of the data review, Terracon initiated the field reconnaissance and survey activities. Specifically, the field reconnaissance entailed:

1. Location and verification of potential surface features identified in the desktop review;
2. Location of uncatalogued or previously unidentified surface features, specifically sinkholes, cave entrances, dry runs, sinking streams or abandoned mine entrances.

Each survey area was delineated and then examined for features (both catalogued and previously nondescript) in the field. This entailed walking over the survey area in a systematic manner, to observe features that fit the criteria. The locations and outlines of all relevant features were recorded using a sub-meter accuracy GPS device. For this study, the outline (parapet) of a closed depression (sinkhole) was defined as either the last closed descending contour at a 2-foot mapping interval or by the presence of a visible parapet. Cave entrances were identified as single points, unless the entrance was located within a larger sinkhole structure, in which case the cave entrance was indicated as a point within the sinkhole's parapet. Sinking streams were located as points of entry into the subsurface; however, losing streams were identified as linear features. Springs were also identified as points.

Each feature was assigned a unique identifier using the same protocol as the data review. Features verified from the data review retained their original identifiers; however, any feature that could not be verified in the field was removed from the final data set. Any new features were assigned the next number after the last one assigned.

3.0 GEOLOGY AND TERRAIN

3.1 Physiography – The proposed Golden Solar site is situated within the western portion of the Interior Low Plateaus Physiographic Province of Ohio, Kentucky and Tennessee, which extends from the Greater Cincinnati metropolitan region in the Ohio River Valley southward to the Nashville Region of Tennessee. In general, the Interior Low Plateaus range from approximately 380 to 1,200 feet in elevation and predominantly comprise of rolling plains and eroded plateaus. This region is almost completely composed of horizontal beds of sandstone, shale, and limestone from the Paleozoic Era (541 to 252 million years ago). The Interior Low Plateaus exist at the

southeastern area of the Central Lowlands, the boundary occurring where the maximum extent of the Pleistocene glaciers reached.

Specifically, the subsection of the Low Plateaus Physiographic Province in Kentucky is referred to locally as the Mississippian Plateaus or the "Pennyrile" (named for the Pennyroyal plant, *Hedeoma puligiodes*). The Mississippian Plateaus wrap around the Western Kentucky Coalfield Province, in a crescent that opens towards the north. This Mississippian Plateaus in the site area is divided by the Dripping Springs Escarpment into an upland often called the Mammoth Cave Plateau, and a lowland area called the Pennyroyal Plateau. The Golden Solar site lies within the Pennyroyal Plateau of Caldwell County, KY.

3.2 Topography – The majority of the Golden Solar site has a gently rolling terrain, with an average elevation (EL) of EL 480. There are several high points, which are spurs of the adjacent Dripping Springs Escarpment to the north. One of these outliers of the escarpment occurs in Parcel 16-17, with a crest at EL550. Also, within this parcel the southern edge of the escarpment is present, with a northwest trending hollow rising rapidly to EL700. A second spur of the escarpment is located in Parcel 25-4, which wraps around the absolute high point of this spur at EL590. The third spur of the escarpment is located in Parcels 25-11B and 25-11, with a high point of EL590.

There are a few areas of surface water at the site, primarily ponds, which are mostly flooded sinkholes. An unnamed stream that originates on the escarpment crosses the site running parallel to Goodsprings Road and running to the south. It disappears into the subsurface in a sinkhole southwest of Marion Road (Route 91). A dry run (i.e. intermittent stream) is mapped as running from east to west across Parcel 25-11.

3.3 Geology – The Mississippian Plateau Province is named based on its geology, as it is underlain primarily by karst-prone carbonate units dated to the Mississippian Geologic Period. The following bedrock units are mapped within the survey area, and described from oldest to youngest:

Meramec Series
Rosiclare Sandstone and Fredonia Limestone Members of the Ste. Genevieve Limestone (Msrf)
The majority of the parcels at the Golden Solar site are underlain by these members of the Ste. Genevieve Limestone which are grouped together as one unit.

The base of the geologic stratigraphic column at the site is the Fredonia Limestone Member. This unit is 200 to 250 feet in thickness. It is typically divided into three interbedded facies, each 10 to 30 feet in thickness:

1. Light gray oolitic limestone
2. light to medium gray, finely crystalline and dolomitic limestone with some rare chert nodules

3. light to medium gray, medium to coarsely crystalline packstone comprised of fossil fragments

Because of a lack of outcrops this member of the Ste. Genevieve is often difficult to locate accurately in the field.

The Fredonia Limestone Member is overlain by the Rosiclare Sandstone, a 5 to 10-foot thick stratum of light greenish gray, very fine grained calcareous sandstone, grading laterally into oolitic limestone with sandy and shaley laminations.

Levias Limestone Member of the Ste. Genevieve Limestone (Msgl)
This is the uppermost member of the Ste. Genevieve Limestone, and it occurs around the base of the outlier hills of the Dripping Springs Escarpment described in the topography section above. The Levias Member is 20 to 30 feet thick, present as a light gray, finely crystalline or oolitic limestone. There are scattered thin lenses of greenish-gray sandy shale present at its base, probably rip-ups from the underlying Rosiclare Member.

Chester Series
Renault Limestone (Mre)
Lying above the Levias Limestone is the Renault Limestone, the basal member of the Chester Series of Mississippian age. The formation is 30 to 95 feet in thickness, and consists of limestone and shale. The limestone is light gray to medium gray, medium crystalline, with abundant fossil fragments and shaley partings. The Levias shale is calcareous, gray to greenish gray and reddish brown. The Renault is present on slopes of the Dripping Springs Escarpment and its outliers, lying above the Levias Member of the Ste. Genevieve Limestone.

Bethel Sandstone (Mbe)
This formation is only found at the highest elevation areas of the site. It caps the outlier hills and the upland above the crest of the Dripping Springs Escarpment. The Bethel consists of sandstone, siltstone and shale. Post depositional erosion of the underlying Renault Limestone formed channels where the Bethel Sandstone is present, usually from the middle to the top of the Renault Limestone in places.

3.4 Structural Geology – There is a single mapped fault present crossing parcel 25-11 from west to east. The fault is both “normal” (displaced vertically) with the downthrown block to the south, and “transverse” (displaced laterally). A significant number of sinkholes are located on the footwall surface to the north of the fault, and also on the hanging wall to the south; however, whether these features are directly associated with the fault itself is uncertain.

3.5 Karst Geology – The site is within the classic Pennyroyal Plateau region, an area characterized by tens of thousands of sinkholes, sinking streams, dry valleys, springs, and caverns. It is of note that the limestones of the Pennyroyal Lowland below the Dripping Springs Escarpment are not capped by the soft sandstone that is found on the Mammoth Cave Plateau to the east. For this reason, there is a much higher concentration of karst features located in this

area, most of which have open throats that lead directly into the subsurface, and are not clogged with sandstone residual sediment as are often found within the Mammoth Cave upland area.

Based on topographic mapping most of the site is internally drained. Nevertheless, as described in the topographic section above there is a surface stream running from north to south along Goodsprings Road. Most of the drainage to the site sinkholes is composed of broad "sheet flow". Nevertheless, there are a few features with poorly defined drainage channels. It is almost a certainty that the surface karst features at the site are interconnected in a complex network of subsurface conduits and caverns, however the actual groundwater flow in this area has never been fully characterized. It is likely however that the groundwater most likely eventually moves towards the south and west and emerges in springs that discharge their water to the Cumberland and Tennessee Rivers.

4.0 SURVEY RESULTS AND DISCUSSION

4.1 Data Review

Based on the methods and procedures for the data review as detailed previously in Section 2.1, the majority of identified suspect karst features (SKFs) were identified throughout the proposed site. Review of the existing high-resolution LiDAR datasets resulted in two hundred and ninety-six (296) suspect karst features. These SKF areas are highlighted in Figure 1 and indicate areas of karst development that were verified during the field survey.

Figure 1. Map of the Golden Solar site showing the SKF zones identified during the data review prior to field reconnaissance. Proposed site boundary (outlined in red), SKF (blue points and blue areas).

4.2 Field Survey

The field survey was performed from December 15, through December 22, 2020, by Sean Vanderhoff, Terracon Staff Geologist. The AOI was assessed for karst in the parcels where the geological mapping suggested there was the possibility of the development of karst terrain and/or where the data review indicated the possible presence of existing surface karst features (e.g. closed depressions, sinkholes, caves, or karst springs). A total of two hundred and eighty-six (286) karst features were verified in the field. A summary of the karst feature inventory documented during the field survey is included in map format in Appendix B, photolog format in Appendix C, and data format in Appendix D.

5.0 KARST RISK RANKINGS

5.1 Examples of Features Used to Develop Risk Ranking

A total of ten different types of karst features with varying characteristics impacting the risk ranking are shown below. The following exemplary karst feature "types" are representative of the various characteristics used to develop the risk ranking. In some cases, the following feature types may have more than one of the characters used in the risk ranking development, nevertheless they are included here as examples.

Type 1 – This type of karst feature is characterized by the presence of an open throat at the base and active erosion along the walls and parapet of the feature. These features are considered the highest risk since they are actively growing and may continue to collapse and widen during construction activities and post development. Two examples of such features are shown below in Image 1.

Image 1. (A) Example of a sinkhole with a very ragged edged parapet which appears to be under cut and widening. (B) Sinkhole with ragged edged parapet, drainage channel leading in from the top of the photo, and throats at the base of the bedrock outcrop.

Type 2 – This type of karst feature is characterized by the presence of an incised drainage channel leading to the karst feature indicating that focused drainage enters the structure, which

commonly results in active erosion and growth of the sinkhole (Image 2). Additionally, this type of feature is problematic because possible construction activities within the drainage may result in the uncontrolled flow of water transporting sediment and contaminants into the subsurface. Awareness of the drainage catchment extent and implementation of proper erosion and sediment controls (ESC) is crucial for these types of karst features.

Image 2. (A) Sinkhole with drainage channel which focuses drainage into this feature. Note the series of open throats along the base of the drainage channel. (B) Incised drainage channel leading to a sinkhole.

Type 3 – This type of karst feature has an open throat and rough, irregular parapet edges, indicating active erosion, collapse, and growth. The features are typically small (<5 feet) yet indicate that the area around the soil piping is undergoing sinkhole development which may widen, deepen, and affect the surrounding area (Image 3). It is commonplace to observe multiple soil piping features which may all be feeding into a single open throat in the subsurface. In the field these soil piping features were observed near or within patches of washed stone, which was presumably used by the property owners to fill in the features. The development of the soil piping features indicates that the filling in process was not sufficient to stop sinkhole development. These features pose a significant risk because the karst features are actively developing; therefore, official remediation or avoidance is necessary.

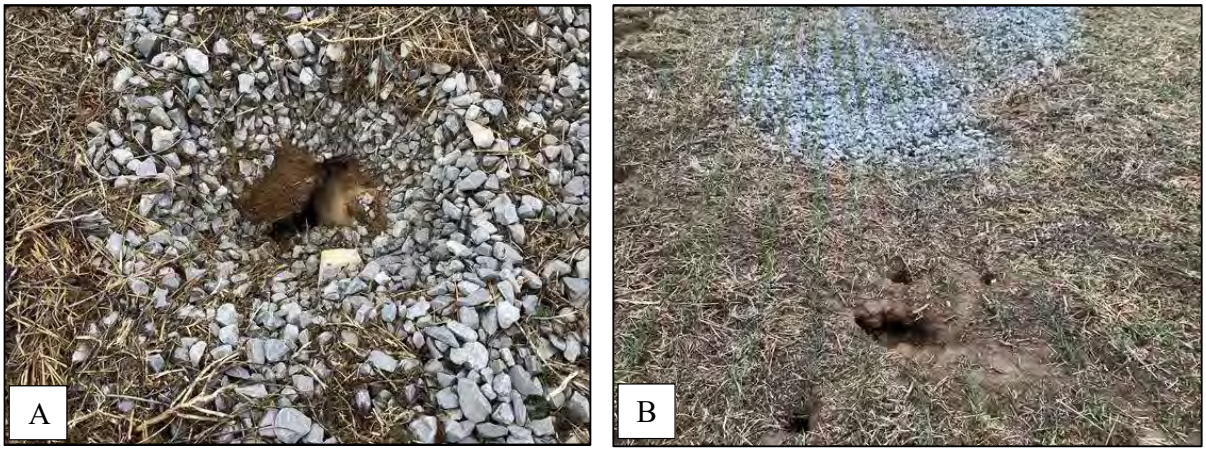


Image 3. (A) Open throat and soil piping present within a patch of washed stone. (B) Soil piping present along the edge of a filled in sinkhole, indicates that new conduits may have formed around the initial “fix”.

Type 4 – This type of karst feature is a sinkhole with a cave entrance located at the base or within the sidewall of the structure (Image 4). Caves pose a significant risk since they are relatively large openings that can receive surface runoff, may contain significantly sized chambers and passages below the surface, and may host cave fauna and sensitive biological habitats. Unless the cave is newly formed (Image 4A) the entrances are often stable and surrounded by bedrock as shown in Image 4B. Aside from having certified spelunkers enter the caves and map out the passages, geophysical techniques are often utilized to determine the presence, extent, depth, and size of cave passages in relationship to planned construction.

Image 4. Two examples of cave entrances located within sinkholes.

Type 5 – This type of karst feature has an open throat within the structure, yet the remainder of the sinkhole is overgrown with vegetation and the parapet appears to be stable[2] (Image 5). Although there is an opening present leading into the subsurface, the protection and stabilization of the feature by maintaining a vegetated buffer dramatically reduces the risk of impacting the subsurface habitat during construction activities.

Image 5. Small overgrown closed depressions. The open throats at the bases of these structures receive drainage but the vegetated buffer provides stability to the parapet.

[2] Circular or oval sinkhole parapets are assumed to have reached equilibrium.

Type 6 – This type of karst feature is characterized by bedrock bound open throats and rock outcrops either located at the base of sinkholes or within generally flat laying bedrock benches (Image 6). Although the open throats clearly connect to the subsurface, the bedrock does not present much risk of collapse or change in architecture unless the soil layer is very thin above an open chamber. The general shape of these features is anticipated to remain mostly static, yet the open throat should be buffered and protected from surface runoff during construction activities.

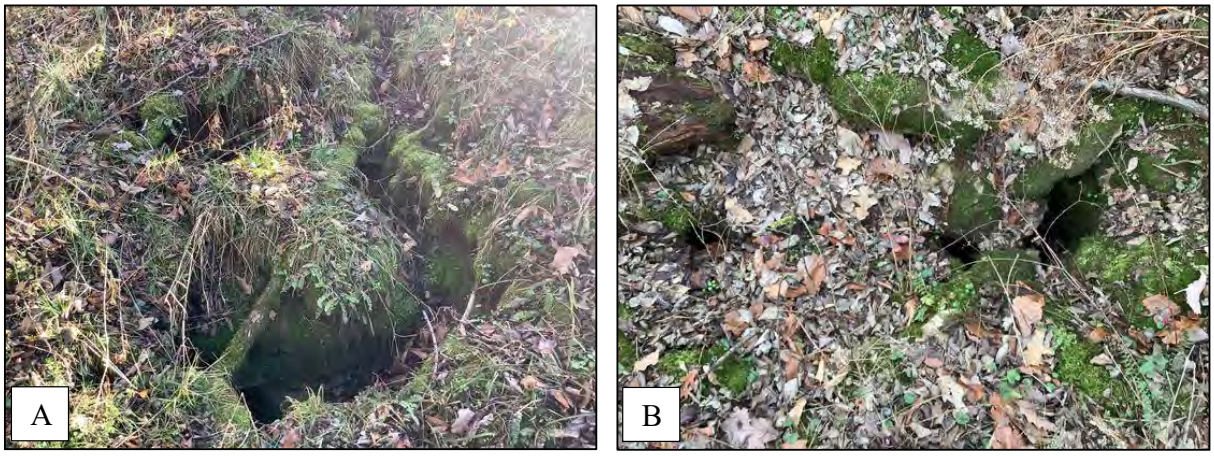


Image 6. (A) Bedrock bound open throat located at the end of a deeply incised channel. (B) Small bedrock bound open throat located at the base of a gentle closed depression, which only receives minor amounts of sheet flow.

Type 7 – This type of sinkhole has been used by farmers and landowners as a convenient place to deposit field rock, trees, trash, and a menagerie of various items and materials. This practice of depositing trash is highly discouraged since the contaminants originating from the infill material may quickly reach and may affect the subsurface aquifer. Nevertheless, these karst features were present within the AOI and most typically observed to be infilled with trash and occasional trees (Image 7). Since these may have been partially or completely filled, it is impossible to fully characterize these features for the presence or absence of an open throat. Therefore, we assume that there is an open throat at the base in order to be conservative for protection measures during construction activities.

Image 7. A series of filled in sinkholes with trash and debris

Type 8 – This type of feature is present as small depressions ranging in size from a few feet in length, width and depth, and are typically flush with the ground and exhibit minor/major soil raveling but no open throat (Image 8). Typically, little to no substantial growth of the feature occurs over time unless the topography and hydrology change.

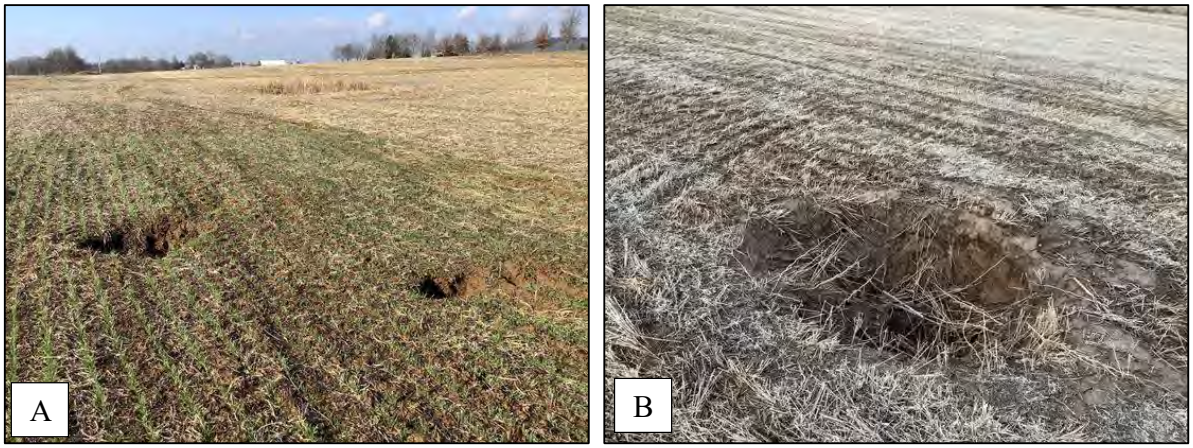


Image 8. (A) A series of small collapses within row crops. (B) Typical newly formed cover collapse feature.

Type 9 – These types of features are presumably sinkholes which had been filled in with washed stone or field rock by the property owner (Image 9). This "remediation" only serves as a temporary fix to the existing problem but may at times be enough to clog the throat or change the flow of water, resulting in apparent stabilization. If these features do not show signs of reactivation such as in the type 4 features, then they are considered to have minimal risk. Caution is recommended for the filled in features where the "remediation" is recent (e.g. disturbed ground) because there is a chance that the features may reactivate.

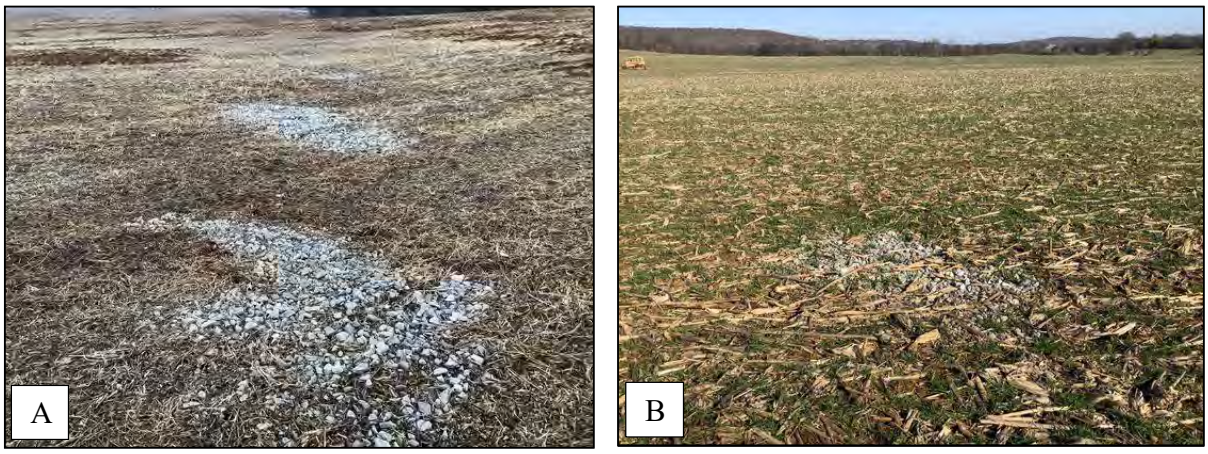


Image 9. (A) A series of filled in sinkholes with washed stone. (B) Filled in sinkhole that appears to have stabilized due to the developed nature of ground surface.

Type 10 – These types of sinkholes are present as broad and shallow depressions which may range in size from tens to hundreds of feet in diameter and are commonly referred to as "mature" or paleokarst sinkholes (Image 10). Mature sinkholes often have a roughly circular parapet outline, are bowl shaped, lacking any opening to the subsurface (i.e. "throat") or showing evidence

of active soil raveling or tension cracks around the parapet. Thus, whatever conduit or opening into the underlying karst aquifer that may have functioned to create the structure is probably now clogged with soil, which would act as a filter for water infiltrating from the surface. Therefore, this feature does not pose a significant risk to the karst groundwater aquifer.

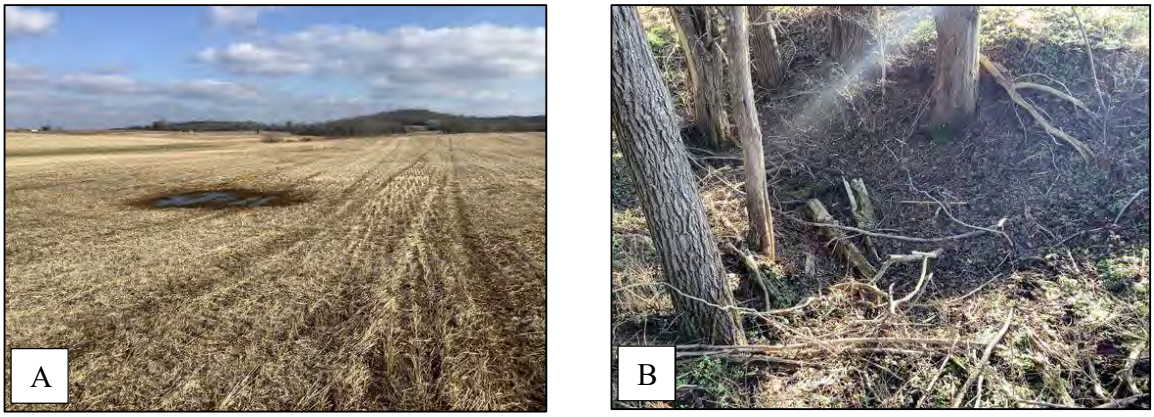


Image 10. (A) Broad and shallow mature sinkhole in a pasture with some water ponding. (B) Mature sinkhole covered in leaf litter within a forest.

25-1-202 – This feature is specifically worth discussing due to the fact that a large chamber was observed through a small opening flush with the ground. The surficial expression of the feature was in a patch of trees and brush surrounding three depressions. Two of the overgrown depressions (shown by the yellow dashed lines) and the relatively nondescript overview of the feature is shown in Image 11.

Image 11. Surface characteristics of karst feature 25-1-202.

Upon closer inspection of one of the small depressions (right feature in Image 11) a chamber approximately 8-10 feet deep was observed that "belled out" a few feet below the surface (Image 12A). This widening extends past the view from the surface and indicates that there is a significant void underneath the area, which is supported by a thin septum of limestone (Image 12B). Although there is no official scale, the plant life and leaf litter observed at the bottom of the chamber can be used to generally estimate the dimensions. We believe this feature to be high risk of future collapse and it should be buffered and avoided during all construction activities. A geophysical investigation may delineate the direction and extent of the observed passages.

Image 12. (A) Small depression at the surface leading to a significant chamber below. (B) View of the chamber from the entrance shows a room continuing to the top of the photograph and fallen boulders. Although there is no official scale, the plant life and leaf litter can be used to generally estimate the dimensions.

5.1 Risk Character Analysis and Results

Karst risk was assessed per karst feature through the compilation of a data matrix comprising of five karst feature variables. These variables were assessed per karst feature by analyzing the field notes, observing the photographs, and considering the overall context and resources from the desktop data review.

It is of note that this type of data analysis and reduction (i.e. character analysis) is designed to assist in minimizing subjectivity in assessment of karst features for overall risk. The tabulation of the data analysis is present in Appendix D, Table 2.

The variables (characters) embodied in creating the risk data matrix and resulting risk assessment summary are:

1. Presence of an open throat
2. Parapet characteristics
3. Degree of soil raveling
4. Drainage leading to the karst feature
5. Presence and quality of vegetation

Explanation of the Characters

Character 1 – The presence of an open throat (e.g. an opening into the subsurface, usually at the base of a sinkhole, an opening within a rock outcrop, or a cave entrance) in a karst feature is important since it may allow the unimpeded flow of surface runoff into the subsurface and eventually the groundwater table. This is a serious environmental concern to the groundwater and proper erosion and sediment control and buffering must be utilized during construction around these types of karst features.
Coding: Absent = 0; Small/Unknown = 1; Large/Open = 2

Character 2 - The shape and conformation of the parapet of each karst feature is important because the smoothness of the edge indicates the degree of erosion, growth, and overall activity of the karst feature. Typically, the rougher the parapet edge the more active the karst feature, and hence higher risk for the surface to continue to change.
Coding: Parapet Stable/Circular = 0; Irregular/Unstable = 1

Character 3 - Coeval with parapet shape changes and erosion, soil raveling of the sinkhole walls, throat, and subsidiary channels is a good indicator for sinkhole activity and risk. We further distinguish soil raveling into “minor raveling” and “raveling” to differentiate between levels of erosion and growth inside the karst feature.
Coding: No raveling = 0; Minor raveling = 1; Major/severe raveling = 2

Character 4 - An important factor that we note when assessing karst features, is evidence for surface drainage focused into the karst feature. This is typically manifested as matted down grass/vegetation in the direction of the sinkhole in the case of surface runoff (sheet flow) or distinct erosion and channel development where water commonly drains into the karst features. If the channel leading to the karst feature exhibits signs of erosion and downcutting, then this further supports the notion that the karst feature base level is decreasing and typically growing.
Coding: No evidence of drainage = 0; Sheet flow = 1; Drainage channel = 2

Character 5 - The presence, type, and state of vegetative cover surrounding and within the karst feature is an indicator for sinkhole development and the existence of a natural buffer. If little to no vegetative cover is present within the sinkhole then this indicates that it is changing fast enough to inhibit plant growth and that it is vulnerable to surface runoff. If the sinkhole is overgrown, then this signifies that the sinkhole is more stable and that a natural vegetated buffer is present, which functions to filter out suspended soil/contamination in surface runoff.
Coding: Fully vegetated = 0; Partially vegetated = 1; Soil/rock = 2

Based on the character analysis, we have assigned a low, moderate or high-risk category of each of the confirmed karst features present, specifically to this site. If the defined characteristics sum was 0 it is our interpretation that the feature is very low risk to site development. If the sum was 1-2, we believe the feature is a low risk to site development. If the sum was 3-4, we believe the feature is a moderate risk to site development. If the sum was 5-6, we believe the feature is a

high risk to site development. For features that their characteristics summed to 7-9, we believe present very high risk for continued karstification and site development throughout the operation of the proposed facility.

The degree of risk we identify for these karst features indicates our professional opinion regarding the likelihood of the karst feature becoming unstable or accelerate its growth. The risk rankings should be used as a planning tool to aid in assessing the overall risk of developing the site. However, it should be clearly understood that even karst features designated as low risk can become unstable and negatively impact the proposed development. It is impossible to eliminate the risk of karst features, but measures can be taken to reduce the risk of karst issues.

6.0 KARST RISK RECOMMENDATIONS

The karst risk recommendations entail a suite of approaches for each karst risk level. These various solutions for karst features will depend upon the type and scope of the project, the amount of cut and fill planned for the AOI, the presence of karst dependent rare threatened and endangered species, and the hydrologic significance of the karst aquifer (e.g. municipal drinking water supply). For the specific development of remediation, alternative foundations, or detailed additional studies, it is recommended that a Terracon karst geologist monitor construction activities to ensure that proper protocol is applied and to be available for consultation in the event that new karst features develop during grading activities onsite. The karst avoidance and/or mitigation measures for each karst feature risk level are presented below. Please note that the recommendations from a higher risk category can always be applied to lower features.

Very High Risk
- Avoidance and buffering
- Additional investigations may lower risk ranking

High Risk
- Avoidance and buffering
- Additional Investigations
- Remediation (If necessary)

Moderate Risk
- Avoidance and buffering
- Additional Investigations
- Remediation (If necessary)

Low Risk
- Span karst features

Very Low Risk
- Grade and monitor

The preferred option is to avoid all karst features if possible, since every feature does bring a variable amount of risk to both the project infrastructure and the karst aquifer. In addition, avoidance preserves the vegetated buffer, especially for features which have reached equilibrium naturally. For this avoidance scenario we recommend a minimum buffer of 25 feet which should remain in an undisturbed natural state through all periods of construction and subsequent facility operations. In addition, a 150-foot buffer should be established around each karst feature during construction where vehicles may not be refueled, and stockpiles of equipment or fuel should not be stored. The 150-foot buffer may need to be extended or modified if a significant drainage area has been delineated outside of an open throat feature. This does not mean construction is prohibited within this buffer, only that certain construction related activities primarily storage of fuel and equipment should not occur within this area.

In the case where avoidance is not possible then the next steps may include remediation of the karst features (e.g. reverse graded filter, pillow remediation, cap grouting, etc.) and conducting additional studies (Section 7.0) to shed light on the extent, characteristics, and impact that the karst feature may have on the surface. Remediation will vary for each karst feature based on characterization (e.g.: soil type, the architecture of the bedrock, and the local hydrology among many other factors). The type of remediation is typically determined upon subsurface exploration and excavation of the karst feature and identification and characterization of the bedrock bound throat if present at the soil bedrock interface.

Specifically, for solar field facilities it may be possible to span some of the karst features with the solar arrays, depending upon the length of the arrays and the spacing of the supporting piles. This option is limited to the low and very low risk karst features since their current characteristics do not suggest continued erosion and growth, and instead appear to have reached equilibrium naturally. It is important to note that periodic monitoring of these karst features post-construction is recommended.

It is permissible for the very low risk karst features to be graded per the construction plans, but it is imperative that the locations of these features be marked with survey grade GPS prior to grading activities. These areas should be monitored during construction in case the grading activities cause these features to reactivate.

Please note the risk rankings presented herein are based on the current condition of the site at the time of our study. Changes in the risks and changes in the karst features will occur over time. In addition, changes may occur due to changes in surface grades, surface hydrology, nearby construction activities such as blasting, installation of water supply wells, and other similar changes.

7.0 RECOMMENDATIONS REGARDING ADDITIONAL STUDIES

Prior to site development, additional studies are recommended. Non-invasive geophysical investigations should be used for any features other than very low risk. The preferred method would be electrical resistivity investigation (ERI), however other methods such as seismic and gravimetry may be utilized. The primary purpose of the ERI will be to reveal if there are any near-surface voids that could present a risk during construction or operation of the facility.

Other investigation methods including but not limited to drilling (hollow stem, air track probe, etc.), test pits, direct push borings, or other appropriate methods may be utilized to investigate specific karst features. The actual investigation method to be used will be based on the site-specific conditions, access, and the type of the karst features.

8.0 CLOSURE

The information presented herein has been based on the review of both proprietary and publicly available geologic information. However, it should be noted that karst is a dynamic landform and significant changes can occur over time. We understand that a geotechnical investigation will be completed at this site which may reveal additional subsurface karst issues. As indicated herein, karst features may be present below the ground surface that were not identified by this study. These features may not be identified until during construction. Accordingly, Terracon should be engaged during the construction phase of this project to provide oversight of the karst management plan, and to address karst features encountered during construction.

As indicated in this report, the bedrock and overlying soil below the site are susceptible to sinkhole development, and there can be extensive areas of shallow bedrock and shallow groundwater that can pose a risk to the site development process. Risk associated with these factors can be minimized during development with proper planning, design, and the control of site hydrology. Nevertheless, the client must recognize that risk of sinkhole and hydrologic-related damage to foundations, site infrastructure, and pavements does exist

Terracon has conducted these services in accordance with generally accepted geologic practices. No warranties, either expressed or implied, are made as to the professional services and recommendations presented herein.

Sincerely,
Terracon Consultants, Inc.

STATE OF KENTUCKY
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LICENSED PROFESSIONAL ENGINEER

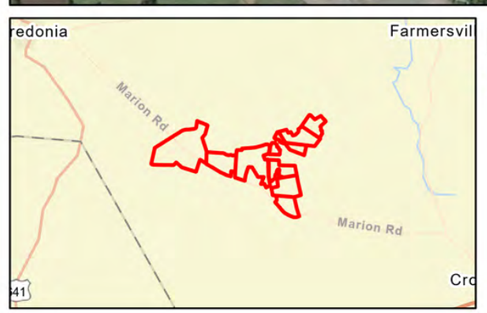
Joshua Valentino, PhD, PG
Senior Staff Geologist

Benjamin W. Taylor, PE, PG
Principal, Regional Manager

For Robert K. Denton Jr., CPG, LPSS
Karst SME

Appendices: Appendix A – Small Scale Maps
Appendix B – Large Scale Maps
Appendix C – Karst Feature Inventory — Not included with application due to length
Appendix D – Karst Feature Description Sheets — Not included with application due to length

APPENDIX A
SMALL SCALE MAPS



Legend

Project Site

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

0 0.25 0.5 1 Miles

Project No.:	57205095
Date:	Jan 2021
Drawn By:	JDV
Reviewed By:	BWT

Terracon
13050 Eastgate Park Way, Suite 101 Louisville, Kentucky 40223
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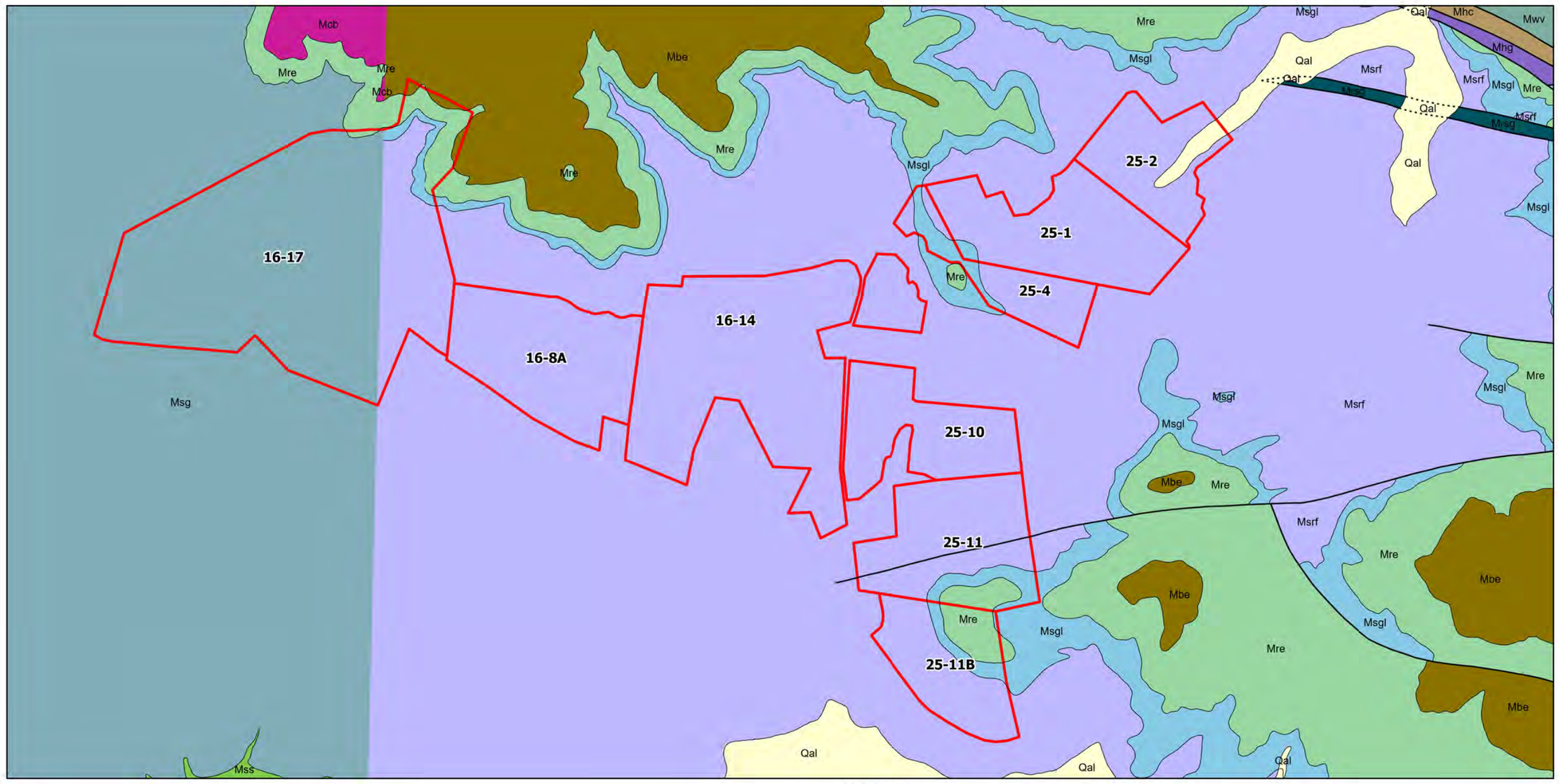
Golden Solar Site Map

Golden Solar, LLC
National Grid Renewables
Princeton, Caldwell County, Kentucky

Map

1



Legend

- Alluvium
- Bethel Sandstone
- Cypress Sandstone, Paint Creek Limestone, and Bethel Sandstone
- Hardinsburg Sandstone and Golconda Formation
- Hardinsburg Sandstone, Golconda Formation, and Cypress Sandstone
- Renault Limestone
- Renault Limestone and Ste. Genevieve Limestone
- Waltersburg Sandstone and Vienna Limestone
- Levias Limestone Member, Ste. Genevieve Limestone
- Rosiclare Sandstone Member and Fredonia Members, Ste. Genevieve Limestone
- Ste. Genevieve Limestone
- St. Louis Limestone and Salem Limestone

Project Site

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap
Kentucky Geologic Survey 1:24000 Geology Maps

0 0.25 0.5 1 Miles

Project No.:	57205095
Date:	Jan 2021
Drawn By:	JDV
Reviewed By:	BWT

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Golden Solar Geology Map

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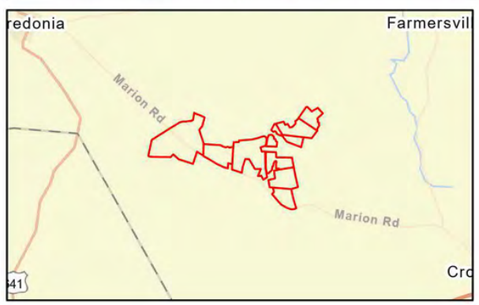
National Grid Renewables
Princeton, Caldwell County, Kentucky

Map

2

APPENDIX B
LARGE SCALE MAPS



Legend

- Project Site
- Index Maps

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

0 0.25 0.5 1 Miles

Project No.:	57205095
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Golden Solar Index Map

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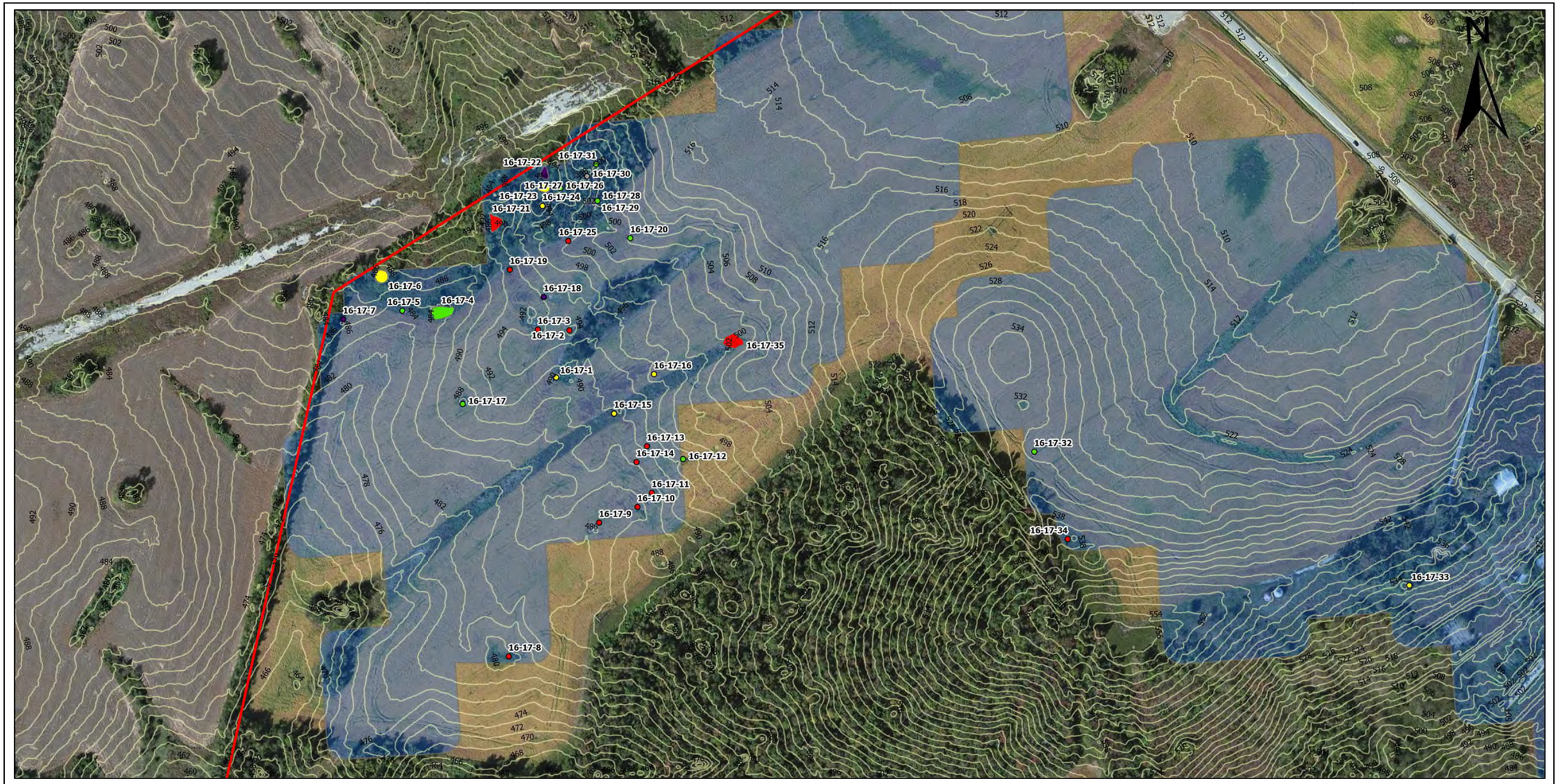
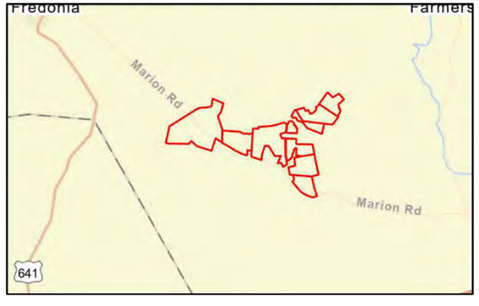
Princeton, Caldwell County, Kentucky

Map

1





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap
2 foot contours derived from LiDAR data
LiDAR data from KyFromAbove
Solar array data from data received from client (Golden Solar.kmz, 11/18/2020)

0 250 500 1,000 Feet

Project No.:	57205095
Date:	Jan 2021
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Reviewed By:	BWT

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Golden Solar Karst Feature Risk Map

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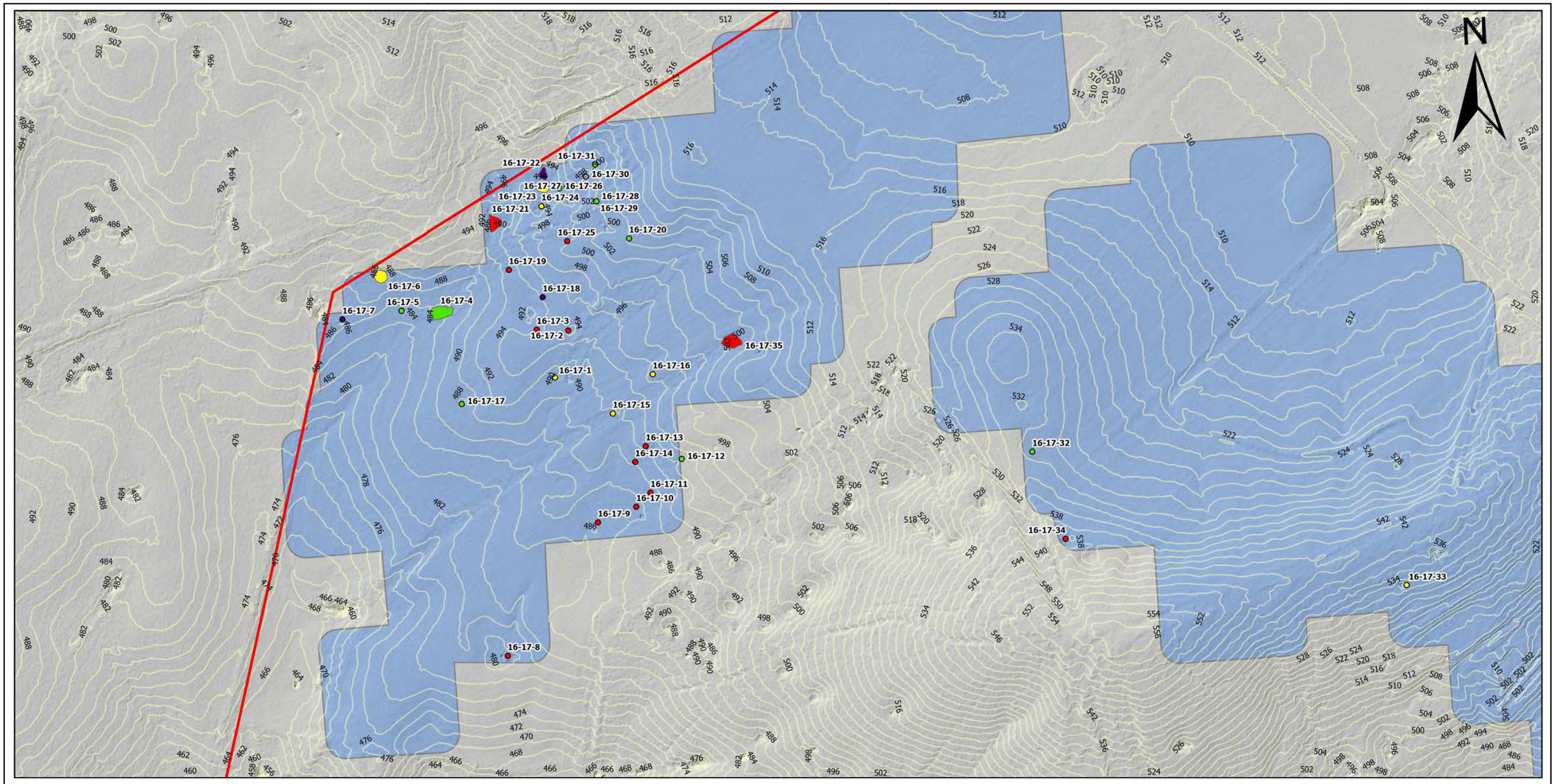
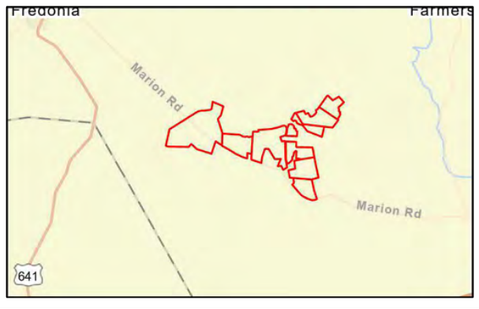
National Grid Renewables
Princeton, Caldwell County, Kentucky

Map

A1





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
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- Very Low

Area Karst Risk

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Golden Solar Karst Feature Risk Map

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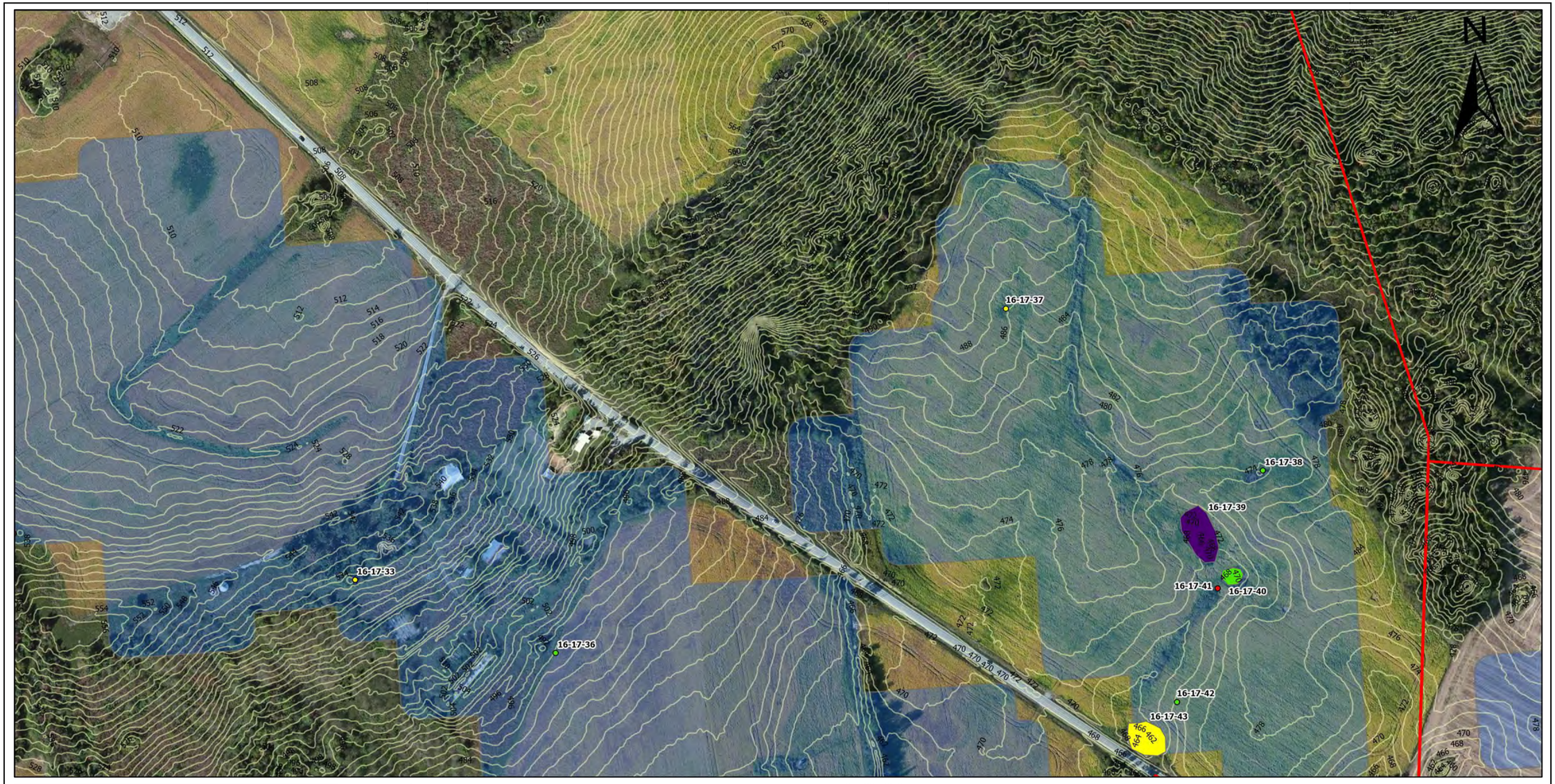
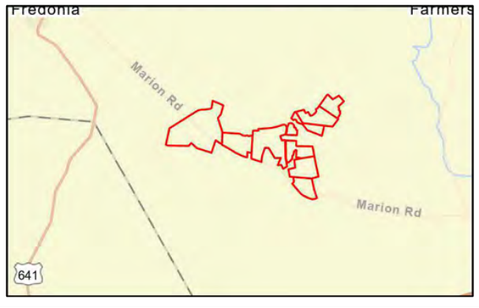
National Grid Renewables
Princeton, Caldwell County, Kentucky

Map

B1





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
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- Moderate
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Golden Solar Karst Feature Risk Map

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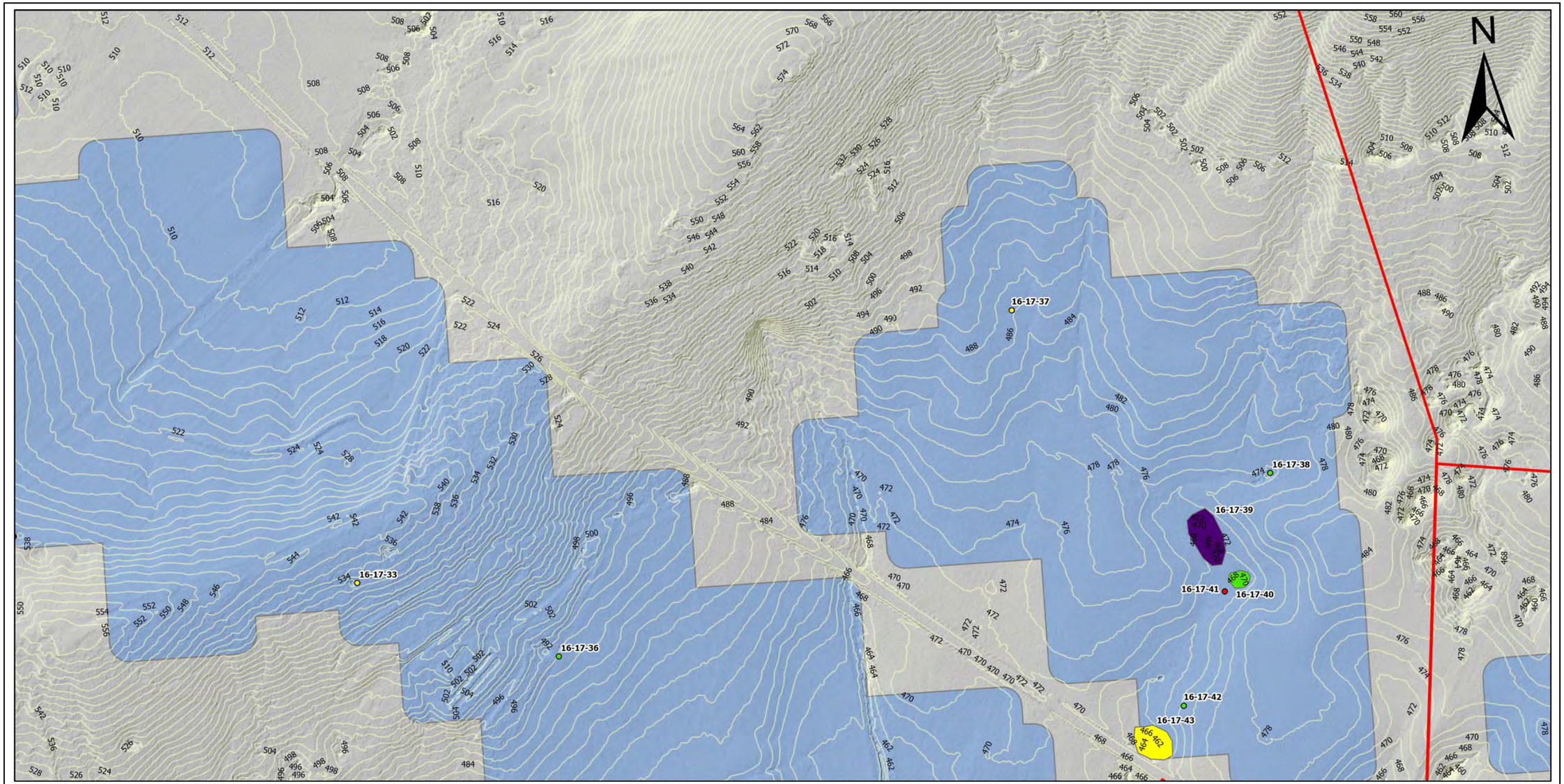
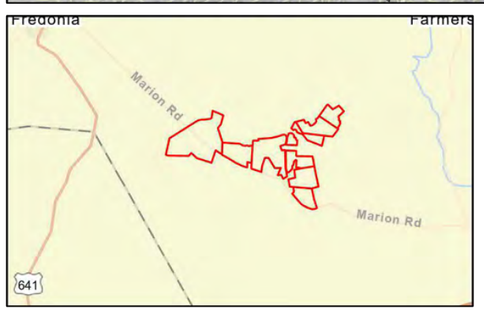
Princeton, Caldwell County, Kentucky

Map

A2





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
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DATA SOURCES:
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0 250 500 1,000 Feet

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Golden Solar Karst Feature Risk Map

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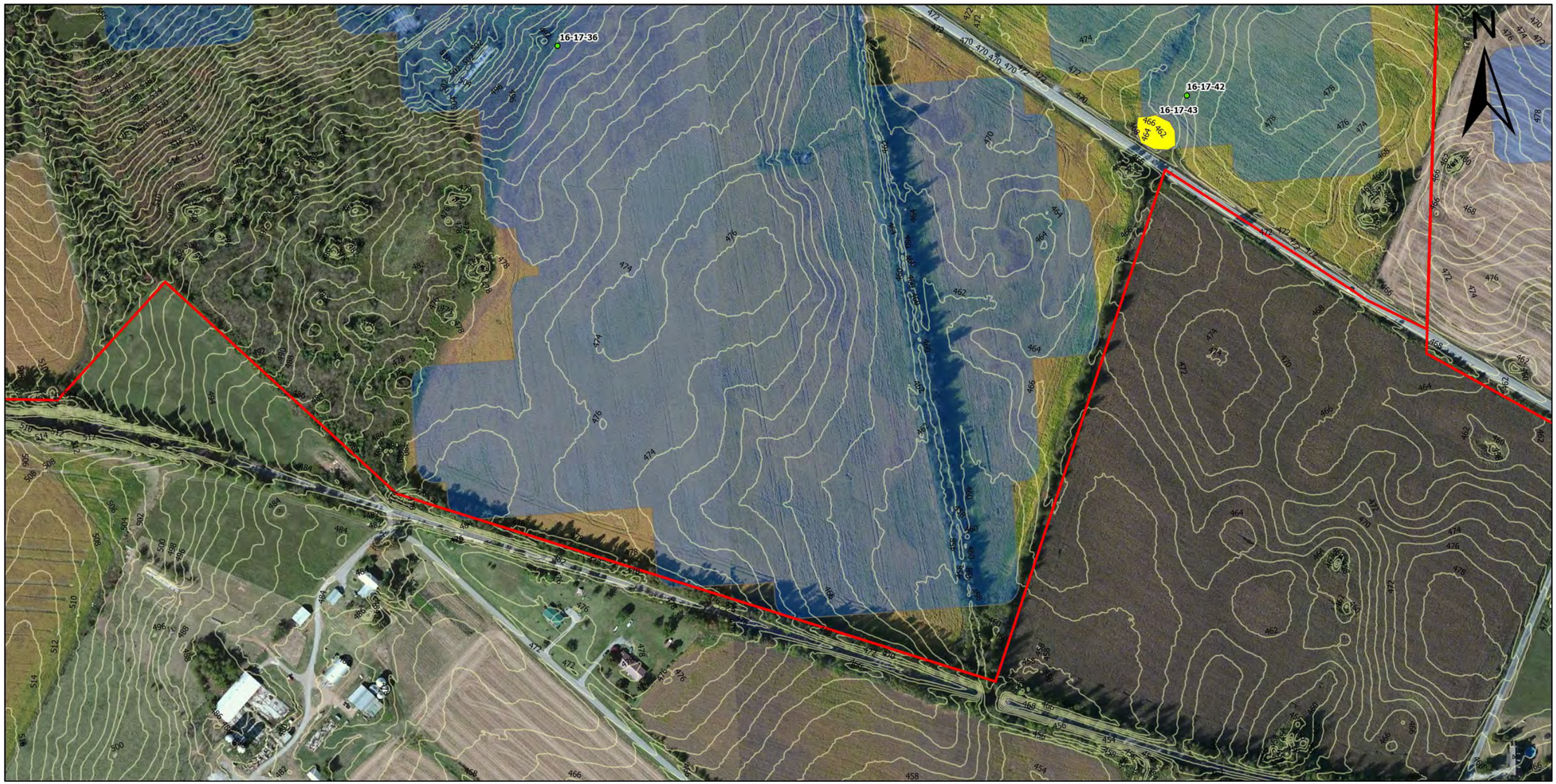
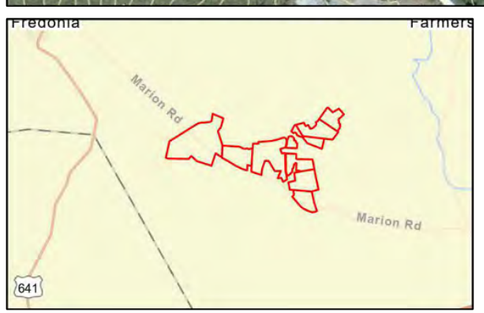
National Grid Renewables
Princeton, Caldwell County, Kentucky

Map

B2





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
- Moderate
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- Very Low

DATA SOURCES:
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Solar array data from data received from client (Golden Solar.kmz, 11/18/2020)

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Golden Solar Karst Feature Risk Map

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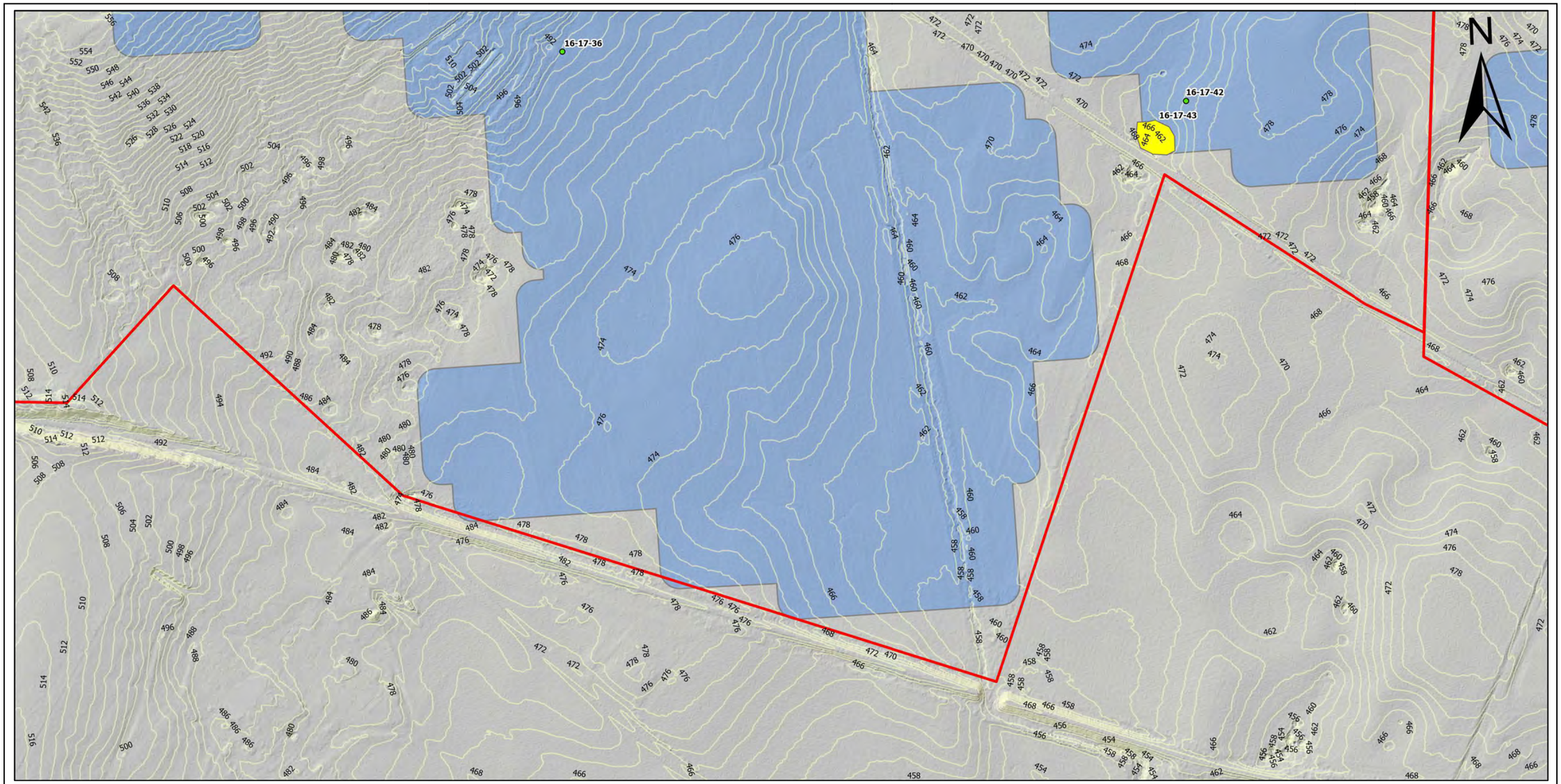
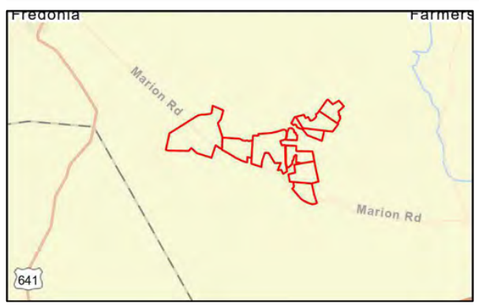
Princeton, Caldwell County, Kentucky

Map

A3





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

DATA SOURCES:
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LiDAR data from KyFromAbove
Solar array data from data received from client (Golden Solar.kmz, 11/18/2020)

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Golden Solar Karst Feature Risk Map

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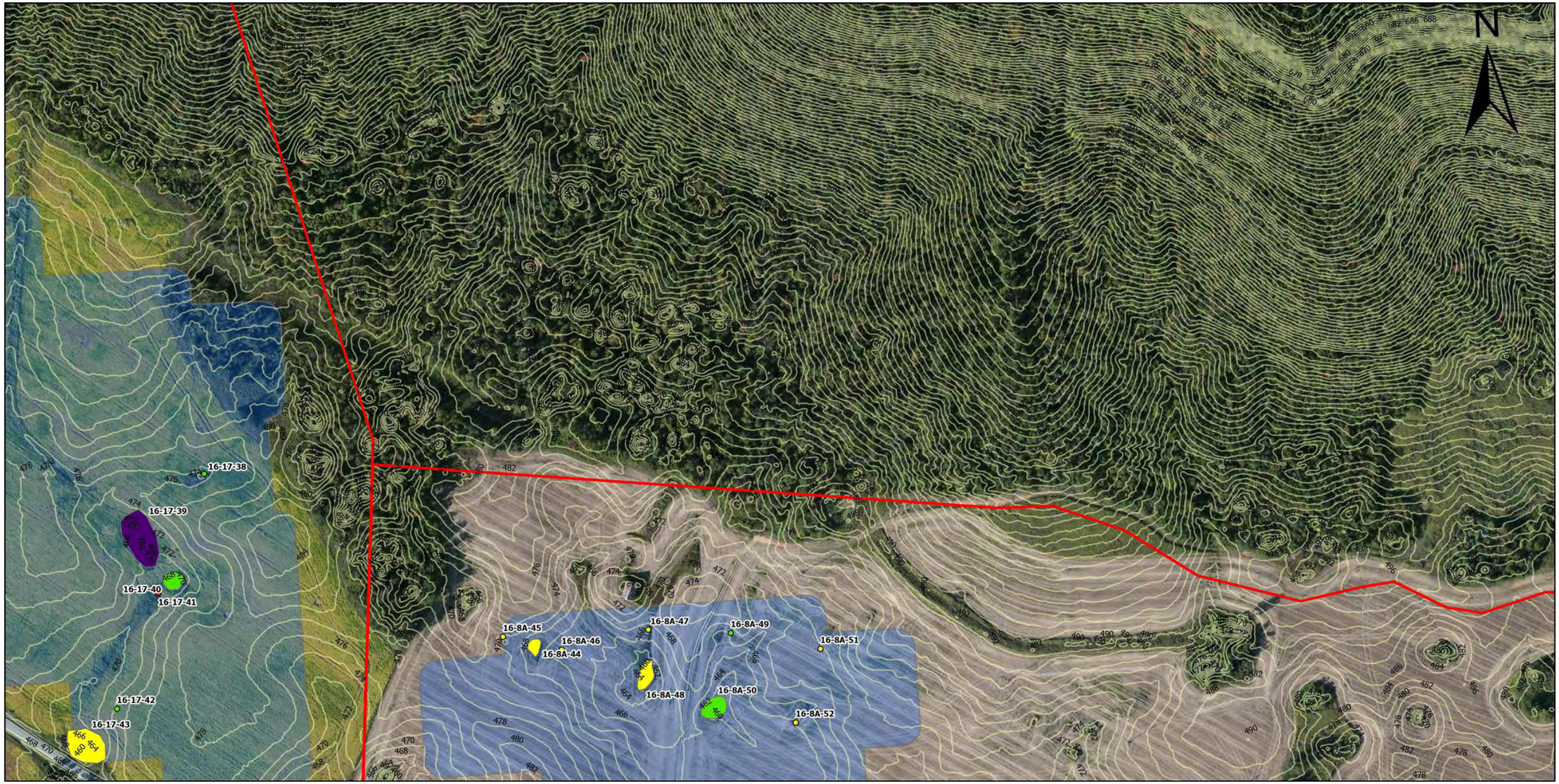
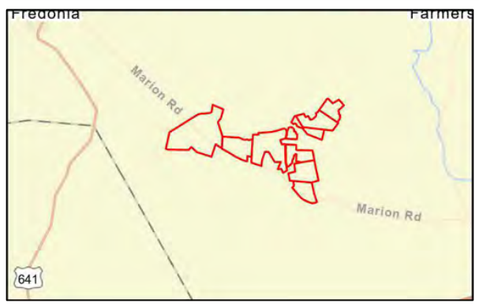
Map

B3





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

DATA SOURCES:
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Solar array data from data received from client (Golden Solar.kmz, 11/18/2020)

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Golden Solar Karst Feature Risk Map

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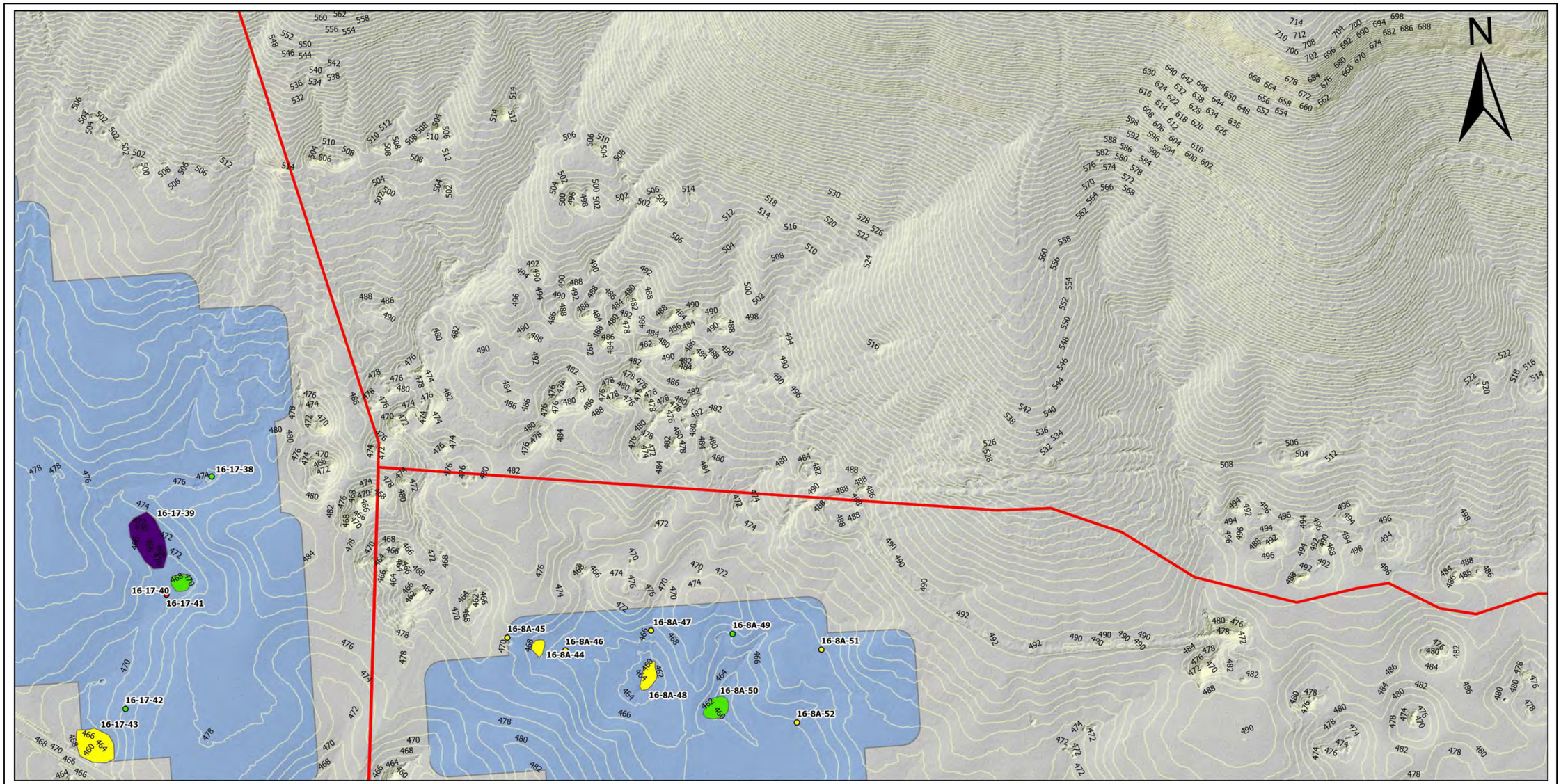
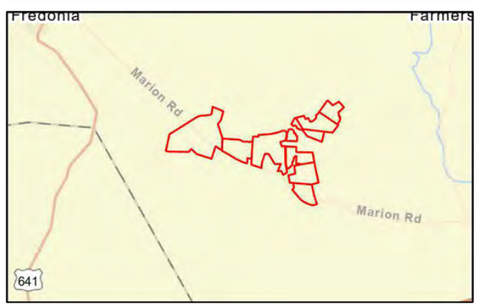
Map

A4





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

DATA SOURCES:
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LiDAR data from KyFromAbove
Solar array data from data received from client (Golden Solar.kmz, 11/18/2020)

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Golden Solar Karst Feature Risk Map

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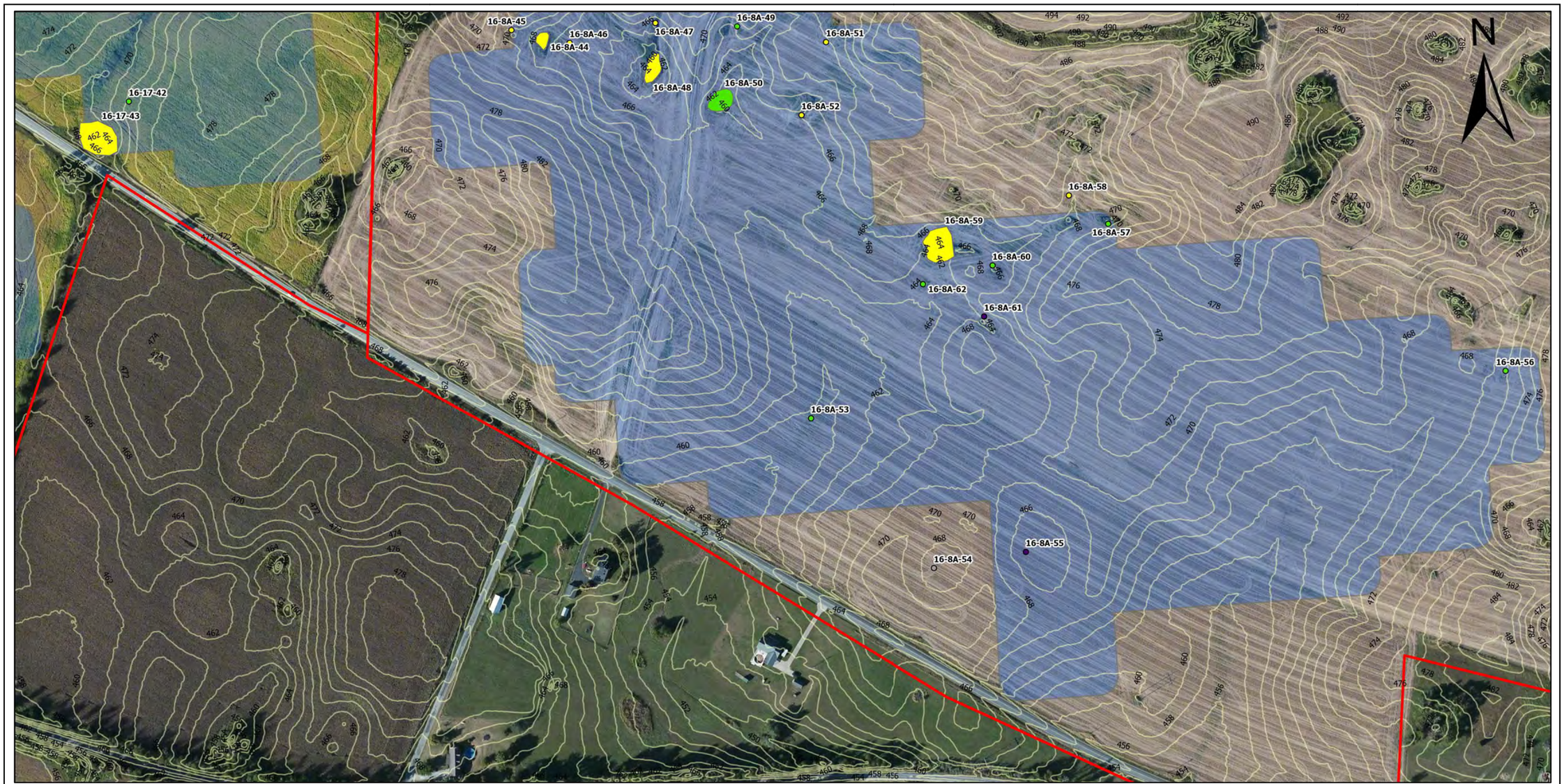
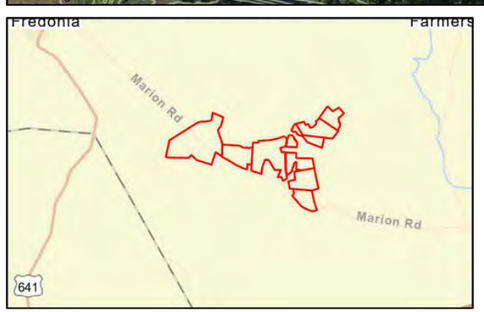
National Grid Renewables
Princeton, Caldwell County, Kentucky

Map

B4





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk	Area Karst Risk
Very High	Very High
High	High
Moderate	Moderate
Low	Low
Very Low	Very Low

DATA SOURCES:
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Golden Solar Karst Feature Risk Map

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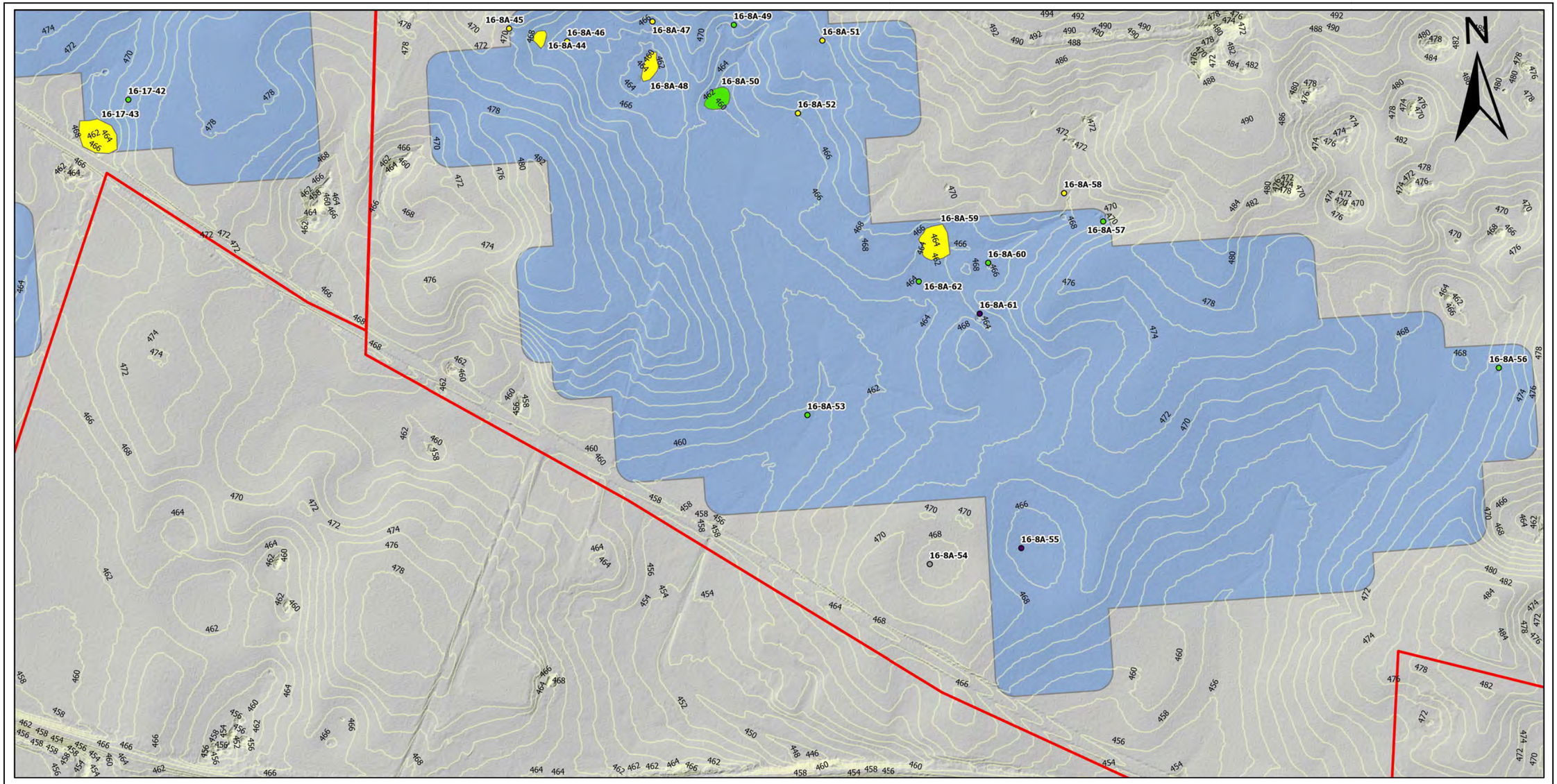
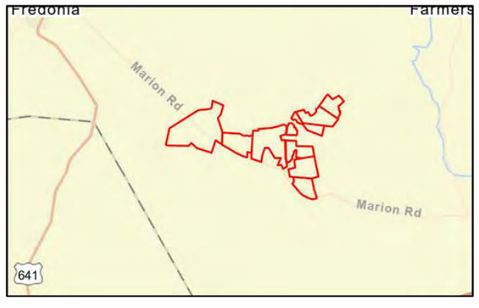
Princeton, Caldwell County, Kentucky

Map

A5





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
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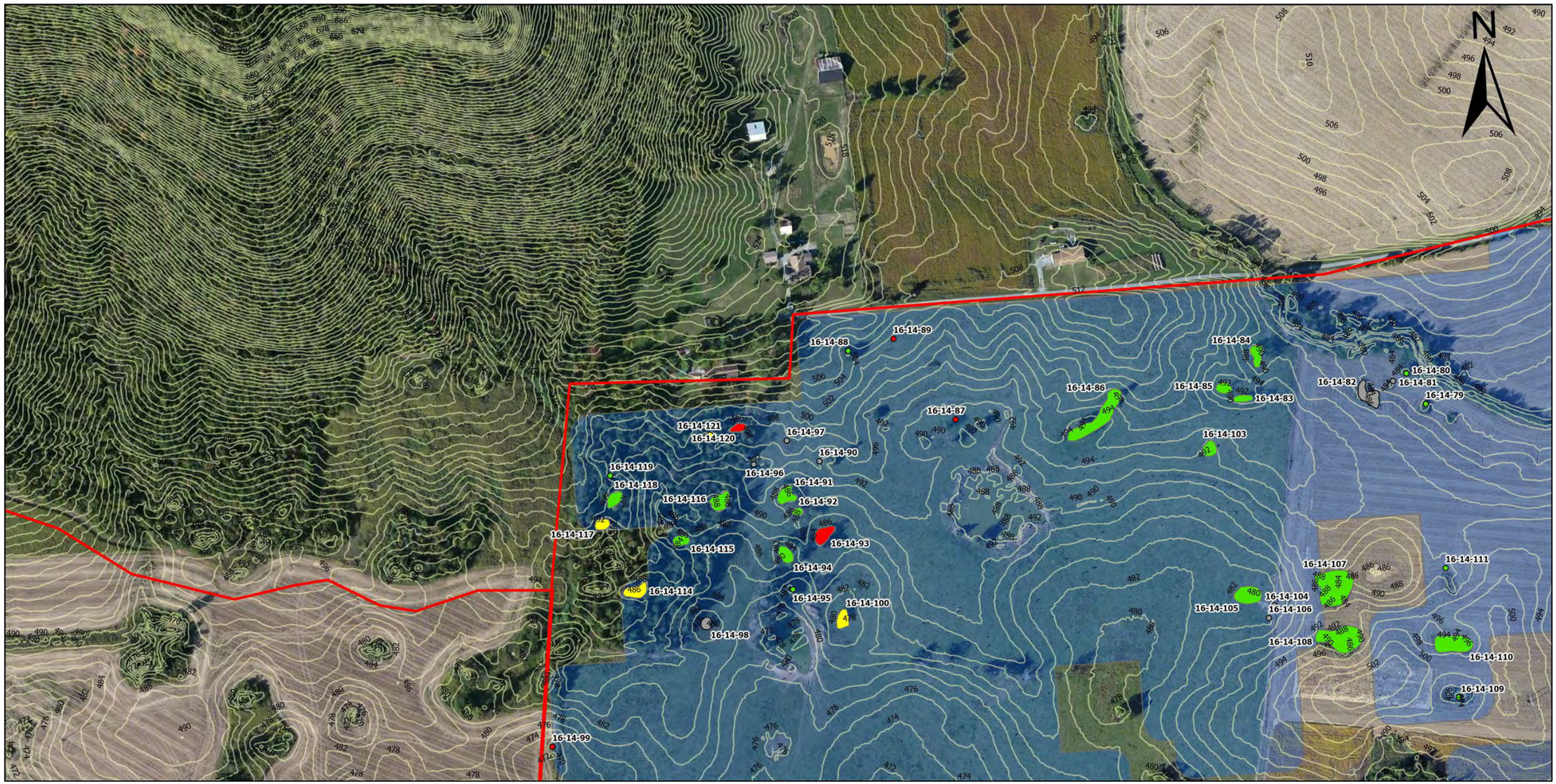
Map

B5



Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk	Area Karst Risk
Very High	Very High
High	High
Moderate	Moderate
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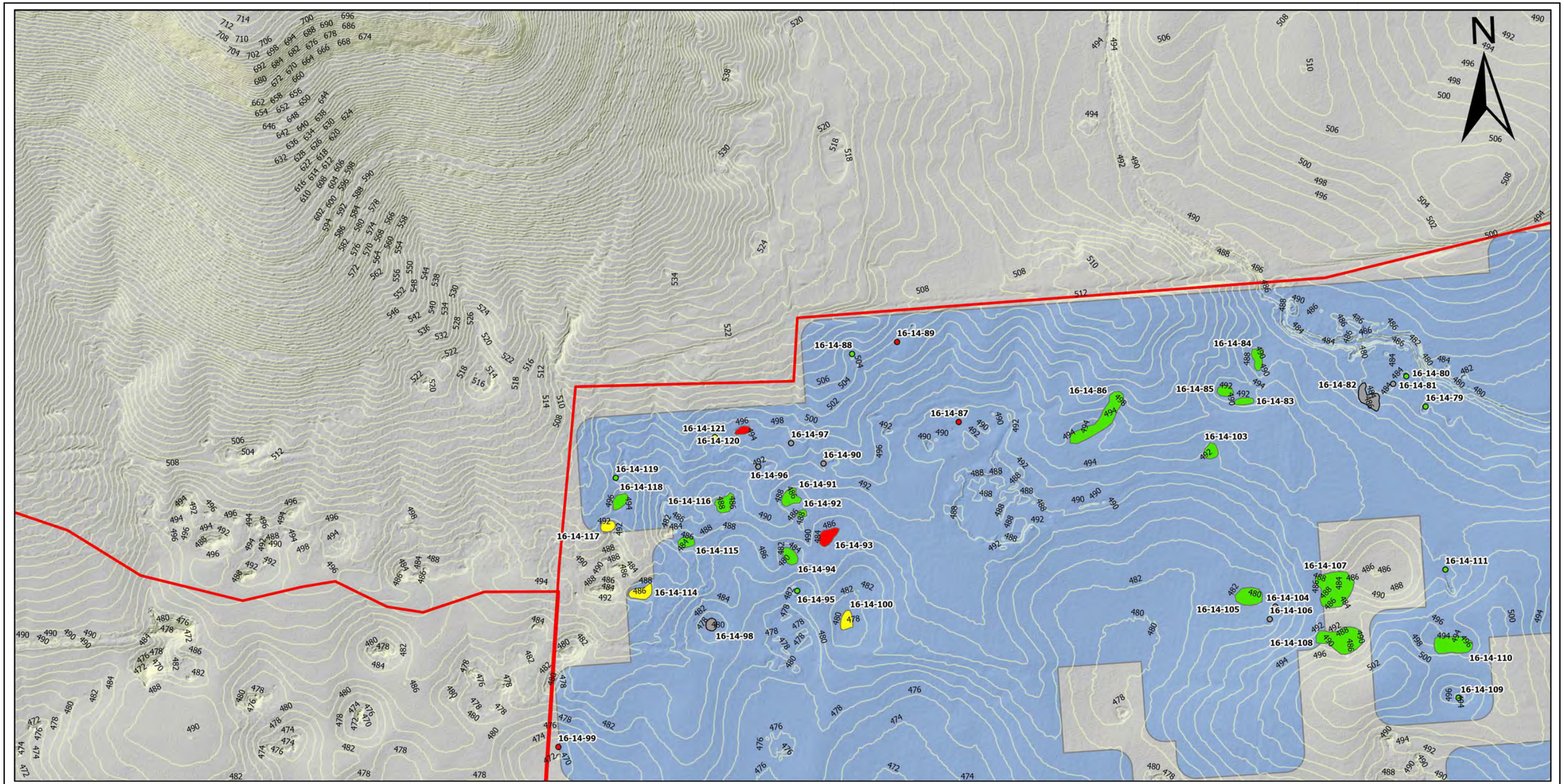
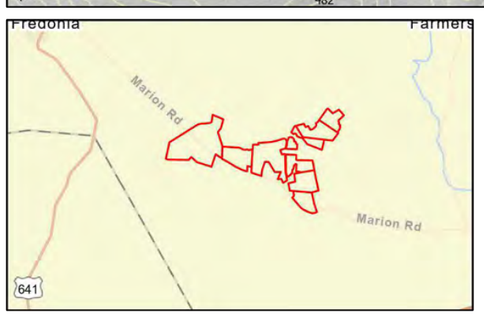
Map

A6





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

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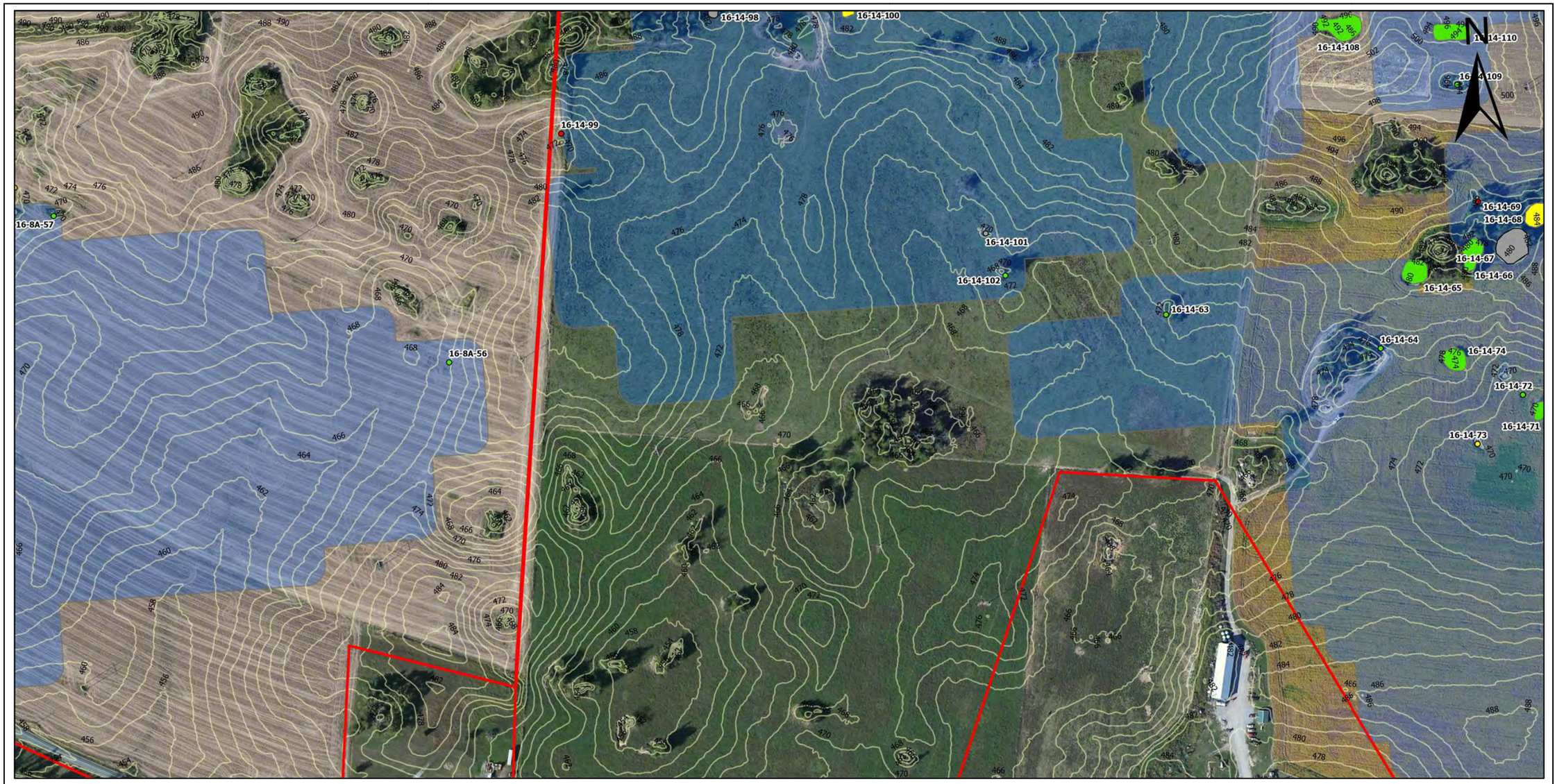
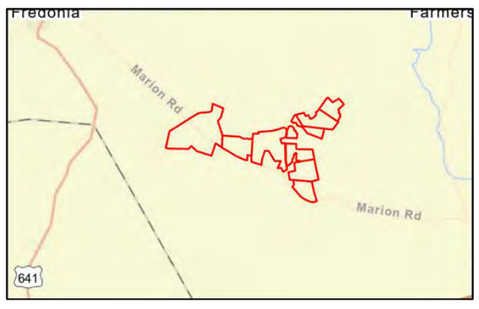
Map

B6





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

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- Low
- Very Low

Area Karst Risk

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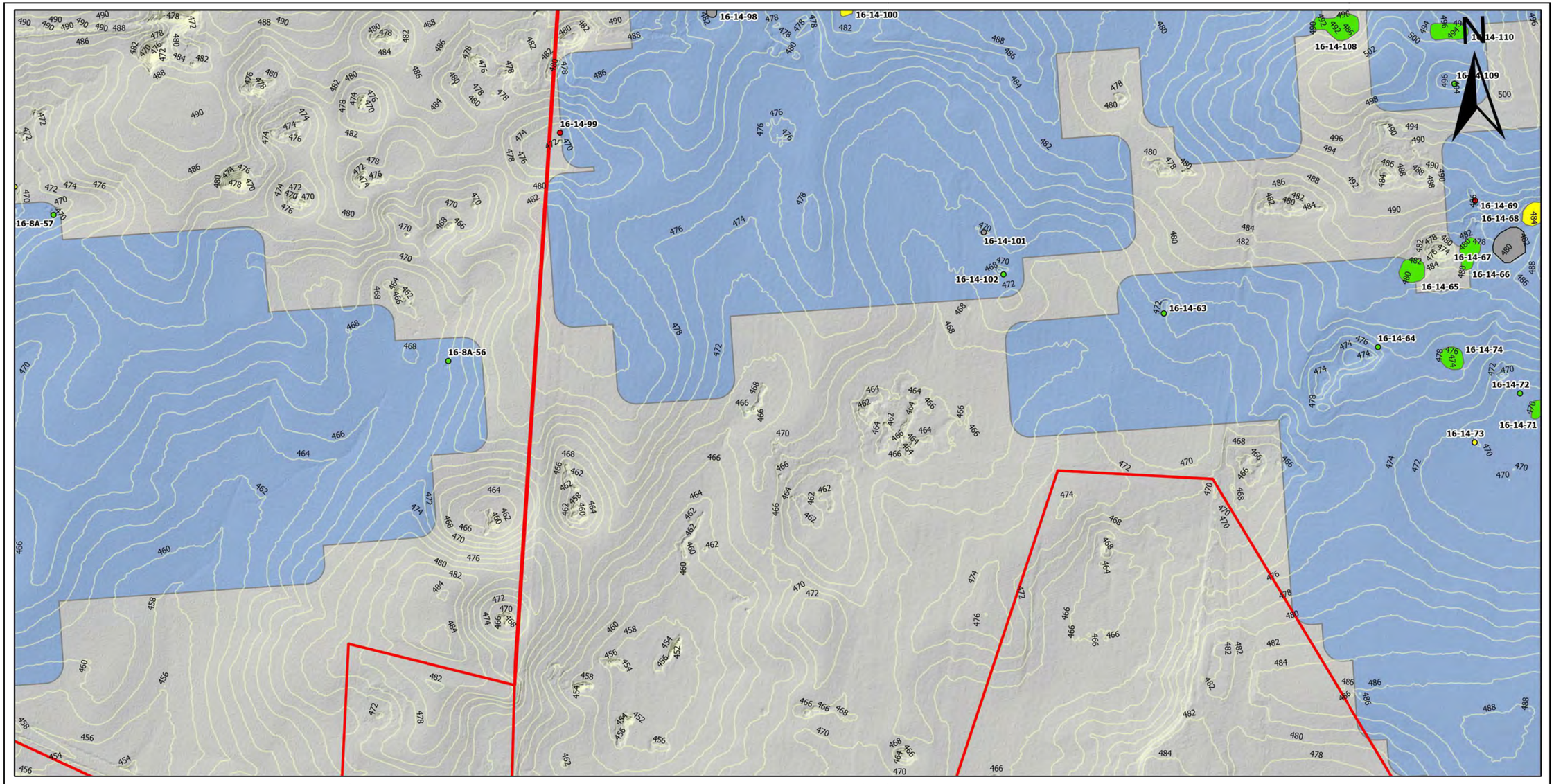
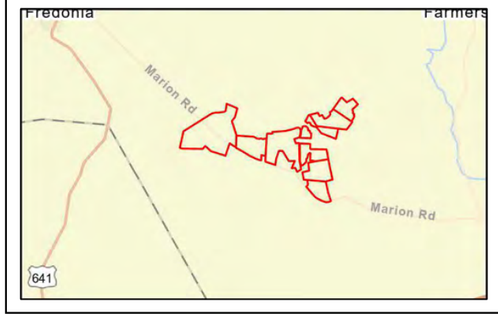
Princeton, Caldwell County, Kentucky

Map

A7





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

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Area Karst Risk

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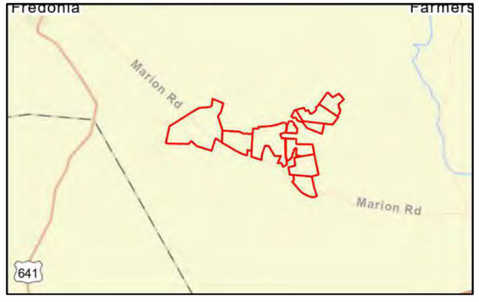
Map

B7



Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap
2 foot contours derived from LiDAR data
LiDAR data from KyFromAbove
Solar array data from data received from client (Golden Solar.kmz, 11/18/2020)

0 250 500 1,000 Feet

Project No.:	57205095
Date:	Jan 2021
Drawn By:	JDV
Reviewed By:	BWT

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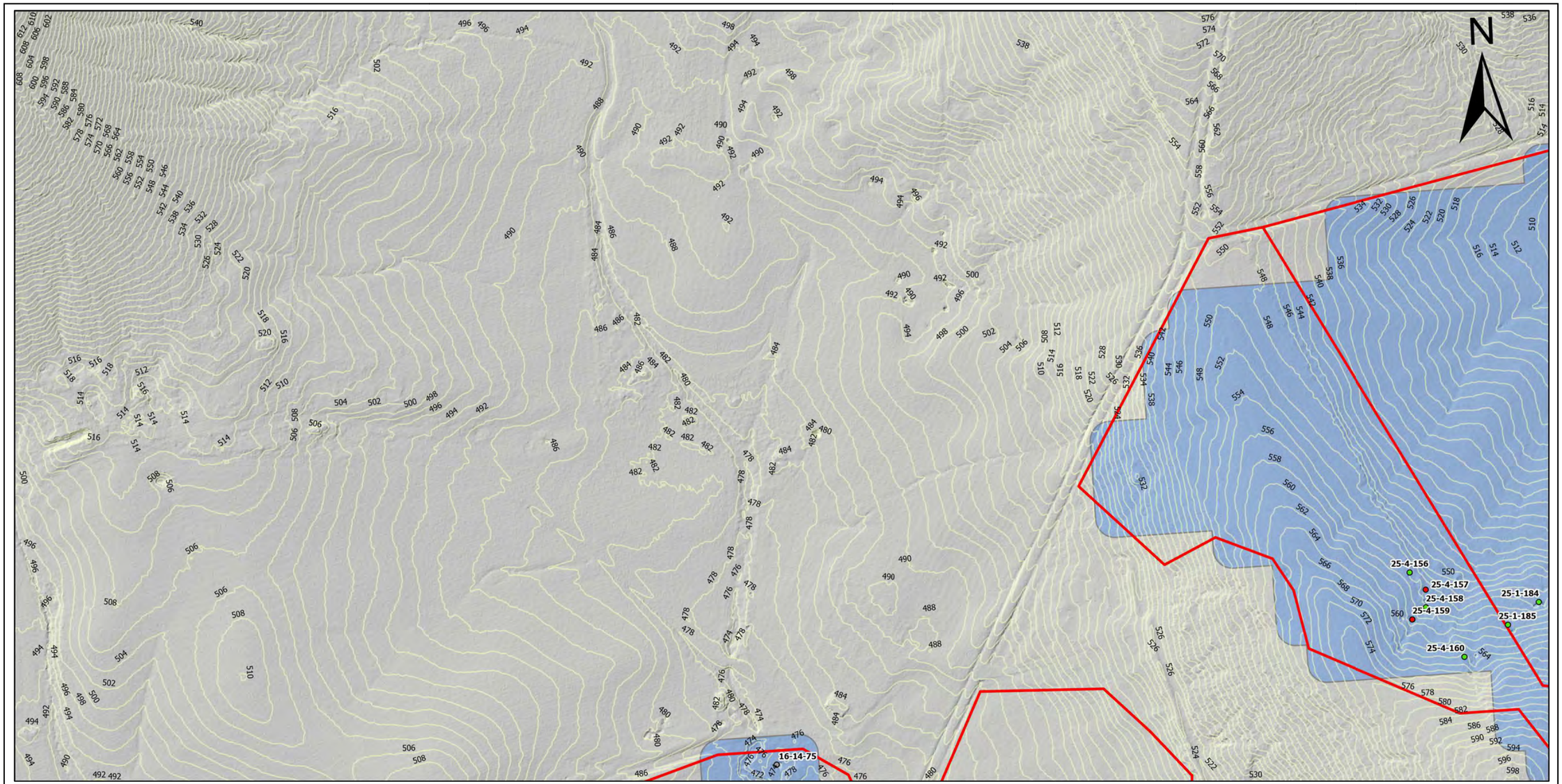
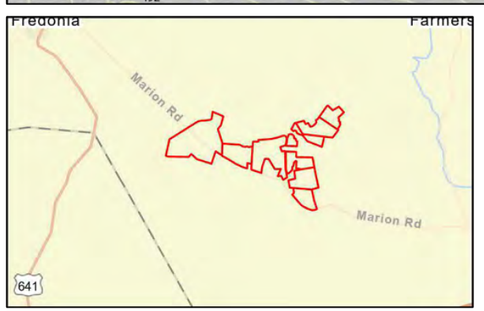
Golden Solar Karst Feature Risk Map

Golden Solar, LLC
National Grid Renewables
Princeton, Caldwell County, Kentucky

Map

A8





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

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Area Karst Risk

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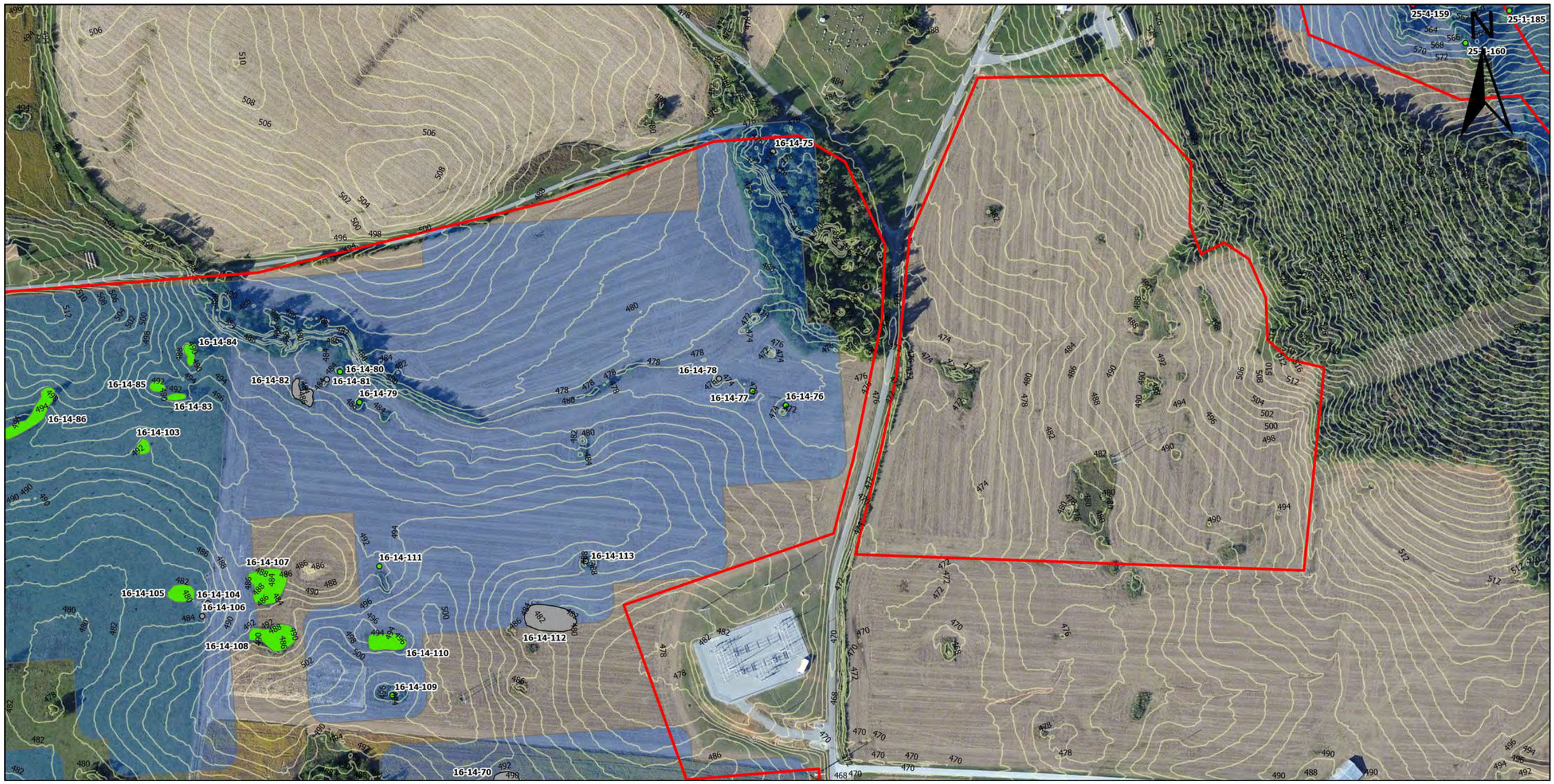
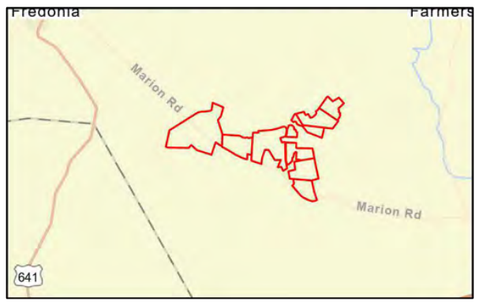
B8





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

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Area Karst Risk

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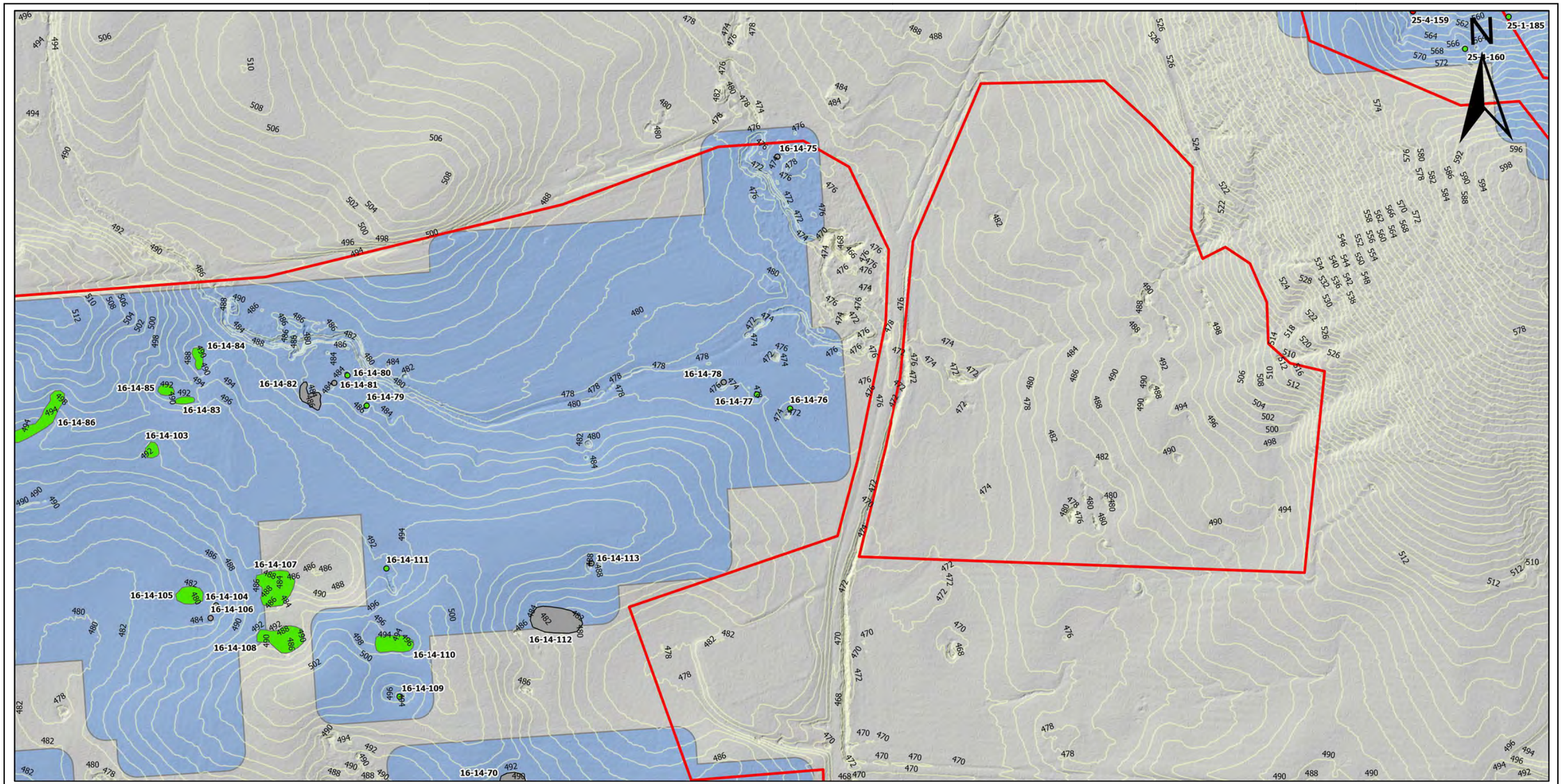
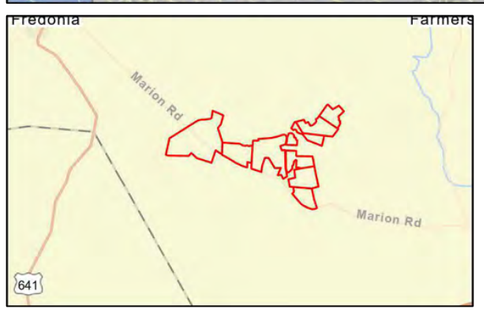
A9





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

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Area Karst Risk

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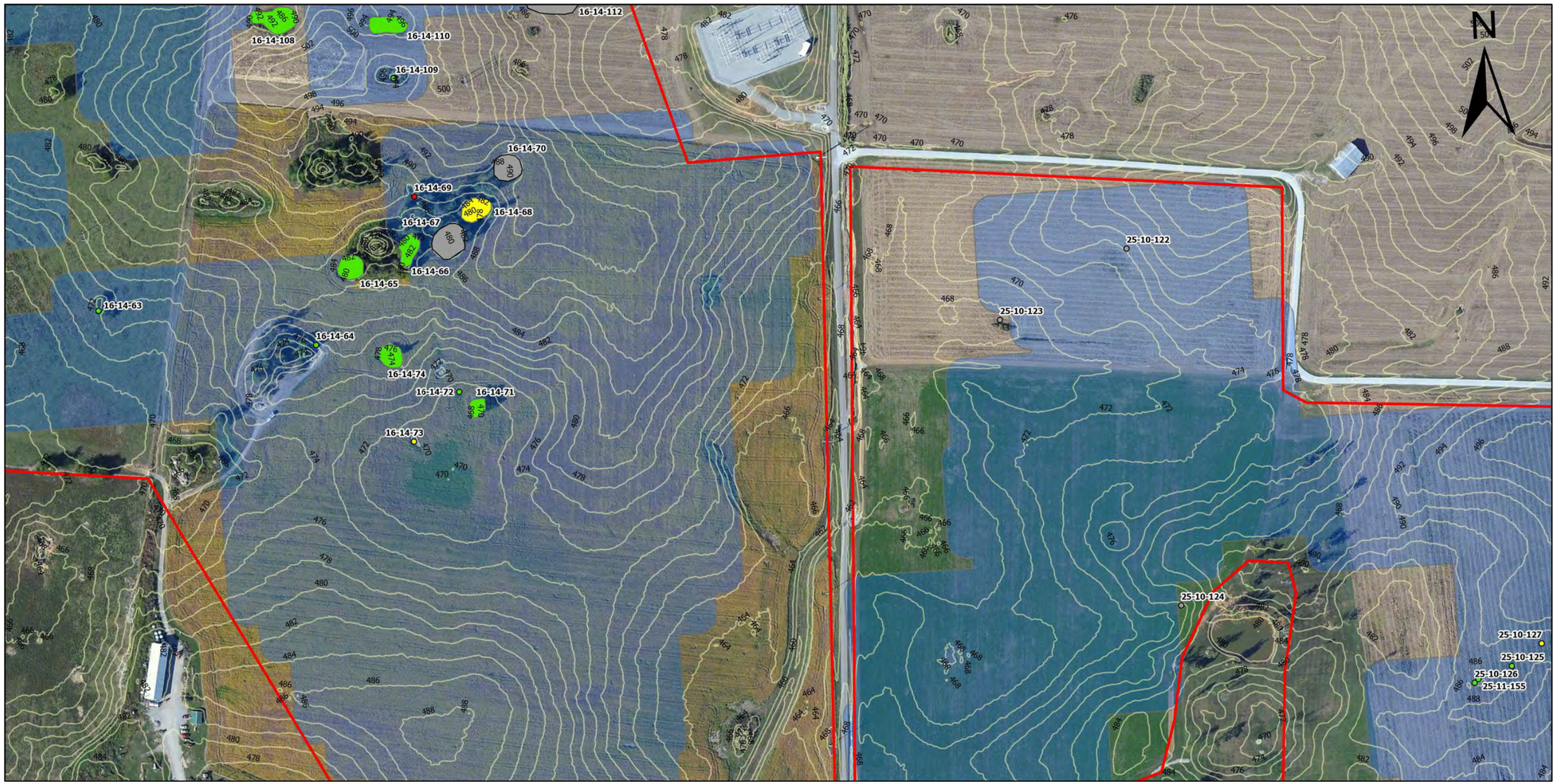
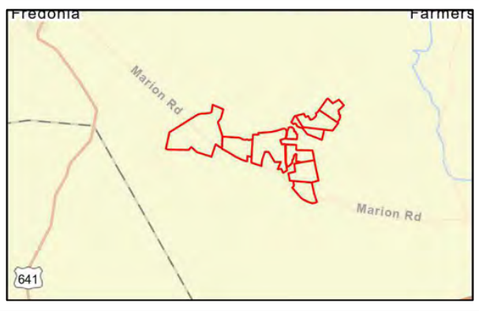
B9





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

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- Low
- Very Low

Area Karst Risk

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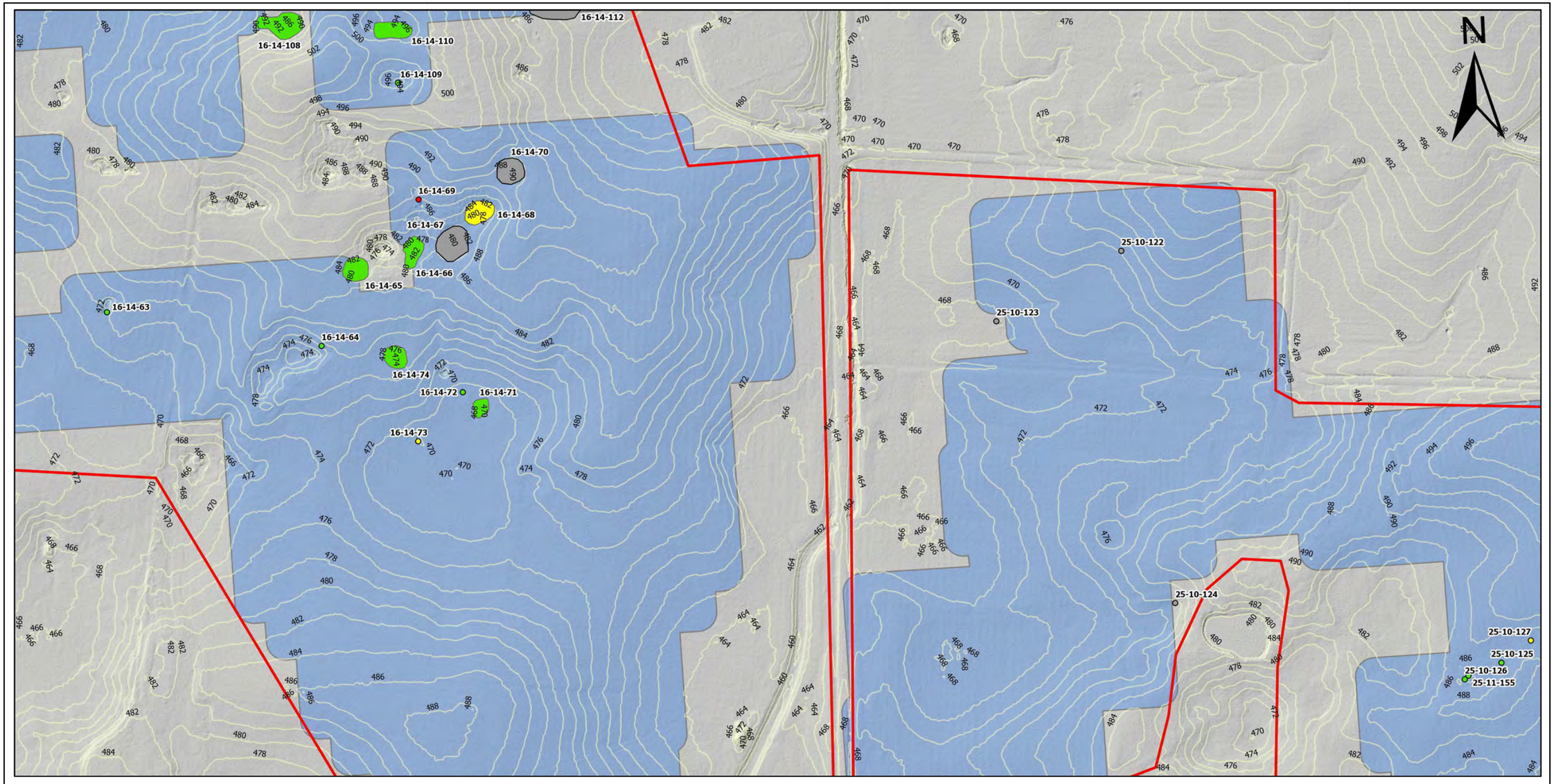
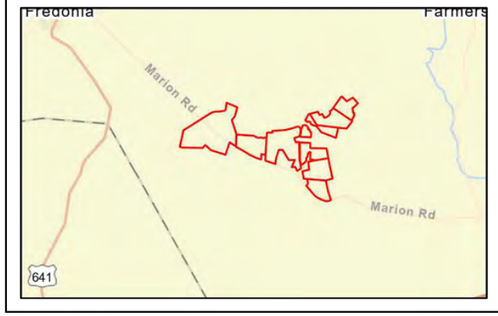
A10





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
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- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
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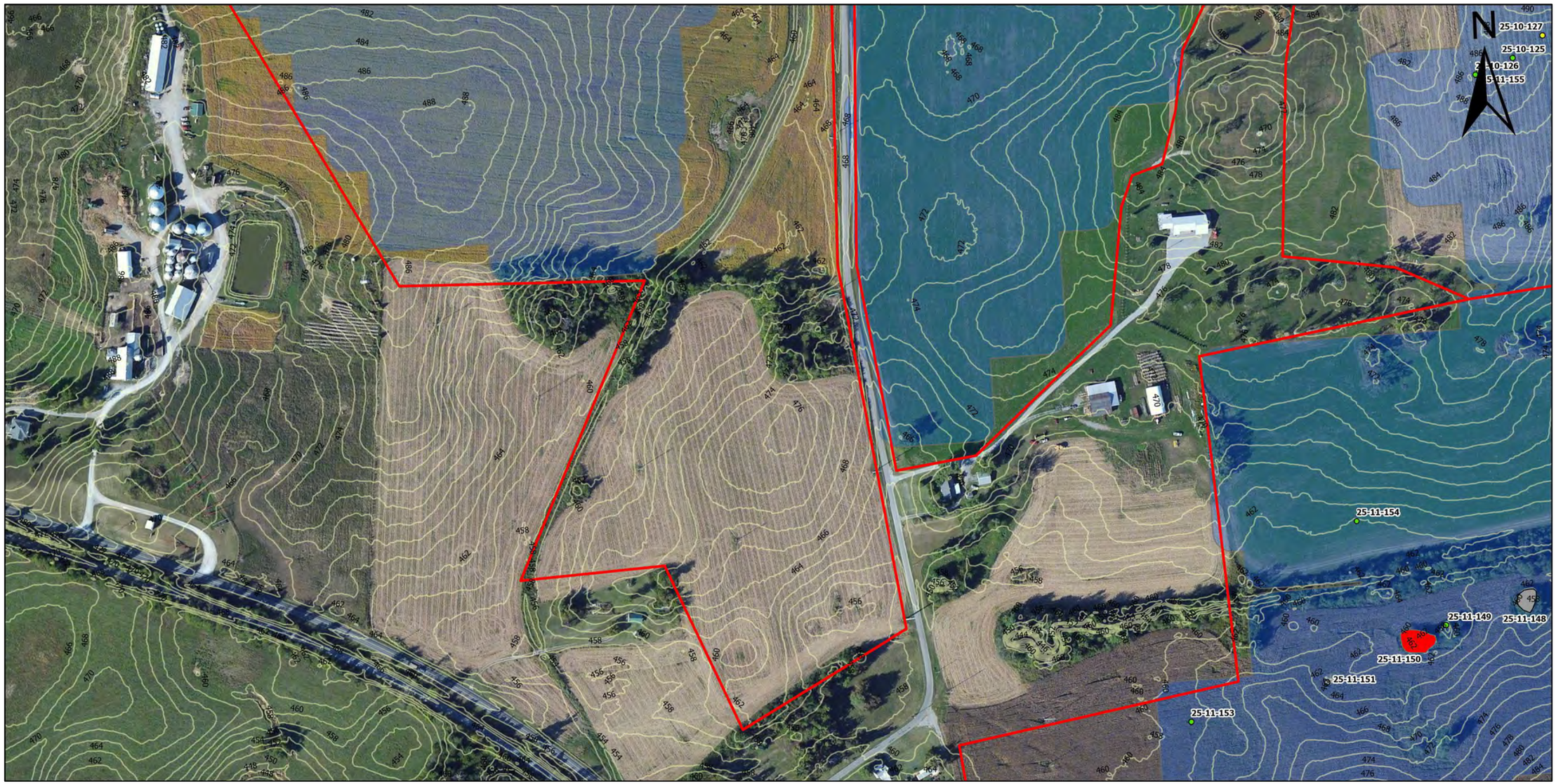
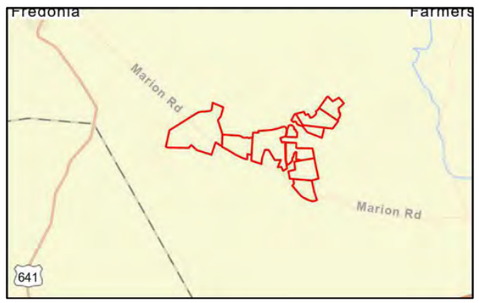
Map

B10





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

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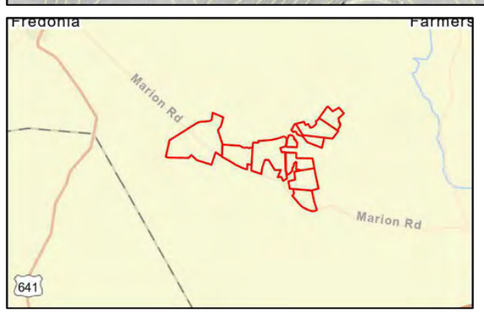
Map

A11



Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
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DATA SOURCES:
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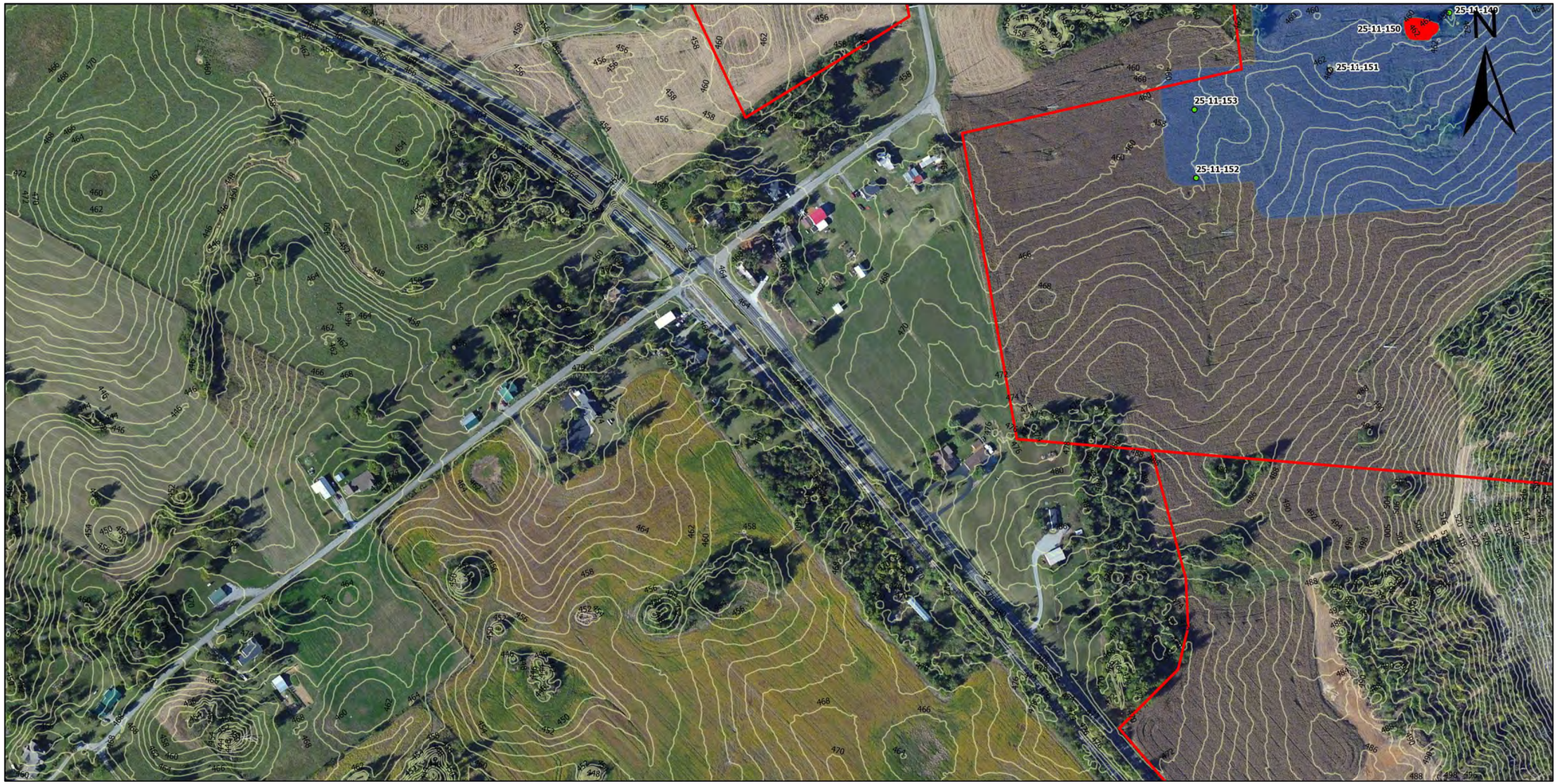
B11



Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
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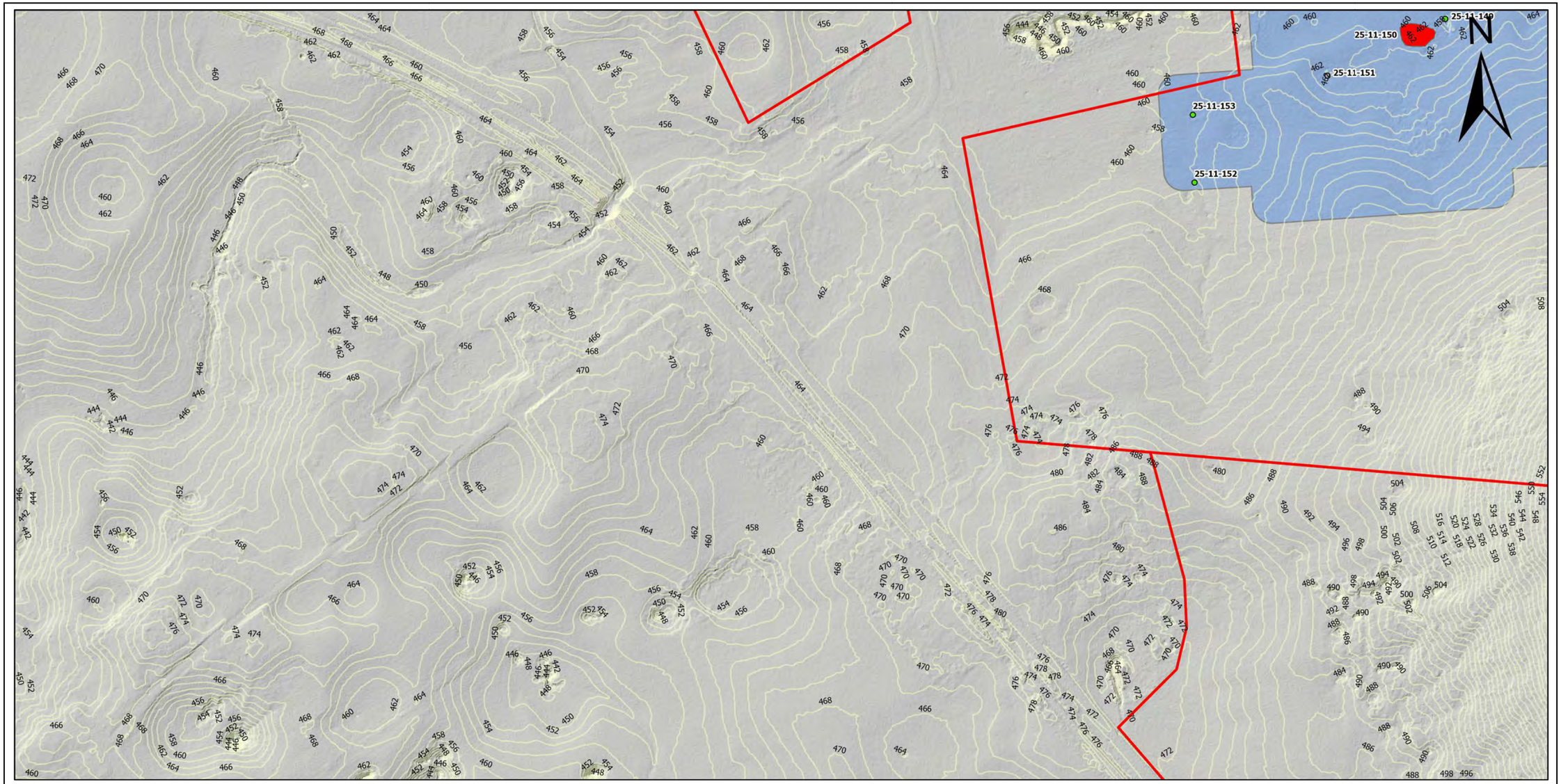
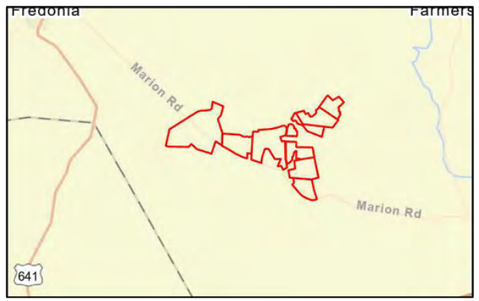
Map

A12





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
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DATA SOURCES:
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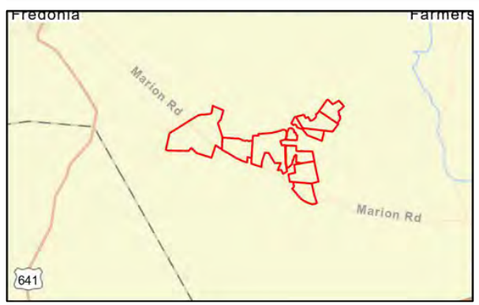
Map

B12



Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk	Area Karst Risk
Very High	Very High
High	High
Moderate	Moderate
Low	Low
Very Low	Very Low

DATA SOURCES:
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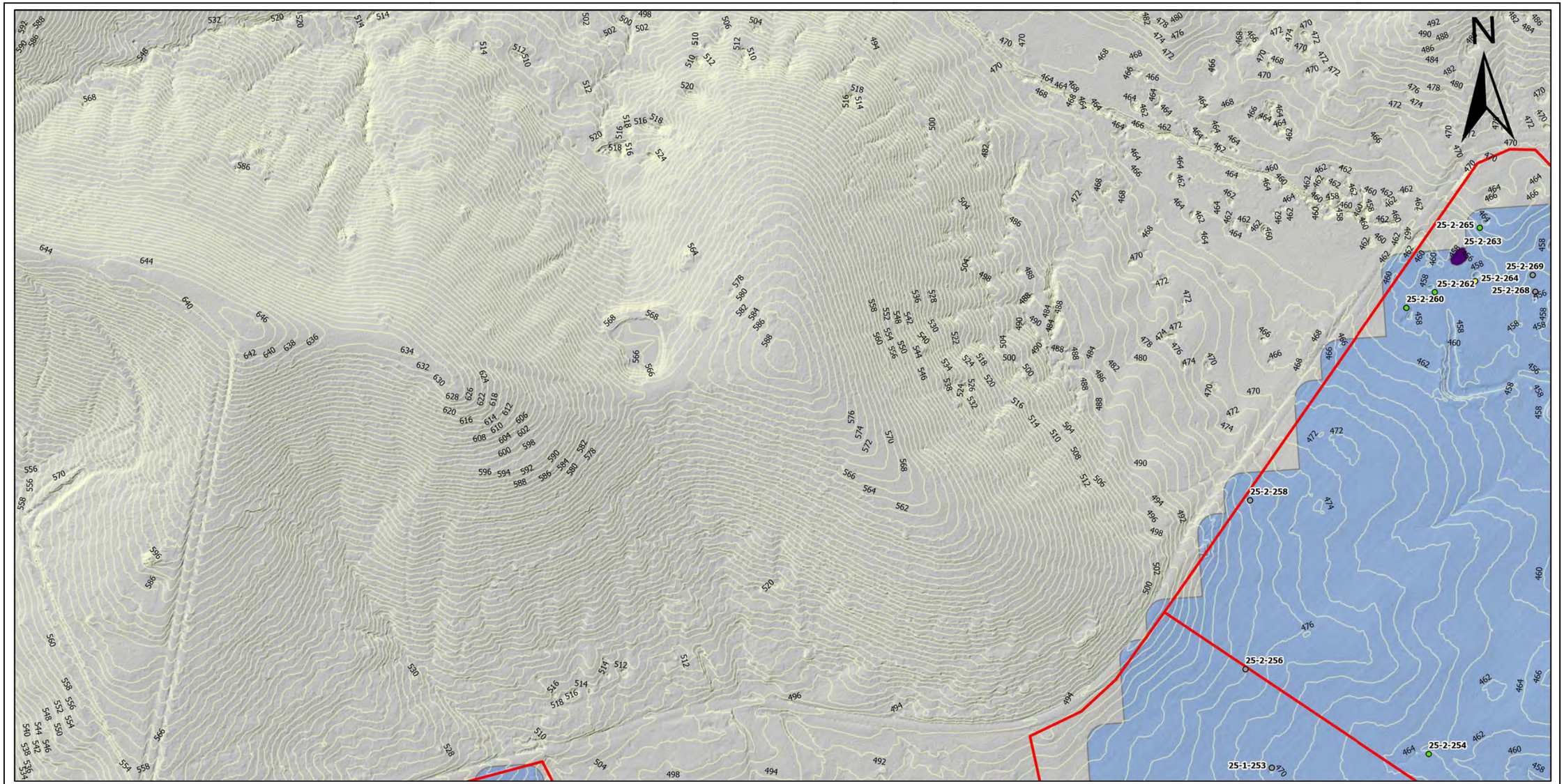
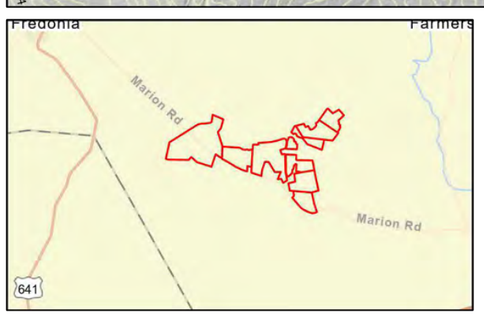
A13





Legend

- Property Limit
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- 2 Foot Contour

Point Karst Risk

- Very High
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Area Karst Risk

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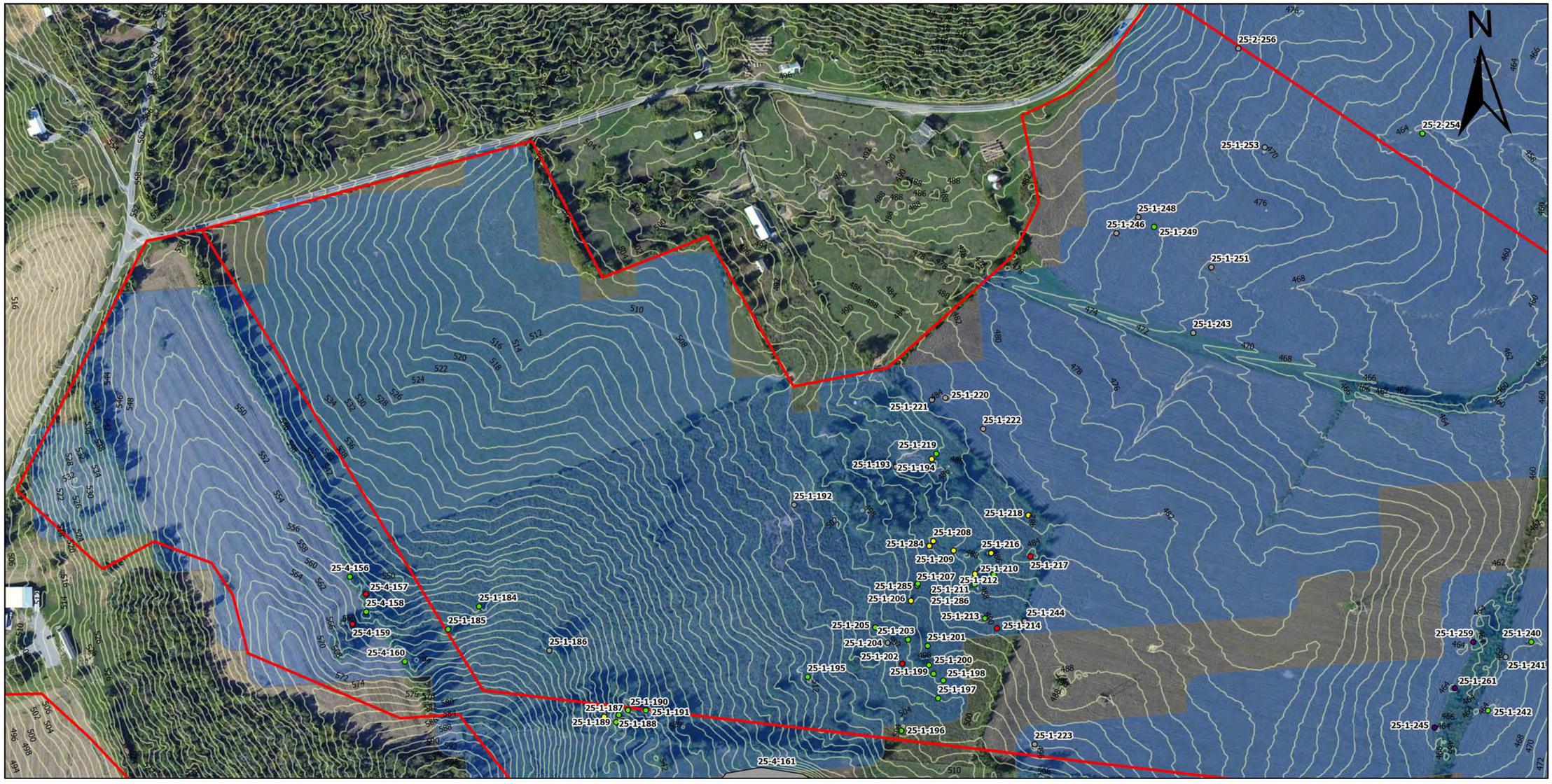

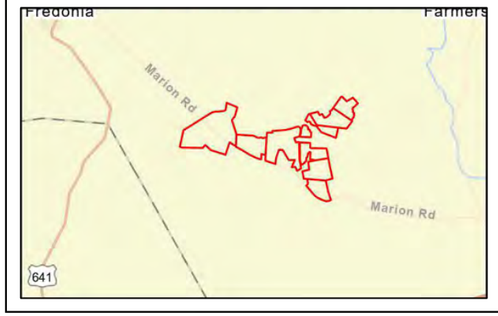

Legend

- Property Limit
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Point Karst Risk

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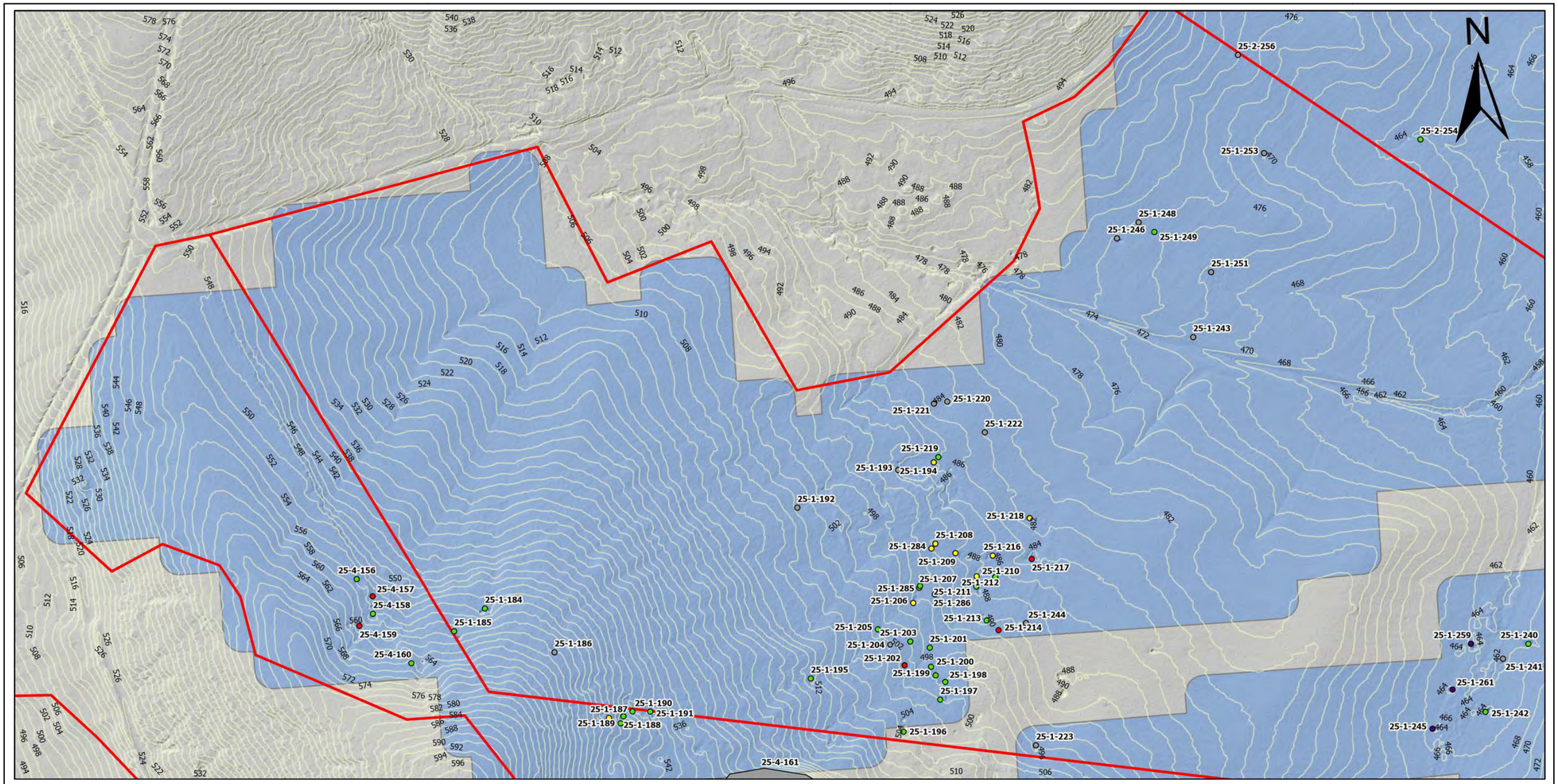
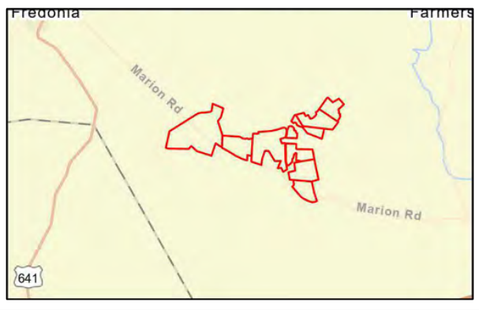
A14





Legend

- Property Limit
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Area Karst Risk

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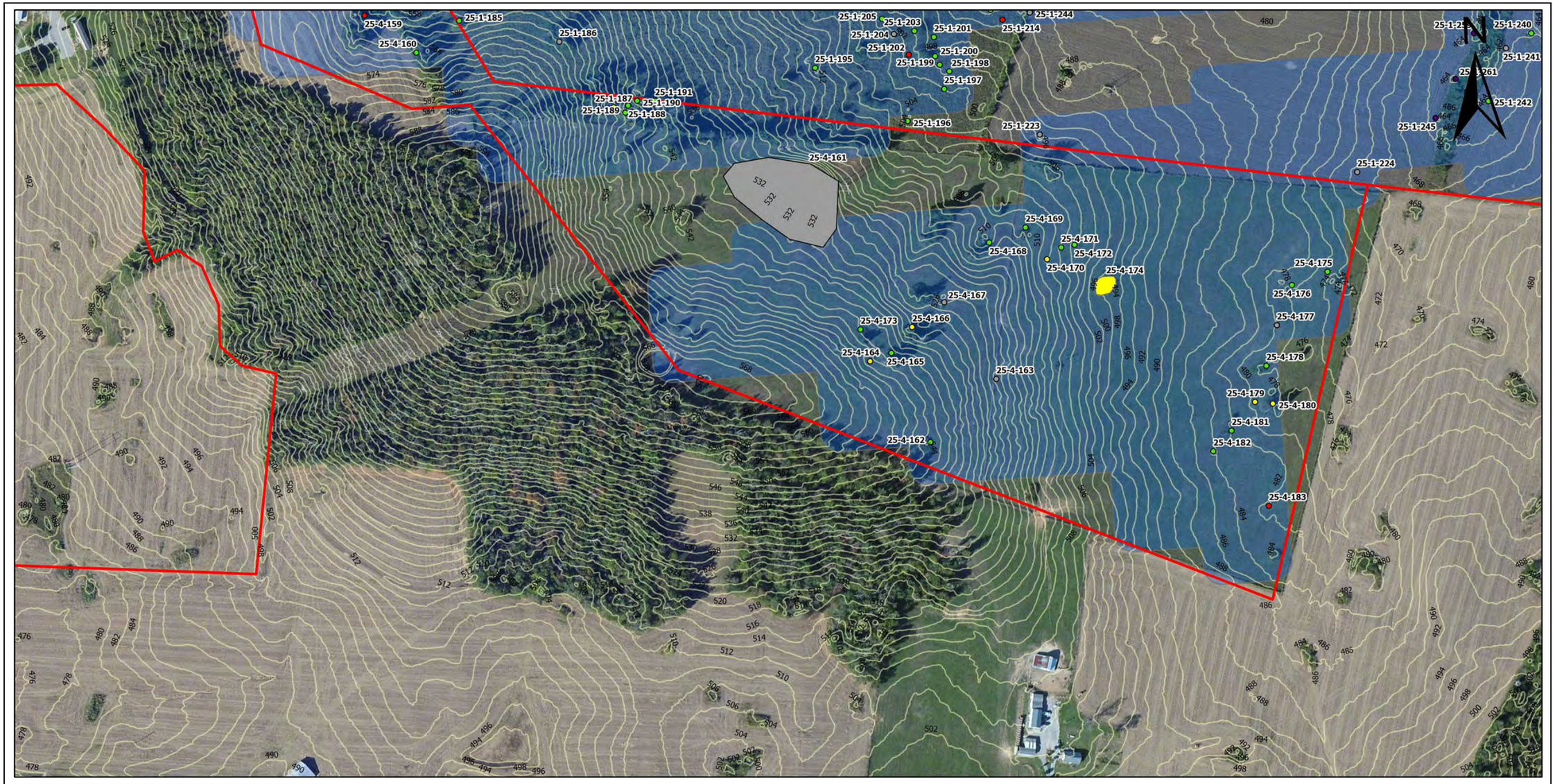
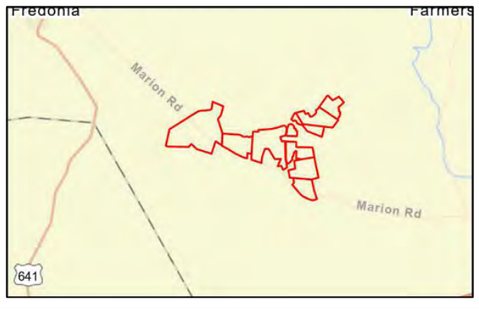
B14





Legend

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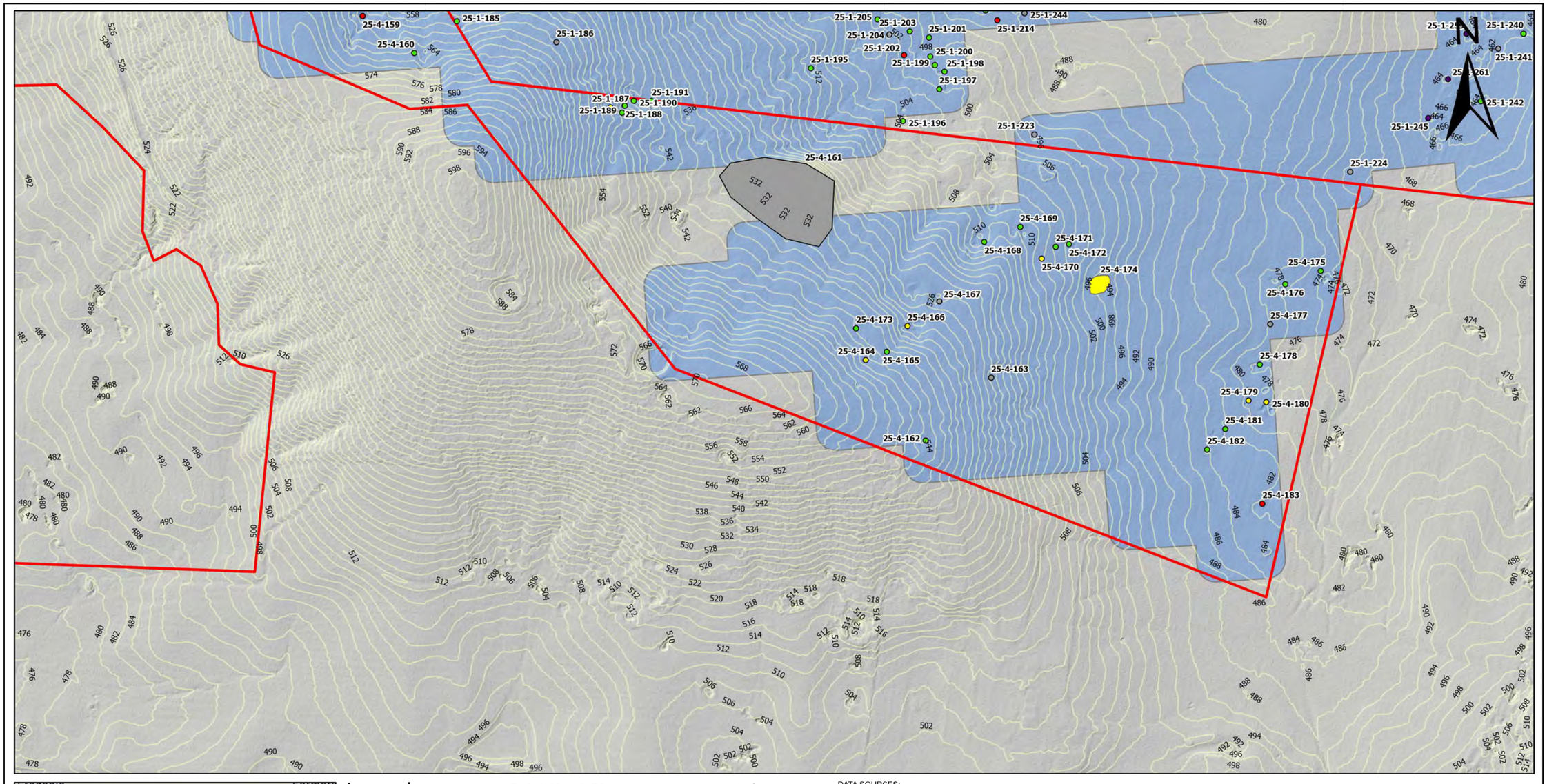
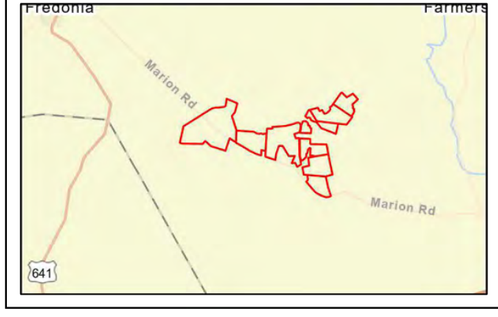
A15





Legend

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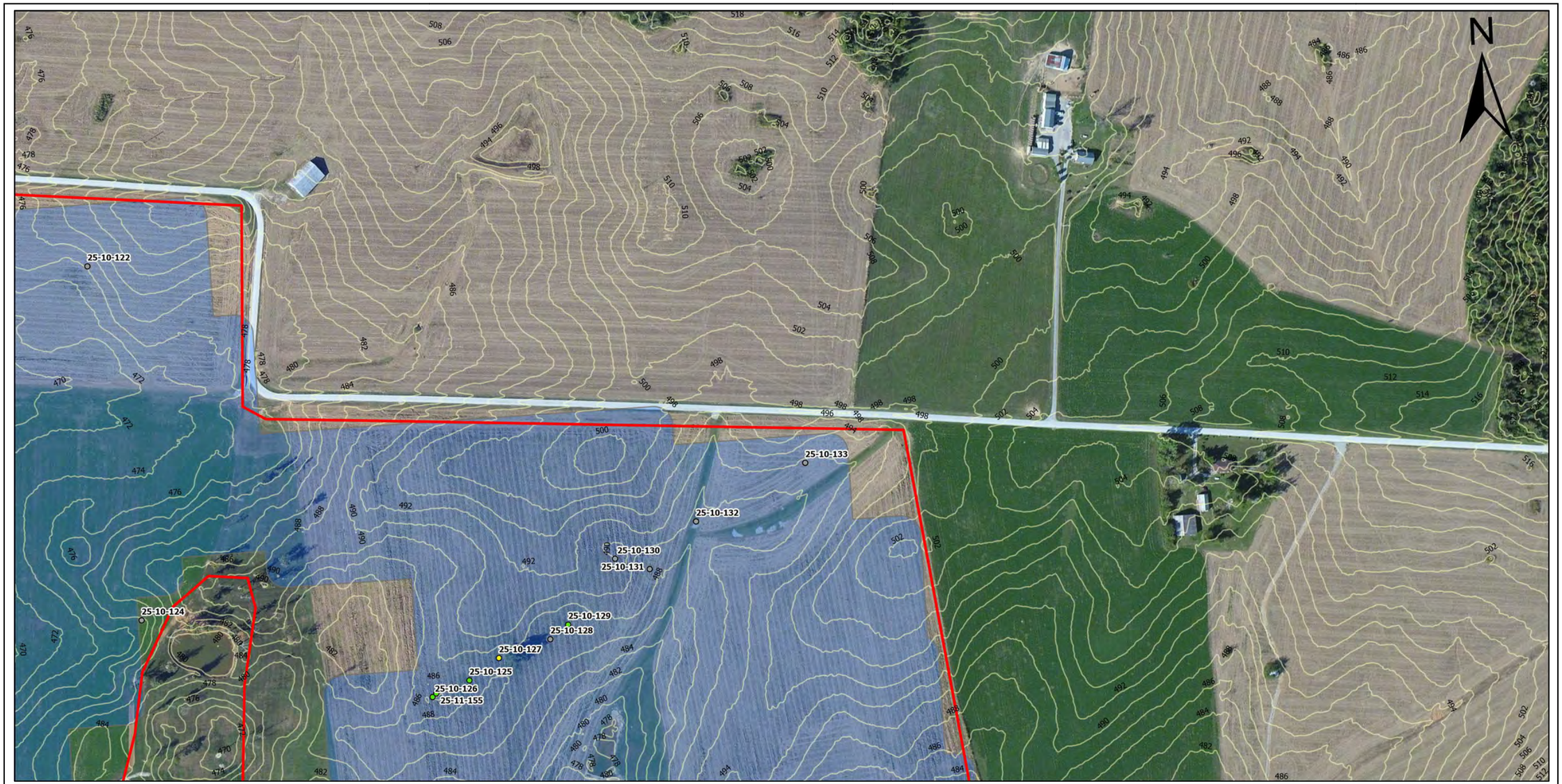
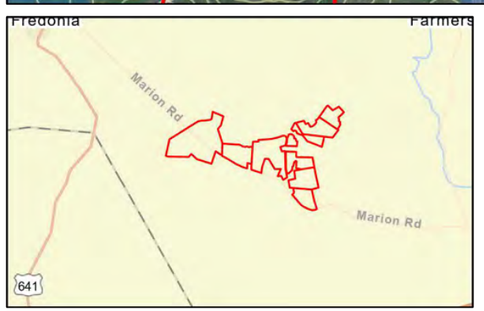
B15





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

DATA SOURCES:
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Solar array data from data received from client (Golden Solar.kmz, 11/18/2020)

0 250 500 1,000 Feet

Project No.:	57205095
Date:	Jan 2021
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Reviewed By:	BWT

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Golden Solar Karst Feature Risk Map

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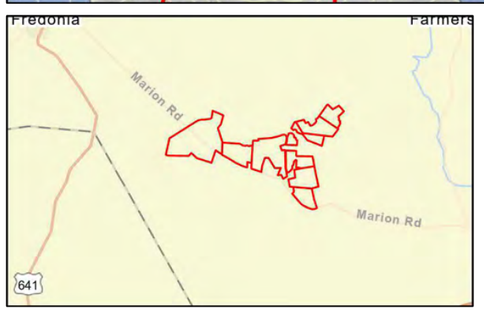
National Grid Renewables
Princeton, Caldwell County, Kentucky

Map

A16



Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk	Area Karst Risk
Very High	Very High
High	High
Moderate	Moderate
Low	Low
Very Low	Very Low

DATA SOURCES:
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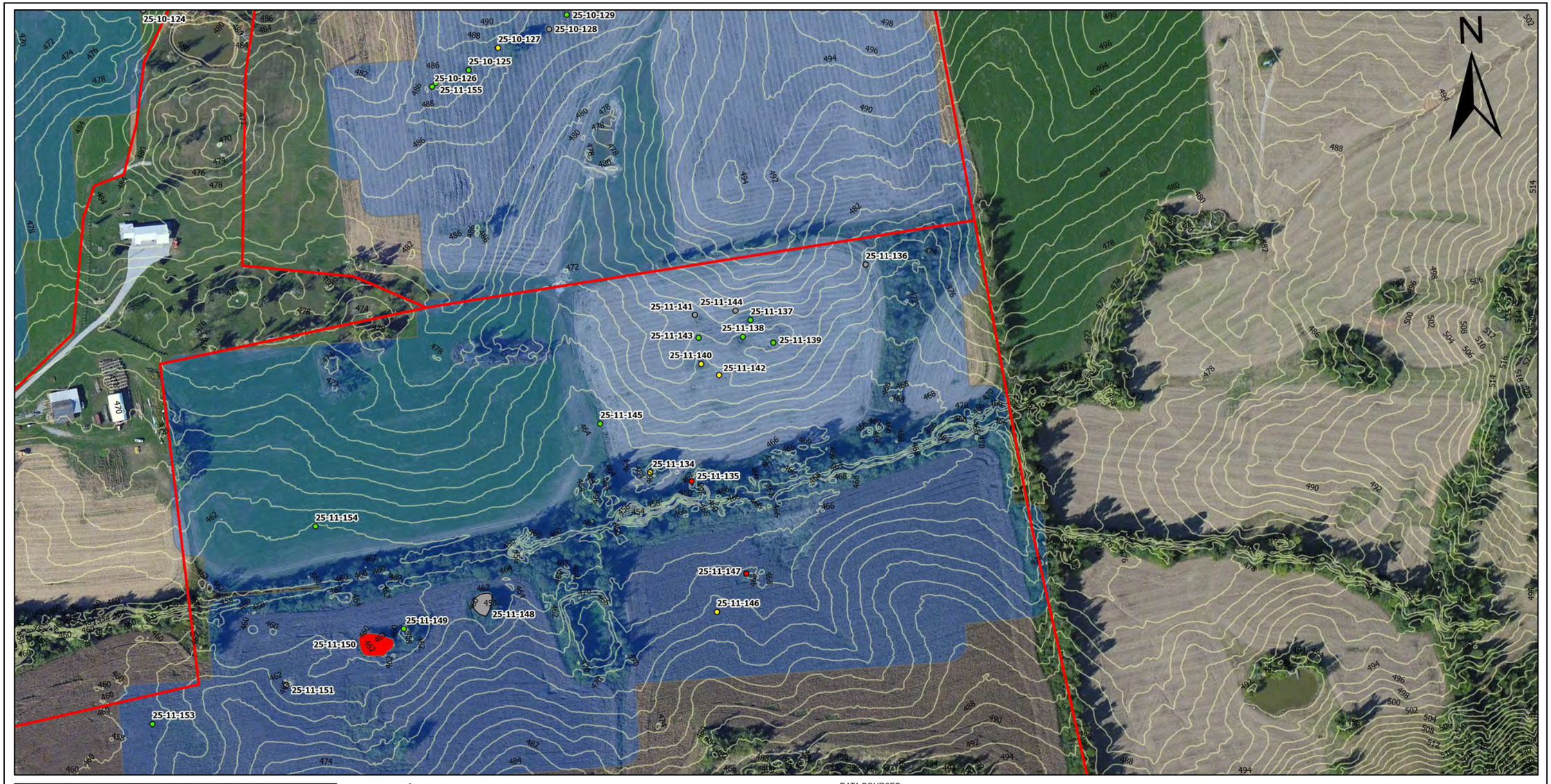

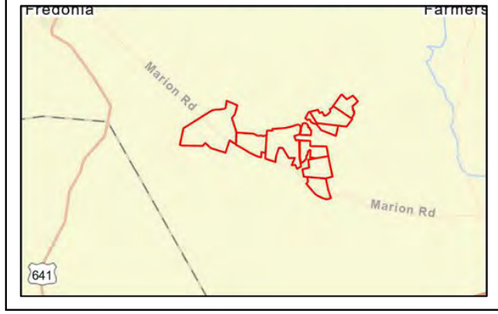

Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

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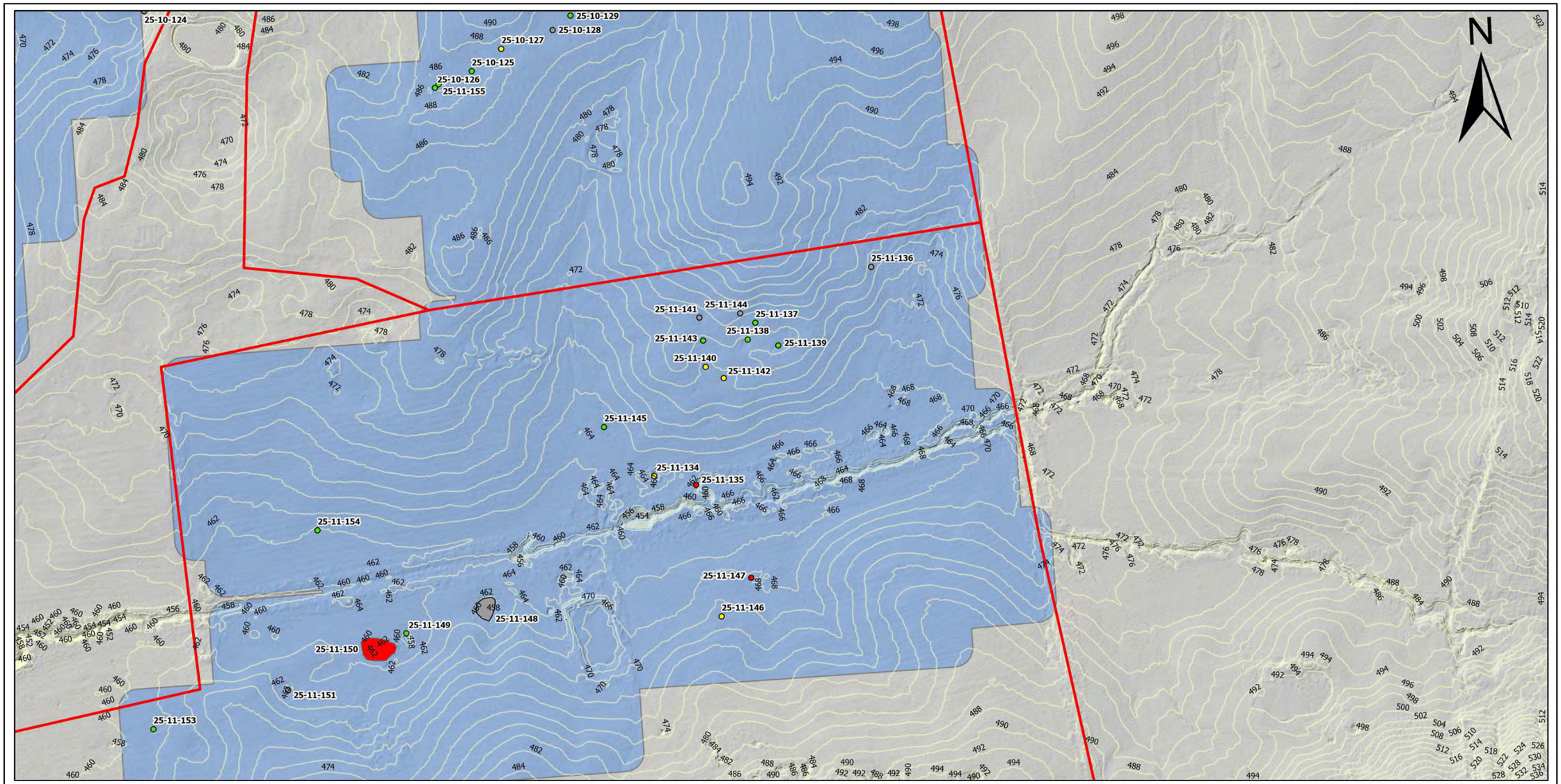
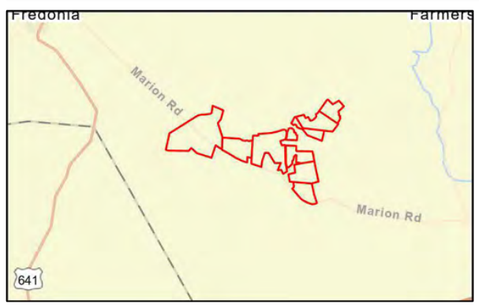
A17





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
- Very Low

Area Karst Risk

- Very High
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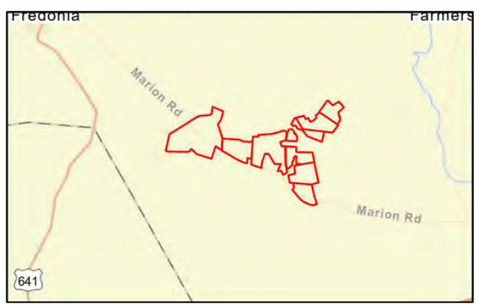
Map

B 17



Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
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Area Karst Risk

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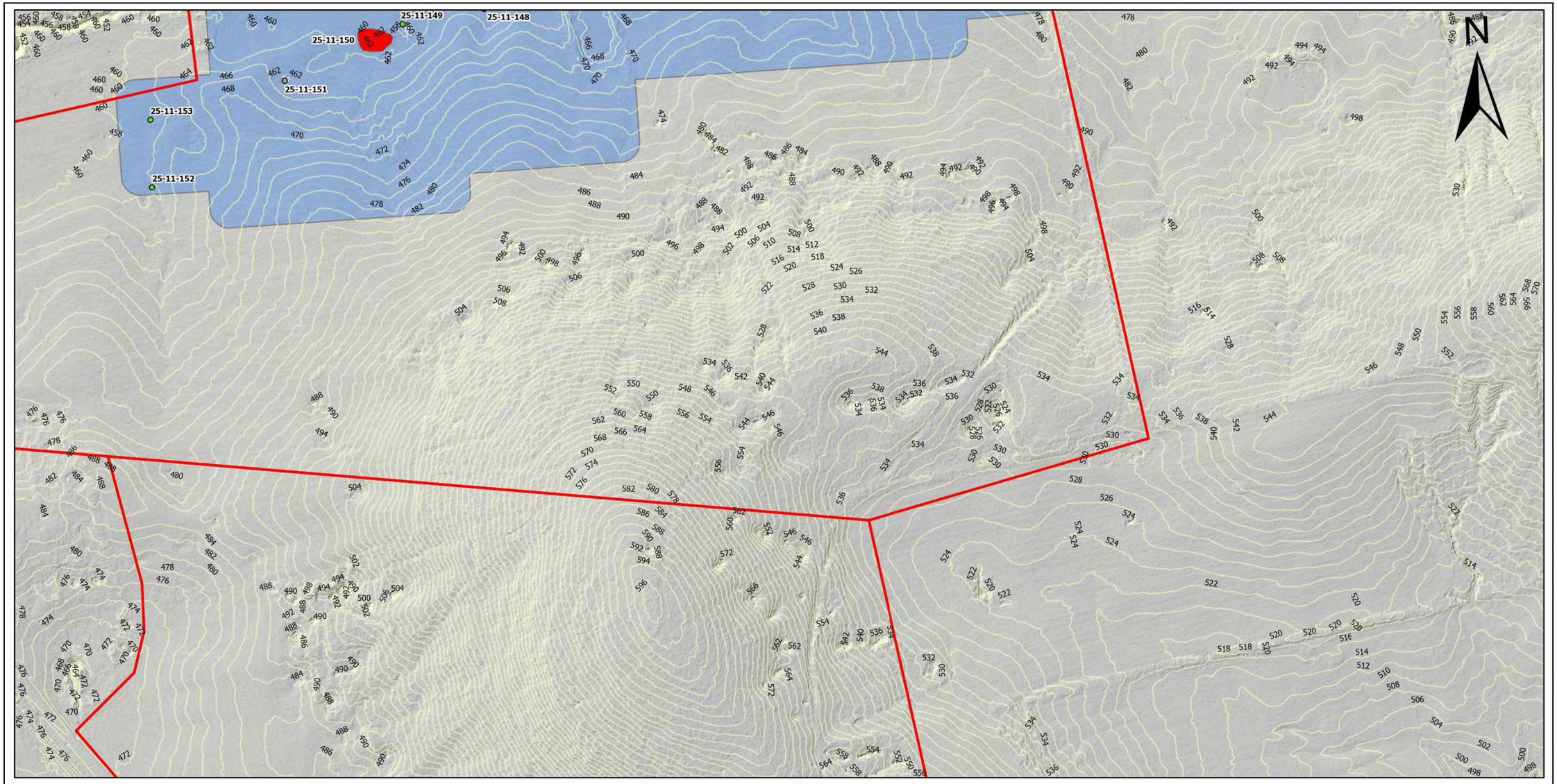
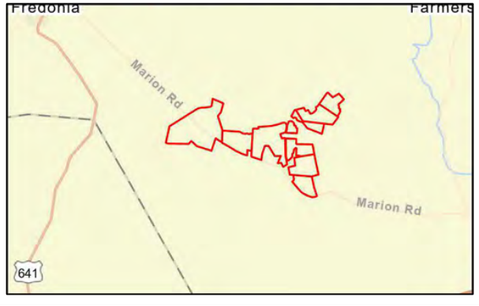
A18





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
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- Very Low

Area Karst Risk

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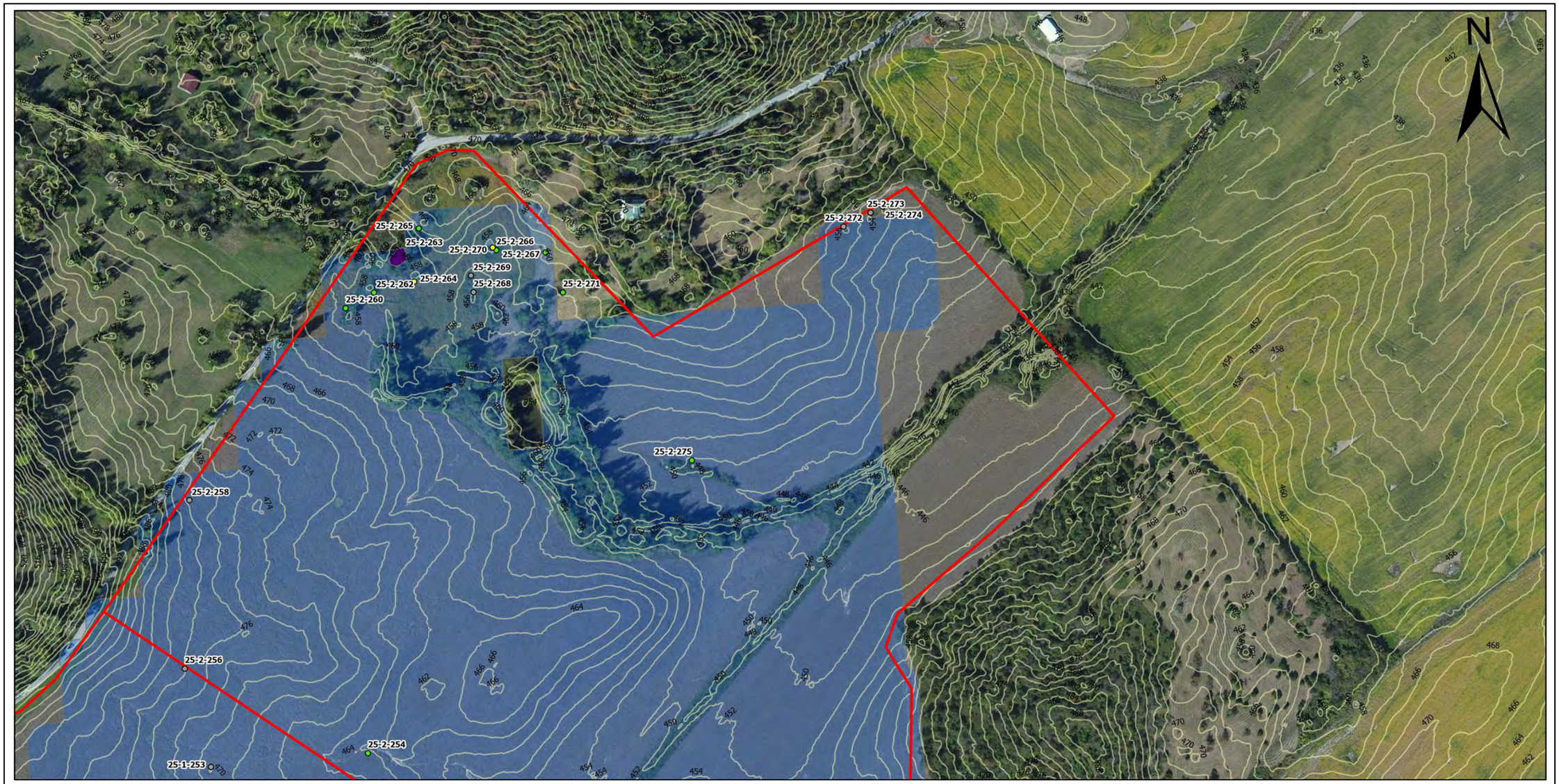
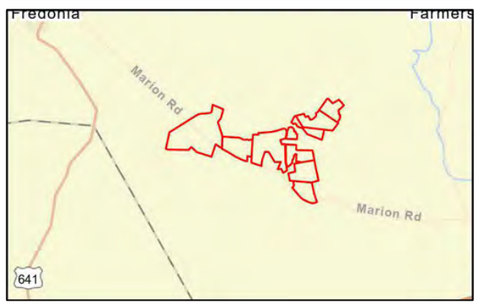
B18





Legend

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Point Karst Risk

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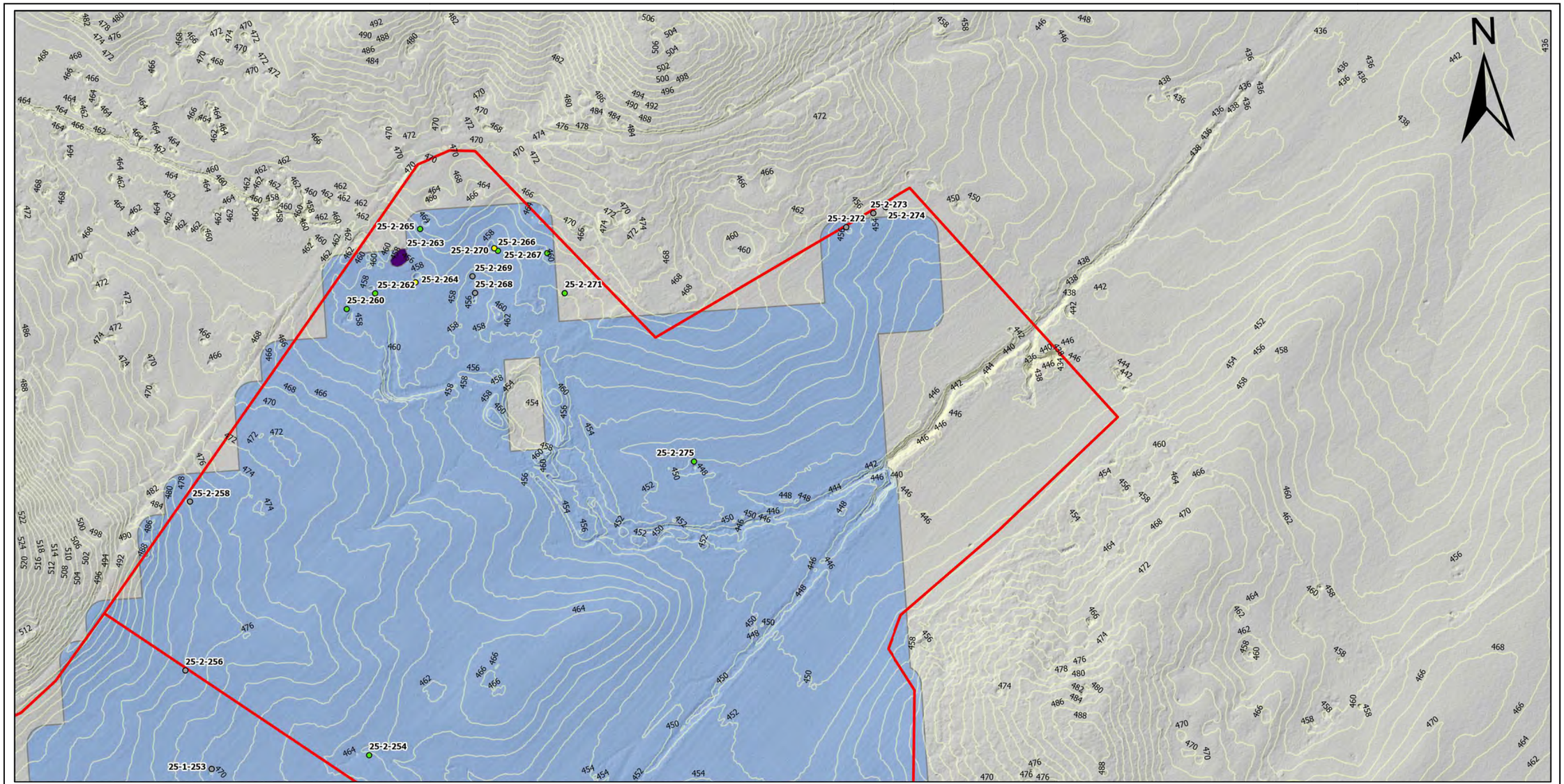
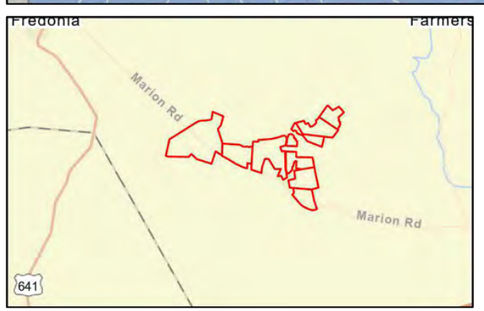
Map

A19





Legend

- Property Limit
- Proposed Solar Array
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Point Karst Risk	Area Karst Risk
Very High	Very High
High	High
Moderate	Moderate
Low	Low
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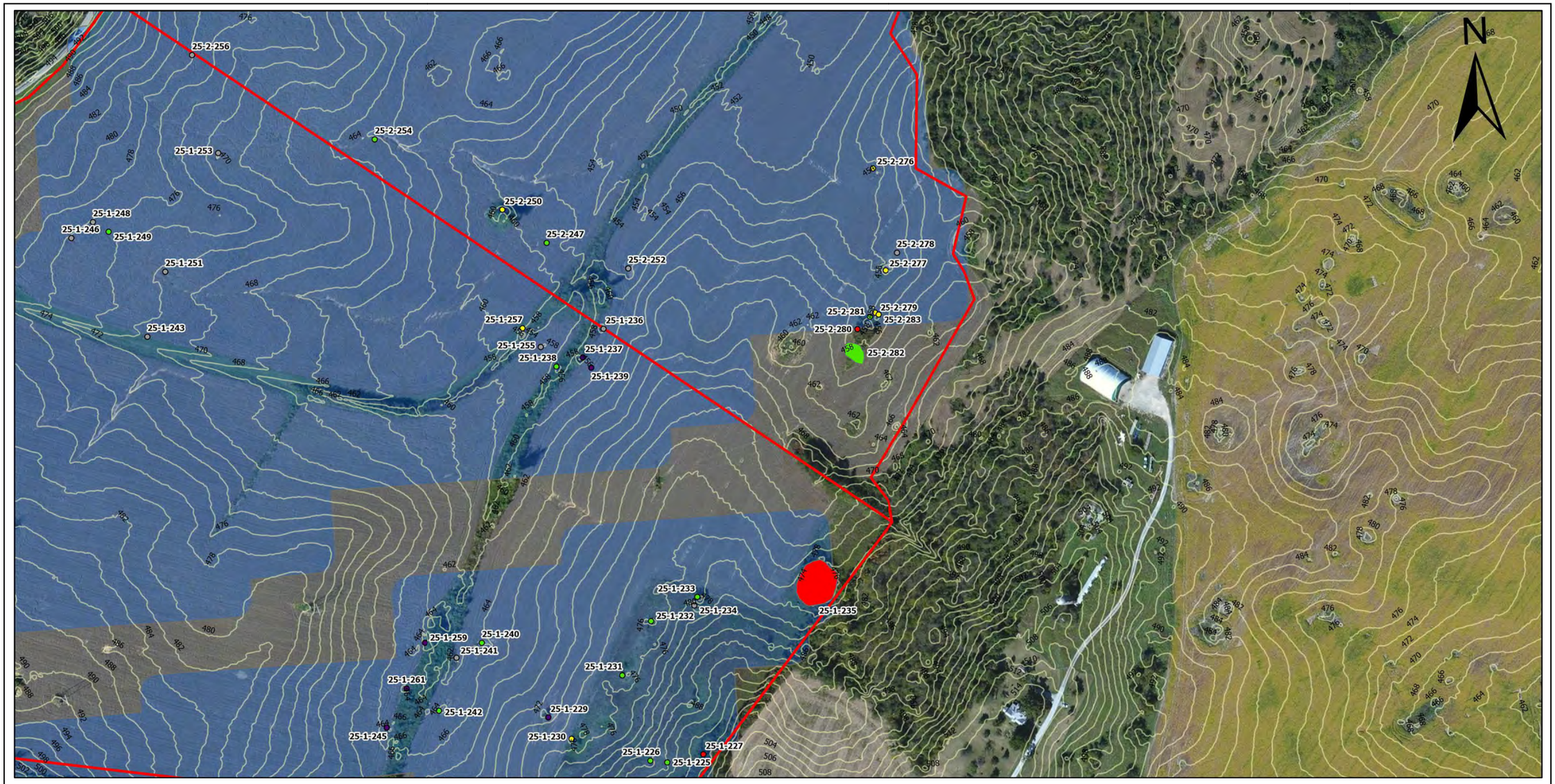
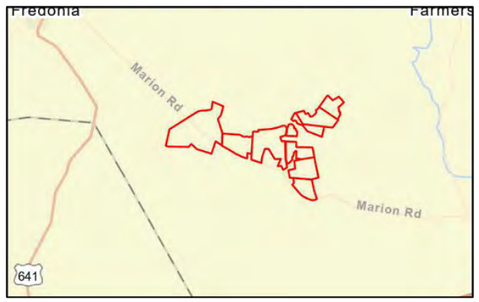
Map

B19





Legend

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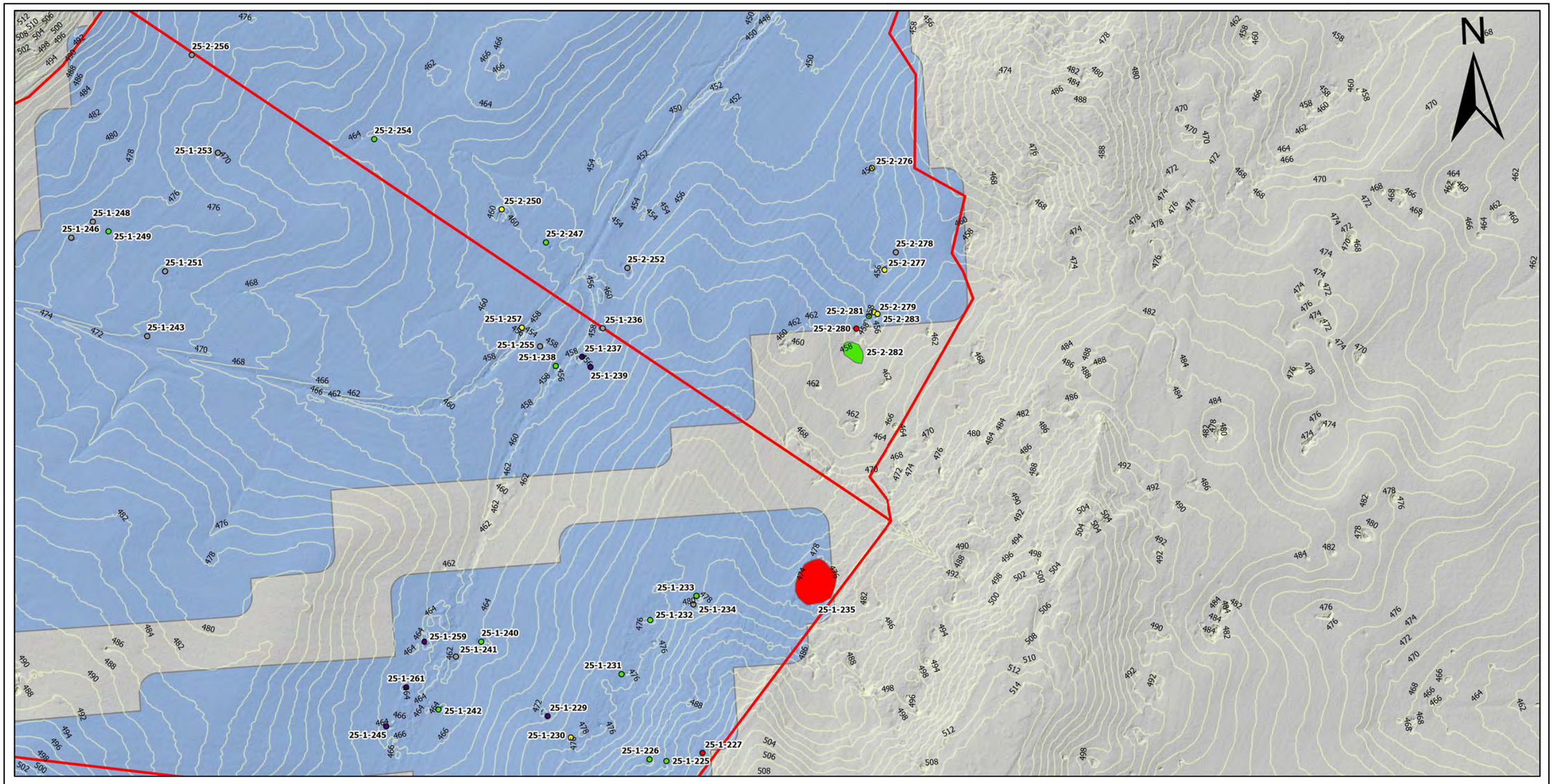
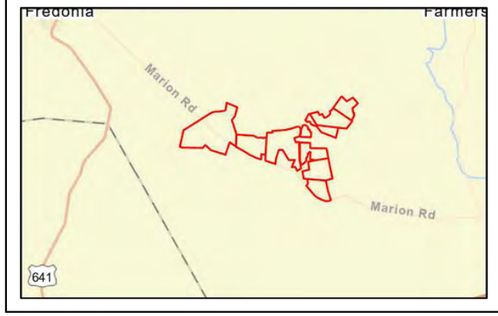
A20





Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

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Golden Solar Karst Feature Risk Map

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Map

B 20

Legend

- Property Limit
- Proposed Solar Array
- 2 Foot Contour

Point Karst Risk

- Very High
- High
- Moderate
- Low
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Area Karst Risk

- Very High
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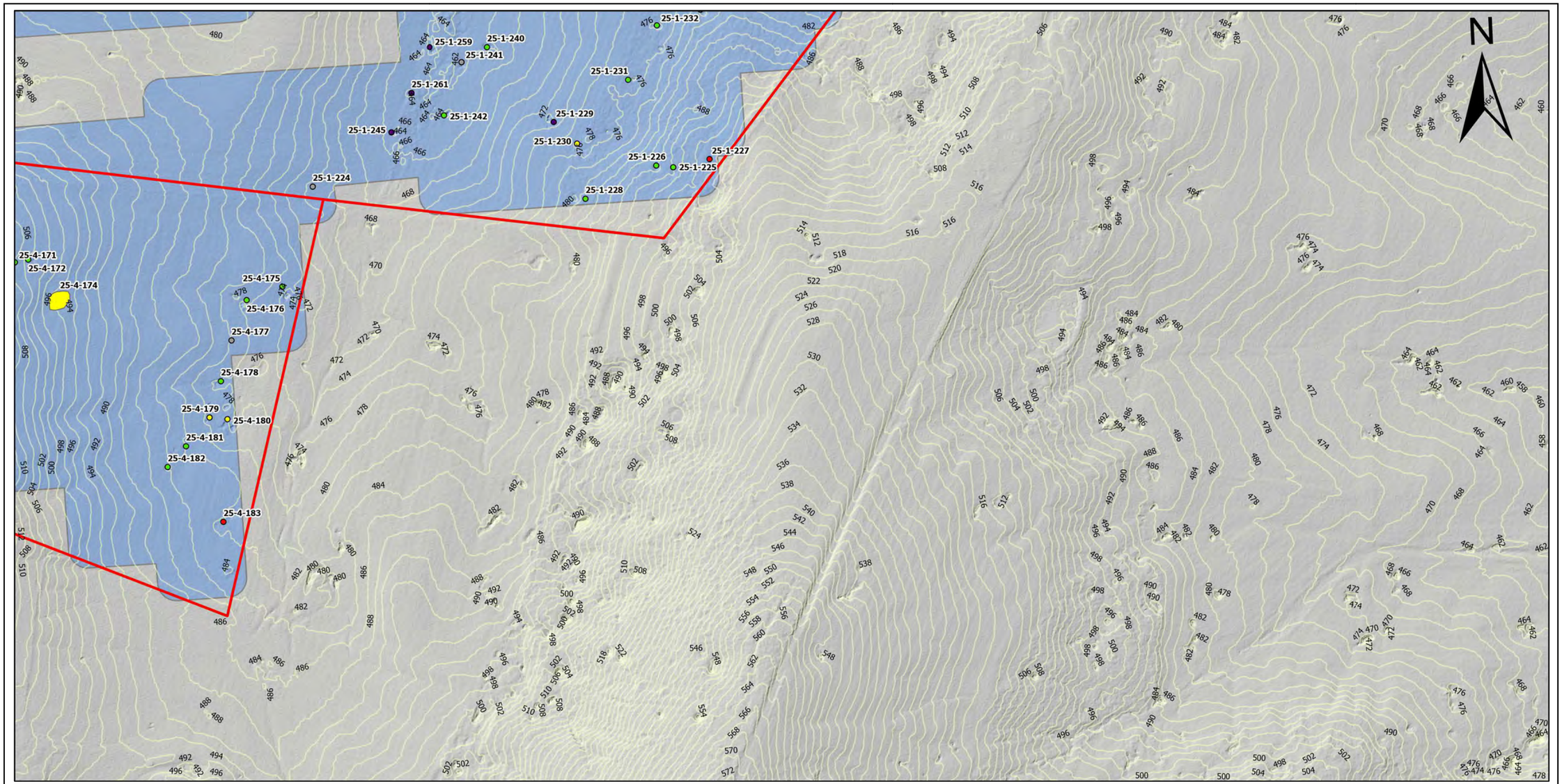
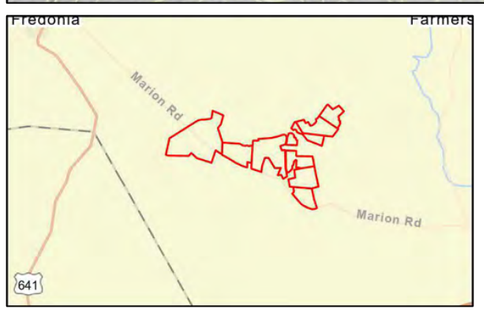
A21





Legend

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B21

Appendices C and D of this document were omitted to reduce file size. These appendices include karst feature inventory and description sheets.

TOGETHER we can do great things

Community

When we say community, we don't just mean the neighborhoods that people call home. We mean everyone and everything with a stake in the work that we do—from our Stantec and industry colleagues to the clients we collaborate with and the people and places we impact.

Whether creating, sustaining, or revitalizing a community, we help diverse cultures and perspectives work together toward shared successes.

Although our work helps to create physical communities, our ultimate goal is to create something far more meaningful—a sense of community.

Creativity

For us, creativity is driven by purpose. Knowing that transformation is truly possible inspires us to approach every situation with a fresh perspective.

Our inventive and collaborative approach to problem-solving helps bring big ideas to life through creative solutions.

Whether our contribution is a design that strikes the perfect balance between function and aesthetics, a feat of engineering that redefines what's possible, or a project management approach that delivers results, we strive for outcomes that transcend the challenges they solve and shape the communities we serve for the better.

Client Relationships

We're better together. This belief shapes how we collaborate with our clients, our partners, and our communities.

We listen so we can deeply understand our clients' needs, communicate with purpose so we maintain alignment, and remain open and flexible so we never miss an opportunity to strengthen a project and positively transform a community.

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now

Stantec