Draft Environmental Assessment

Proposed Emergency Operations Center Garrard County, KY

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FEMA

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Federal Emergency Management Agency Region IV
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Proposed Emergency Operations Center

Chemical Stockpile Emergency Preparedness Program (CSEPP)

Draft Environmental Assessment

Garrard County, Kentucky

May 2014

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List of Acronyms and Abbreviations

40 CFR 131	Water Quality Standards
40 CFR parts 1500-1508	CEQ Authority to Implement NEPA
40 CFR 1508.7	Cumulative Impact
44 CFR 10	FEMA Environmental Considerations
16 USC 703-711	Migratory Bird Treaty Act (MBTA)
33 USC 403	Rivers and Harbor Act (RHA) of 1899
33 USC 1344	Clean Water Act (CWA) of 1972
42 USC 55 parts 4321 et seq.	National Environmental Protection Act (NEPA)
911BCC	Bluegrass 911Communications Center
ACHP	Advisory Council on Historic Preservation
BGAD	Bluegrass Army Depot
BMP	Best Management Practices
CAA	Clean Air Act
CEQ	President's Council on Environmental Quality
CFR	Code of Federal Regulations
CMA	Chemical Materials Agency
CO^2	Carbon Dioxide
CSEPP	Chemical Stockpile Emergency Preparedness Program
CWA	Clean Water Act of 1972
DA	Department of the Army
dB	Decibels
DBH	Diameter at Breast Height
DNL	Day-Night Average Sound Level
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMA	Emergency Management Agency
EO	Executive Order
EO 11988	Floodplain Management (May 24, 1977)
EO 12898	Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994)
EO 13514	Federal Leadership in Environmental, Energy, and Economic Performance (October 5, 2009)
EOC	Emergency Operations Center
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GCEMA	Garrard County Emergency Management Agency
GHG	Green House Gas
ICCATF	Interagency Climate Change Adaptation Task Force
401 KAR 63:010	Fugitive Emissions
KDAQ	Kentucky Division of Air Quality
KDFWR	Kentucky Department of Fish and Wildlife Resources

KDOW	Kentucky Division of Water
KGS	Kentucky Geological Survey
KHC	Kentucky Heritage Council
KPDES	Kentucky Pollutant Discharge Elimination System
KSC	Kentucky State Clearinghouse
KY	Kentucky
KYR10	General Permit for Stormwater Discharges Associated with Construction Activities
MBTA	Migratory Bird Treaty Act
MCP/SGA	Mission Critical Partners and SCHRADERGROUP architecture, LLC
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Protection Act of 1966
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PAZ	Protective Action Zone
PM 2.5	Particulate Matter less than 2.5 microns
PM10	Particulate Matter less than 10 microns
PPE	Personal Protective Equipment
RHA	Rivers and Harbor Act of 1899
ROW	Right of Way
Section 10	RHA Dredge and Fill Permit
Section 401	CWA Water Quality Certification
Section 404	CWA Dredge and Fill Permit
SHPO	State Historic Preservation Officer
SSURGO	Soil Survey Geographic database
T&E	Threatened & Endangered Species
THPO	Tribal Historic Preservation Officer
US	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USDC	U.S. Department of Commerce
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
WQC	Water Quality Certification

1.0 INTRODUCTION

This Draft Environmental Assessment (EA) has been prepared on behalf of the Garrard County Fiscal Court (Garrard County) for the proposed construction and operation of the Garrard County Emergency Operations Center (EOC) in Lancaster, Kentucky. On January 18, 2012, the Federal Emergency Management Agency (FEMA), in partnership with the U.S. Army, provided funding for the Garrard County EOC by means of a grant (EMA-2012-CA-5250) through the Chemical Stockpile Emergency Preparedness Program (CSEPP). CSEPP for this proposed project is administered through the Commonwealth of Kentucky, as well as additional FEMA funding under a separate cooperative agreement (12-KY-DES-00486) on March 29, 2012.

CSEPP is a multi-agency program created by the U.S. Army Chemical Materials Agency (CMA) and FEMA in 1985. CSEPP's mission is to *"enhance existing local, installation, tribal, State, and Federal capabilities to protect the health and safety of the public, work force, and environment from the effects of a chemical accident or incident involving the U.S. Army chemical stockpile."* The U.S. Army and FEMA have entered into a Memorandum of Understanding (MOU) that delegates the responsibilities of the program amongst the two agencies. The U.S. Army administers the on-post responsibilities of the CSEPP, and FEMA administers the off-post responsibilities.

The Bluegrass Army Depot (BGAD) located in Madison County is a U.S. Army storage facility for conventional munitions and chemical weapons. In accordance with the Chemical Weapons Treaty (effective 1997), planning for BGAD chemical stockpile destruction began in 2003. Preparations for a planned chemical destruction facility started in 2006. The facility should be completed by 2018 when chemical weapons disposal will commence. Garrard County is designated as within the Protective Action Zone (PAZ) along with Clark, Powell, Estill, Jackson, and Rockcastle counties and therefore qualifies for inclusion in the CSEPP.

In April 2012, FEMA's CSEPP commissioned Mission Critical Partners and SCHRADERGROUP architecture, LLC (MCP/SGA) to conduct a Programming and Planning Study for a new EOC facility in Garrard County (Appendix G). The overall goal of the study was to determine the building, property, equipment, operation, budget, and future growth requirements of a CSEPP mission critical facility that would serve Garrard County residents for the next 20 years. The

study determined the existing Garrard County emergency response facilities insufficient to meet the CSEPP mission requirements and provided the basis of the proposed EOC facility design.

This Draft EA is written in accordance with the National Environmental Policy Act (NEPA) (42 USC 55 parts 4321 et seq., 2000) of 1969, the President's Council on Environmental Quality (CEQ) to implement NEPA (40 CFR parts 1500-1508), and FEMA's regulations implementing NEPA (44 CFR Part 10). FEMA is required to consider potential environmental impacts before funding or approving actions and projects. This EA will analyze the potential environmental impacts of the proposed Garrard County EOC. FEMA will use the findings in this EA to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

2.0 PURPOSE AND NEED

2.1 Purpose

The purpose of CSEPP is to bolster local emergency planning and response resources to better respond to the potential, but unlikely event of a release of a chemical weapons hazardous agent from one of the Army's chemical weapons storage installations. Garrard County is within the PAZ of the BGAD and operates an existing EOC facility. Therefore, it is the purpose of CSEPP to provide the Garrard County Emergency Management Agency (GCEMA) with funding that will better protect residents in the event of a chemical weapons material release before and during chemical weapons decommissioning.

2.2 Need

Garrard County and the GCEMA need an adequate facility to effectively provide emergency services to county residents. The Garrard County EOC and Bluegrass 911 Communications Center (911BCC) facilities are located in separate buildings; 319 Stanford St. and 308 W. Maple Ave., Lancaster, KY, respectively. Because they are in separate buildings, the two operations rely on separate communication systems and an additional communication link. This bimodal communication link is inefficient and vulnerable to interruption during critical emergencies. The current EOC and 911BCC do not support the technical communication equipment,

hardened structure architecture, or space required to satisfy the CSEPP goals and objectives. As such, the current facilities and operation capacities of the GCEMA and 911BCC are deemed to be inadequate to protect the residents from a potential chemical weapon agent release.

3.0 ALTERNATIVES

3.1 No Action Alternative

Under the No Action Alternative, the proposed EOC would not be constructed. The EOC and 911BCC would continue to operate out of their current and separate facilities. This would continue to hamper emergency response for Garrard County citizens. The GCEMA would not receive the technical equipment and communication upgrades to meet the CSEPP program readiness standard. The ability of the County to respond to a chemical weapon agent release would be inadequate.

3.2 Proposed Action Alternative

Garrard County proposes to construct a combined EOC and 911BCC at 278 Precision Court Lancaster, KY 40444 (Appendix A, Figures 1 and 2). The facility would be constructed on Lot 1A (7.324 acres) within a small industrial park adjoining KY 52 (N 37.625874, W -84.592512). The property is currently owned by the Lancaster-Garrard County Industrial Authority and is zoned as "Urban." The property access road, electric service, water service, and sewer service already exist within the industrial park. Three other businesses have developed facilities at the industrial park. The industrial park is located on the west side of Lancaster and is less than one mile from the city center. Lands within one mile radius are comprised of agriculture land (67.87%), developed land (20.87%) and natural lands (11.30%) (Appendix A, Figure 3).

The proposed EOC facility would include the following:

- EOC building – 5,960 sq. ft. - one story - with hardened construction and anti-terrorism design features;
- Radio communication tower - 185 ft. tall (180 ft. tower plus 5 ft. lightning protection);
- Emergency electrical power generator;
- Small utility shed;

- Sidewalks & landscaping;
- Chain link security fence – ±975 ft. perimeter - eight ft. tall;
- Staff parking lot – ±7,800 sq. ft. - bituminous pavement - 20 spaces (two handicap) and a 20′ x 20′ dumpster pad;
- Access road for staff parking lot - ±130 ft. (±3,250 sq. ft.) – bituminous pavement;
- Visitor parking lot (separate from staff parking lot) – ±7,800 sq. ft. - bituminous pavement – 23 spaces (two handicap); and
- Access road for visitor parking lot – ±80 ft. (±2,000 sq. ft.) - bituminous pavement.

Please refer to the Design Plans in Appendix E and Figure 4 (Appendix A) for details.

3.3 Alternatives Considered and Dismissed

The GCEMA considered upgrading the existing EOC and 911BCC. However, the Programming and Planning Study performed by MCP/SGA (July 1, 2013) demonstrated that this alternative was infeasible due mainly to the inadequacies of the physical location and building to satisfy the provisions of CSEPP (Appendix G).

4.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

The proposed EOC property, Lot 1A, is located within the existing Lancaster-Garrard Industrial Park on the west side of Lancaster Kentucky. The majority of the property area is cleared to bare soil and filled to create a flat building site relatively even in elevation to the access road, Precision Court (Appendix A, Figure 2). The north and west faces of this open and filled area slopes sharply where it meets a woodland that occupies the northern and western perimeters. A riparian corridor is located within the woodland along its northern boundary. The riparian corridor supports an unnamed tributary of Boone Creek which flows west off the property and towards its confluence with the Dix River/Herrington Lake and then north to the Kentucky River. Cattle grazing pastures are present beyond the woodland to the north and south. The eastern boundary of the property is demarcated by a hedgerow that separates it from a hay pasture further to the east. The southern boundary is bordered by Precision Court and Lot1B. Lot 1B is distinguished from the proposed EOC property by having retained its hayfield-like

ground cover. The remainder of the Industrial park lies beyond this southern boundary until it ends at KY 52. Please refer to the site photographs in Appendix B for reference.

The discerned impacts associated with the No Action and Proposed Action Alternatives are documented in this section and are summarized in Table 1.

4.1 Physical Resources

4.1.1 Geology and Soils

The proposed Garrard County EOC is located within the Outer Bluegrass physiographic province at approximately 1000 ft. above mean sea level (KGS 1979). The Outer Bluegrass typically has low to moderate relief and soils that range from thick, over limestone, to thin, over shale, of Late Ordovician and Silurian age (USGS 1986). Specifically, the proposed EOC property lays over the Ashlock Formation of the Upper Ordovician Limestone, dolomite and shale (Appendix A, Figure 5). In their 1965 paper, Wier, *et.al*. describe the Ashlock Formation to be …

> *"Ashlock Formation of the Upper Ordovician Limestone, dolomite and shale. The lower part of the Ashlock Formation is chiefly greenish-gray very sparsely fossiliferous limy and dolomitic mudstone; the middle part consists of bluish and light-gray fossiliferous aphanitic to medium-grained and salty limestone; the upper part consists of greenish-gray unfossiliferous limy and dolomitic mudstone overlain by gray thin-bedded fossiliferous micro-grained, medium-grained, and silty limestone. The Ashlock Formation ranges from about 125 to 145 feet in thickness…The Ashlock Formation is here named for the Ashlock Cemetery near U.S. Highway 27 about 0.1 mile north of the Dix River in northeastern Lincoln County, KY."*

The presence of the Ashlock Formation at the proposed EOC, and more specifically the Tate Group of that formation, was confirmed by the geotechnical investigation performed by Cardno ATC (December 4, 2013). Rock was encountered 2.6 to 19.5 ft. below the surface and averaged 11.1 ft. across five borings. The report does not identify geologic risks to the proposed EOC facility. However, the report does contain soil conditions that require special consideration and treatment for stable building and foundation design and construction. Specifically, the report

Table 1. Summary of Garrard County EOC Alternatives and Impacts.

Resource	No Action Alternative	Proposed Project Alternative	Mitigating Factors
Geology and Soils	No significant impacts expected.	Minor negative impact (not significant) to Prime Farmland soils; Soil erosion.	Negative impacts avoided or minimized through installation of BMPs as per construction plans and maintenance of installed structures throughout construction.
Air Quality	No significant impacts expected.	Minor and temporary, but not significant, negative impacts during construction (machinery emissions & dust).	Negative impacts minimized through construction machinery maintenance, construction entrance pads, silt fences, clearing soil from pavement, watering exposed soil, and covering open-load trucks.
Climate Change	No significant impacts expected.	No significant impacts expected.	None.
Water Quality	No significant impacts expected.	Minor and temporary, but not significant, negative impacts during construction are possible (sediment transport).	Negative impacts avoided or minimized through installation of BMPs as per construction plans and maintenance of installed structures throughout construction.
Wetlands	No significant impacts expected.	No significant impacts expected.	Wetlands not present.
Floodplains	No significant impacts expected.	No significant impacts expected.	Floodplains not present.
T&E Species and Habitat	No significant impacts expected.	No significant impacts expected.	Potential habitat present for Indiana bat, gray bat, and running buffalo clover. Negative impacts avoided by avoiding disturbance of potential habitat.
Migratory Birds	No significant impacts expected.	Minor negative impact (not significant) possible (bird – radio tower strike hazard).	Bird strike impact minimized by monopole design of radio tower, eliminating the need for guy wires.
Wildlife and Fish	No significant impacts expected.	Minor and temporary, but not significant, negative impacts during construction are possible (sediment transport).	Negative impacts avoided or minimized through installation of BMPs as per construction plans and maintenance of installed structures throughout construction.

Resource	No Action Alternative	Proposed Project Alternative	Mitigating Factors
Historic Properties	No significant impacts expected.	No significant impacts expected.	Construction contracts would have language that requires contractors to stop working and notify authorities in the event that there are unexpected discoveries during construction activities.
American Indian Cultural/ Religious Sites	No significant impacts expected.	No significant impacts expected.	Construction contracts would have language that requires contractors to stop working and notify authorities in the event that there are unexpected discoveries during construction activities.
Environmental Justice	No significant impacts expected.	No significant impacts expected.	None.
Noise	No significant impacts expected.	Minor and temporary, but not significant, negative impacts during construction are possible (machinery noise).	Negative impacts minimized through construction machinery maintenance (mufflers) and daylight construction schedule.
Traffic	No significant impacts expected.	Minor and temporary, but not significant, negative impacts during construction are possible (construction vehicle traffic).	Parking construction vehicles on the proposed EOC property will minimize impacts
Public Service and Utilities	No significant impacts expected.	No significant impacts expected.	None.
Public Health and Safety	Significant negative impact to public health and safety possible during chemical weapon agent release.	Significant positive impact to public health and safety in the event of a chemical weapon agent release.	None.

details the needs to address "fat clay" (clay susceptible to shrink-swell variations) and un-compacted fill material. A copy of their report detailing the results of the geotechnical investigation is included in Appendix F.

According to the Soil Survey Geographic database (SSURGO) developed by the Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture (USDA), the proposed EOC property contains four soil types as listed in Table 2 and illustrated in Figure 6 (Appendix A).

Table 2. Soil series that occur on the proposed EOC property.

Symbol	Soil Series	Farmland Rating	Erodible Rating
OwB	Otwell silt loam, 2 to 6 percent slopes, rarely flooded	Prime Farmland	Highly Erodible
FeD2	Faywood-Cynthiana complex, 12 to 25 percent slopes, eroded, very rocky	Not Prime	Highly Erodible
LoC2	Lowell silt loam, 6 to 12 percent slopes, eroded	Farmland of Statewide Importance	Highly Erodible
SaB	Sandview silt loam, 2 to 6 percent slopes	Prime Farmland	Not Highly Erodible

Prime Farmland is defined as land that has the best mix of physical and chemical properties for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses. The land can exist as cropland, pastureland, rangeland, forestland, or other land not covered in water. It cannot include developed land, urban land, built lands or filled lands. Farmlands of Statewide Importance include those that nearly possess the physical and chemical attributes of Prime Farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods (USDA 2012).

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to geology and soils.

Proposed Action Alternative – Although the Proposed Action Alternative would impact mapped areas of Prime Farmland and Farmland of Statewide importance (Appendix A, Figure 6),in their comment letter/report (Appendix C, Letter 1), the NRCS noted that the soils of the

northern portion of the site appeared disturbed as observed on 2012 aerial photography. The NRCS stated that the disturbed northern portion of the site…

> *"…will not be considered as natural agricultural land and the Farmland Protection Policy Act (FPPA) will not apply to this land or to the FeD2 soil type as it is not prime or important farmland. The area on the soils map with yellowish hash marks* [the southern portion of the site*] indicates the soils that will need FPPA consideration for FEMA funding as these are Prime Farmland or Statewide Important Farmland…"*

The NRCS initiated a Farmland Conversion Impact Rating assessment of the Proposed Action Alternative using form AD 1006. The NRCS estimated the area of Prime Farmland soil to be converted to be approximately 1.8 acres in size and calculated a "relative value" of 87 on a 100-point scale for the conversion (Part V of form AD 1006). Part VI of the form requires the project-supporting Federal agency to perform a "site assessment" using 12 separate criteria. The site assessment yielded a value of 40 on a 160-point scale for a total impact rating of 127 on a 260-point scale (Appendix D).

It should be noted that the ±7.3-acre property of the proposed EOC facility is within an industrial park. Though ±1.8 acres of this property would technically experience Prime Farmland conversion, the likelihood of this area returning to agriculture essentially does not exist. The conversion of this land functionally occurred when it was re-zoned and developed as an industrial park. In light of this and the diminutive size of the conversion, it is deemed that the Proposed Action Alternative will have only a minor negative impact on Prime Farmland.

Soil erosion is a concern for most of the property as asserted by the NRCS (Appendix C, Letter 1). The high clay content (shrink-swell) and slope of the original soils and the current state of soil disturbance indicate that development of the property may result in subsequent migration of surface soil. To avoid or minimize the escape of eroded soil materials during construction, the proposed EOC development plan calls for the installation and maintenance of soil conservation best management practices (BMP). Please refer to the Design Drawings in Appendix E.

4.1.2 Air Quality

The Clean Air Act (CAA) of 1970 (last amended in 1990) requires that states develop their own ambient air quality standards. The U.S. Environmental Protection Agency (USEPA) administers this law and has established a slate of national air quality standards based on the maximum concentration of six principal pollutants (or "criteria") as listed in Table 3.

Table 3. National air quality criteria for six principal pollutants.

Pollutant	Citation	Type
Carbon Monoxide	76 FR 54294, Aug 31, 2011	Primary
Lead	73 FR 66964, Nov 12, 2008	Primary and Secondary
Nitrogen Dioxide	75 FR 6474, Feb 9, 2010; 61 FR 52852, Oct 8, 1996	Primary and Secondary
Ozone	73 FR 16436, Mar 27, 2008	Primary and Secondary
Particle Pollution	Dec 14, 2012 (PM2.5, PM10)	Primary and Secondary
Sulfur Dioxide	75 FR 35520, Jun 22, 2010; 38 FR 25678, Sept 14, 1973	Primary and Secondary

Source: http://www.epa.gov/air/criteria.html

The CAA establishes two types of standards, (1) Primary standards, which protect the public health, including the health of "sensitive populations, such as people with asthma, children, and older adults" and (2) Secondary standards, which protect public welfare by promoting ecosystems health, and preventing decreased visibility and damage to crops and buildings (USEPA 2012). Of these six pollutants, ground level ozone and airborne particles are the two that pose the greatest threat to public health (USEPA 2012). Garrard County exceeds or meets ambient air quality standards of the USEPA and the Kentucky Division of Air Quality (KDAQ 2012).

The KDAQ regulates the release of fugitive emissions (401 KAR 63:010). The regulations prohibit or regulate the release of dust, soil, and other particulates outside the property line of where the emission originate.

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to air quality.

Proposed Action Alternative – Under the Proposed Action Alternative, minor, short-term impacts to air quality would occur during facility construction. Heavy construction activities can result in fugitive dust and soil (particulate matter) emissions from earth moving activities

and the release of nitrogen oxide (a precursor to ozone) from diesel powered construction vehicles and equipment. Vehicle and equipment emissions would unavoidably increase local pollutant levels. To reduce theses emissions, vehicle and equipment running times would be minimized, idling times for vehicles would be kept to a minimum and engines would be properly maintained.

Fugitive dust and soil from machinery activity may be a temporary negative impact during construction. To minimize fugitive soil impacts, two large aggregate *construction entrance pads* would be constructed abutting Precision Court. These pads will help to "drop" fugitive soil from construction vehicles before they leave the site. In addition, the construction site will be surrounded by silt fencing (Appendix E). If soil is accidently deposited on paved roads by the construction activities, it will be promptly removed. If dry weather conditions create significant fugitive dust emissions, construction workers will water down the exposed soils creating the dust. Further, if it is necessary to transport excess soil from the construction area to an off-site location, the dump trucks will be required to use a tarp to cover the load. This will minimize the creation of fugitive dust on the roadways.

There would be minor, long-term impacts on air quality, from the facility generator's emissions during occasional, short-term generator tests, maintenance and external power outages. There are no known topographical or meteorological conditions in the project area that are expected to hinder dispersal of these emissions.

4.1.3 Climate Change

In accordance with the Presidential Executive Order (EO) 13514 of October 2009 and the 2010 Climate Change Adaptation Report drafted by the Interagency Climate Change Adaptation Task Force (ICCATF), Federal agencies must consider potential impact of their actions on climate change. A Presidential CEQ memorandum (2010) lends guidance to this initiative and its application within the purview of NEPA. The memorandum notes:

> "*Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG* [greenhouse gas] *emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual*

direct emissions of less than 25,000 metric tons of CO_2-equivalent, CEQ encourages Federal agencies to consider whether the action's long-term emissions should receive similar analysis."

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to climate change.

Proposed Action Alternative – Under the Proposed Action Alternative, there would be a temporary increase in GHG emissions by heavy equipment during construction. The net gain or loss in GHG emission output of the proposed EOC operations versus the existing facility is not known. However, the Proposed Action Alternative would not approach 25,000 metric tons of CO_2-equivalent emissions and is not expected to significantly increase or decrease impacts to climate change.

4.2 Water Resources

4.2.1 Water Quality

Water quality is protected through various regulatory programs that exist under the umbrella of the Federal Clean Water Act (CWA). States can adopt these programs or keep them under Federal authority as per 40 CFR 131. The Kentucky Division of Water (KDOW) develops water quality standards for the waters of the Commonwealth and classifies those waters based on surface water use and habitat. Further it provides standards for the implementation of the Kentucky Pollutant Discharge Elimination System (KPDES) permit program.

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to water quality.

Proposed Action Alternative – Under the Proposed Action Alternative, impacts to water quality are expected to be minimal. Temporary and minor impacts can occur during construction when fugitive soil may enter the stream to the north of the property. This will be minimized or avoided by implementation of BMPs as per the design plans (Appendix E). To assure the proposed BMPs are sufficient, the project will require a KPDES General Permit for Stormwater Discharges Associated with Construction Activities (KYR10). Long-term impacts will be limited to stormwater run-off entering the stream. The dilute contaminants of the run-off will be typical of low intensity commercial land use such as petroleum products from incidental

vehicles leaks, air-born particulate deposition, lawn fertilizer and chemicals, etc. The impact of these contaminants is expected to be minor to the aquatic ecology of the receiving stream.

4.2.2 Wetlands/Streams

The discharge of dredged and fill materials into wetlands, streams and other waters of the U.S. is regulated by Sections 404 and 401 of the CWA of 1972 (33 USC 1344) and Section 10 of the Rivers and Harbor Act (RHA) of 1899 (33 USC 403). Permitting authority under Section 404 CWA and Section 10 RHA is delegated to the U.S. Army Corps of Engineers (USACE). Section 401 CWA maintains the rights of each state by requiring them to certify activities permitted under Section 404 do not violate state water quality standards. The Section 401 CWA program, also known as "Water Quality Certification" (WQC) in Kentucky is implemented by the KDOW.

Wetlands occur in areas of hydric soils where there is sufficient hydrology to support hydrophytic vegetation (wetland plants). The proposed EOC property does not contain hydric soils (Appendix A, Figure 6). The property was visited by Copperhead scientists in September, 2013. Wetlands were not observed; however, a stream was present along the northern border of the site and within a forested riparian corridor (Appendix A, Figure 2).

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to wetlands or other waters of the U.S.

Proposed Action Alternative – Under the Proposed Action Alternative, there will be no impacts to wetlands, streams, or other waters of the U.S. In their comment letter dated January 9, 2014 (Appendix C, Letter 2), the USACE noted:

> *"…a Department of the Army (DA) Permit MAY BE REQUIRED if the project results in a discharge of fill material into 'waters of the U.S.' The mapping you provided shows work in or near what appears to be 'waters of the U.S. ' These waters include an unnamed tributary to Boone Creek of the Dix River."*

However, in accordance with the design plans (Appendix A, Figure 4 & Appendix E), the project will not result in a discharge to this stream. Therefore, impacts to waters of the U.S. are avoided.

4.2.3 Floodplains

Floodplains are lands adjacent to large waterways that experience periodic flooding. According to EO 11988, Federal agencies should avoid project impacts to floodplains whenever there is a practicable alternative. In addition, an EOC is considered critical infrastructure and a critical resource during severe flooding events that may adversely affect the populous. Hence, locating an EOC within a flood zone where EOC operations could be adversely affected by flooding would be inconsistent with its mission.

The Flood Insurance Rate Maps (FIRM) and database maintained by FEMA illustrate the flood hazard zones. Accordingly, the proposed EOC is located outside the 500-year floodplain (Appendix A, Figure 7). Further, construction of the EOC will not occur within the riparian corridor of the small stream located along the northern boundary of the property.

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to floodplains.

Proposed Action Alternative – Under the Proposed Action Alternative, there will be no impacts to floodplains. There are no mapped flood hazard areas located on the property of the proposed EOC.

4.3 Biological Resources

4.3.1 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act (ESA) of 1973 requires Federal agencies to determine the effects of their proposed actions on listed species of fish, wildlife, and plants, and their designated critical habitats. The ESA further requires that Federal agencies actively conserve and protect these listed species and their habitat.

The U.S. Fish and Wildlife Service (USFWS) has Federal authority to administer the ESA. According to the USFWS response letter dated December 17, 2013 (Appendix C, Letter 3), five Federally listed species (three mammals and two plants) have the potential to occur within the vicinity of the proposed EOC property (Table 4).

Table 4. Federally-listed species within the Garrard County EOC project area.

Group	Species	Common Name	Legal Status*
Mammals	*Myotis grisescens*	gray bat	E
	Myotis sodalis	Indiana bat	E
	Myotis septentrionalis	northern long-eared bat	P
Plants	*Trifolium stoloniferum*	running buffalo clover	E
	Lesquerella [Physaria] globosa	Short's bladderpod	C

*E = Endangered, C = Candidate, P = Proposed

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to threatened or endangered species or their critical habitats.

Proposed Action Alternative – Under the Proposed Action Alternative, impacts to Federally listed species are not anticipated. The Federally listed species noted by the USFWS have a potential to be present based on their range. No specific observations of these species have been noted to occur on or in close proximity to the proposed EOC property. In each case, either the listed species' habitat is not present on the property or the proposed EOC facility construction and operation will avoid the limited potential habitat that may be present.

Statements and recommendations made by the USFWS in their response letter dated December 17, 2013 (Appendix C, Letter 3) and their applicability to the proposed EOC project are presented in Table 5.

Table 5. USFWS recommendations and the Garrard County EOC Proposed Action Alternative response in regards to Federally-listed species under the ESA.

Issue	Description	USFWS Recommendation	Project Response
gray bat			
Winter/ Summer Habitat	Caves, rock shelters, and underground mines.	Search for these structures.	Structures are not present on the proposed EOC property.
Foraging Habitat	Streams	Use BMPs to minimize siltation of stream.	The stream in the northern portion of the EOC property is potential foraging habitat. This habitat will be avoided and BMPs will be employed to protect the aquatic stream environment.

Issue	Description	USFWS Recommendation	Project Response
Indiana bat			
Winter Habitat	Caves, rock shelters, and underground mines.	Search for these structures.	Structures are not present on the proposed EOC property.
Summer Habitat	Forested areas, trees with ≥ 5"DBH.	Eliminate impact to trees.	Trees are present on the property; However, tree impacts will be avoided as per the proposed EOC construction and operation designs.
northern long-eared bat			
Winter Habitat	Caves, tunnels, and underground mines.	Search for these structures.	Structures are not present on the proposed EOC property.
Summer Habitat	Forested areas, any trees.	Eliminate impact to trees.	Trees are present on the property; However, tree impacts will be avoided as per the proposed EOC construction and operation designs.
running buffalo clover			
Habitat	Disturbed pastures, moderately grazed fields, road ROWs, power line ROWs, stream banks, low mesic forest, lawns, and cemeteries.	Search for these potential habitat areas. Avoid impact.	Stream banks and low mesic forest are present within the north part of the property. However, impacts to these areas will be avoided as per the proposed EOC construction and operation designs. The remaining EOC property has been landfilled and/or stripped of vegetation.
Short's bladderpod			
Habitat	Steep, rocky, wooded slopes; talus areas; bluffs; bluff near rivers/streams	Search for these potential habitat areas. Avoid impact.	These habitats are not present on the proposed EOC property.

Source: USFWS in their response letter dated December 17, 2013

On April 24, 2014, an email was sent to the USFWS requesting their concurrence that the proposed project would "Not Likely to Adversely Affect" currently listed federally endangered or threatened species. The USFWS concurred and stated that the requirements of Section 7 of the Endangered Species Act had been fulfilled in their response letter dated April 28, 2014 (Appendix C, Letter 3a).

4.3.2 Migratory Birds

The Migratory Bird Treaty Act (MBTA) (16 USC 703-711) protects migratory birds and is enforced by the USFWS. The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations (USFWS 2012).

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to migratory birds.

Proposed Action Alternative – Under the Proposed Action Alternative, negative impacts to migratory birds are not expected. The proposed EOC facility footprint of disturbance (construction and operation) will occur on a portion of the property that was previously cleared to prepare the lot for development (Appendix A, Figure 4). The adjacent woodland and riparian corridor to the north and west of the property and the hedge row to the east will remain intact after construction and during the operation of the EOC facility. These habitats will continue to provide migrating bird habitat and foraging sites.

The radio communications tower will be a self-supporting structure (185 ft. tall) and will not require the use of guy wires or navigation lights. Guy wires are believed to be a primary cause of bird mortality at communication tower sites. Observational studies of birds in the vicinity of towers revealed that birds are much more likely to collide with the guy wires than the tower itself (Longcore et. al. 2008).

In their April 28, 2014 correspondence, the USFWS commented on project relative to the MBTA and stated *"The Service believes that constructing towers less than 200 feet in height without guy lines or lights minimizes impacts on protected bird species."*(Appendix C, Letter 3a).

4.3.3 Wildlife and Fish

Impacts to wildlife and fish are associated with consumption of habitat and pollution.

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to wildlife and fish.

Proposed Action Alternative – Under the Proposed Action Alternative, negative impacts to wildlife and fish are not expected. The proposed EOC facility footprint of disturbance (construction and operation) will occur on a portion of the property that was previously cleared to prepare the lot for development (Appendix A, Figure 4). The adjacent woodland and riparian corridor to the north and west of the property and the hedge row to the east will remain intact after construction and during the operation of the EOC facility. These habitats will continue to provide habitat for local wildlife and fish. In their December 17, 2013 letter, the Kentucky Department of Fish and Wildlife Resources (KDFWR) recommended erosion controls to protect the aquatic environment (Appendix C, Letter 4). These controls are part of the EOC facility site plans (Appendix E). Adherence to erosion prevention and sediment transport control BMPs will be essential to protect the adjacent woodlands and the stream habitat for aquatic life including fish.

4.4 Cultural Resources

4.4.1 Historic Properties

National Historic Preservation Act of 1966 (NHPA) Section 106, as amended, and implemented by 36 CFR Part 800, requires Federal agencies to consider the effects of their actions on historic properties and provide the Advisory Council on Historic Preservation's (ACHP) Rules and Regulations for the Protection of Historic and Cultural Properties an opportunity to comment on Federal projects prior to implementation. Historic properties are defined as archaeological sites, standing structures, or other historic resources listed in or eligible for listing, in the National Register of Historic Places (NRHP).

No Action Alternative – Under No Action, there would be no construction, and thus, no impacts on any above ground historic resources, or on below ground archeological resources.

Proposed Action Alternative – Under the Proposed Action, adverse impacts to historic or archaeological resources are not anticipated. FEMA requested Kentucky Heritage Council/State Historic Preservation Officer (KHC/SHPO) concurrence with their determination of "No Adverse Effect to Historic Properties" in a letter dated January 27, 2014. The SHPO concurred in their response letter dated February 27, 2014 (Appendix C, Letter 6). The design height of the radio communication tower later changed from 140 ft. to 185 ft. tall. FEMA

determined that the increased tower height did not change the original finding of "No Adverse Effect to Historic Properties" and communicated this to the KHC/SHPO (via email). On April 14, 2014, the SHPO concurred (via email) that additional information was not required (Appendix C, Letter 6a)

To ensure that the Proposed Project Alternative will not adversely affect archaeological resources, contracts for construction will include the following provisions for the treatment of fortuitous finds or unexpected discoveries during ground disturbing activities within the project area:

1. If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with early Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the immediate vicinity of such discoveries. The applicant shall contact the Kentucky Heritage Council Site Protection Program within 24 hours of the discovery. Project activities shall not resume without verbal and/or written authorization. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Kentucky Statutes, Section 72.02.

2. Any changes to the approved scope of work will require submission to, and evaluation and approval by, the State and FEMA, prior to initiation of any work, for compliance with Section 106.

4.4.2 American Indian Cultural/Religious Site

FEMA initiated coordination with American Indian tribes in order to obtain concurrence with their determination of "No Adverse Effect to Historic Properties". Coordination letters were sent to the following tribes on January 27, 2014:

Absentee Shawnee Tribe of Oklahoma, Cherokee Nation, Chickasaw Nation, Eastern Shawnee Tribe of Oklahoma, Eastern Band of the Cherokee Indians, Miami Tribe of Oklahoma, Peoria Indian Tribe of Oklahoma, Shawnee Tribe, United Keetoowah Band of Cherokee Indians in

Oklahoma. Two tribes responded prior to the conclusion of the comment period (March 12, 2014).

The Peoria Tribe of Indians of Oklahoma responded with the following (Appendix C, Letter 7):

> *"The Peoria Tribe has no objection at this time to the proposed EOC construction project. If, however, at any time items are discovered which fall under the protection of NAGPRA, the Peoria Tribe requests immediate notification and consultation. In addition state, local and tribal authorities should be advised as to the findings and construction halted until consultation with all concerned parties has occurred."*

The Eastern Shawnee Tribe of Oklahoma responded with the following (Appendix C, Letter 8):

> *"We have no objection to the above referenced construction project, but ask for the stipulation to be included that the Eastern Shawnee Tribe of Oklahoma wishes to be consulted if any inadvertent discoveries are made, work will cease and we will be contacted."*

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to American Indian cultural / religious sites.

Proposed Action Alternative – Under the Proposed Action Alternative, no adverse impacts to American Indiana cultural/religious sites are anticipated.

4.5 Socioeconomic Concerns

4.5.1 Environmental Justice

EO 12898 (Environmental Justice) mandates that Federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

The Bureau of Census reports in the 2010 Census, Garrard County's resident population was 16,912, an increase of 12.5% from the 2000 Census. Census data from 2005 to 2009 shows 17.2% of the population for whom poverty status is determined to be living below poverty level. 2007-2010 American Community Survey Census data shows 12.6% unemployment, as compared to 8.9% unemployment for the Commonwealth of Kentucky. Median household income for that

period in Garrard County was estimated at $40,137 as compared to $42,248 for the Commonwealth of Kentucky (USDC web site, accessed November 5, 2013).

The U.S. Census Bureau, 2007-2011 American Community Survey reports that 94.6% (15,982 persons) of the population of Garrard County is "white alone-not Hispanic or Latino". The Commonwealth of Kentucky was 86.6% "white alone-not Hispanic or Latino".

No Action Alternative – There would be no disproportionately high or adverse impact on minority or low income portions of the population. No population would benefit from the emergency services that would be provided by the proposed facility.

Proposed Action Alternative – No disproportionately high or adverse impacts to low income or minority populations are anticipated from the Proposed Action Alternative. Any property value changes caused by the proposed project are anticipated to be positive. The Proposed Action Alternative would benefit all populations in Garrard County, KY by providing a safer, permanent EOC location and facilitating more complete, efficient, and effective emergency communications and services.

4.5.2 Noise

Noise is generally defined as unwanted sound. Sound is most commonly measured in decibels (dB) on the A-weighted scale which is most similar to the range of sounds audible to the human ear. The Day-Night Average Sound Level (DNL) is an average measure of sound. The DNL descriptor is accepted by Federal agencies as a standard for estimating sound impacts and establishing guidelines for compatible land uses. USEPA guidelines, and those of many other Federal agencies, state that outdoor sound levels exceeding 55 dB DNL are "normally inacceptable" for noise sensitive land uses such as residences, schools, or hospitals. The project site is located in a rural area outside of downtown Lancaster. Surrounding land use is predominantly agricultural with some rural-residential development. Few residential structures are located near the proposed site.

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to noise levels.

Proposed Action Alternative – Under the Proposed Action Alternative, temporary short-term noise level increases are expected during construction. Construction activities would be conducted during normal business hours to avoid excessive disturbance to nearby residences. Equipment and machinery installed at the project site would meet all local, state, and Federal noise regulations.

4.5.3 Traffic

The proposed project site is located north of KY 52 just west of downtown Lancaster at the end of Precision Court. The site sits within 2,000 ft. of KY 52 and is less than a mile from the center of downtown Lancaster. In the Lancaster area, KY 52 traverses a mix of rural, residential, commercial, and light industrial land uses.

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to traffic or transportation.

Proposed Action Alternative – Under the Proposed Action Alternative, a minor increase in traffic volume near the project site is anticipated to occur that could potentially slow traffic. Potential delays would be minimized by storing of vehicles and equipment onsite during construction. Any long-term transportation impacts from the Proposed Action Alternative are expected to be very minor and well within local transportation infrastructure capacity.

The KY Department of Transportation commented through the Kentucky State Clearinghouse (KSC) evaluation process that a standard encroachment permit would be required if construction activities encroached upon a state maintained right-of-way (ROW) (Appendix C, Letter 5). The Proposed Action Alternative will require access to Precision Court which is not maintained by the state. Therefore, this permit will not be required.

4.5.4 Public Service and Utilities

The City of Lancaster would be the provider of water and sanitary sewer to the facility. Primary power would be supplied by Kentucky Utilities. Natural gas would be supplied by Atmos Energy. Cable service for the area is supplied by Time Warner Cable. Telephone service is supplied by Windstream Communications.

No Action Alternative – Under the No Action Alternative, there would be no construction and no impacts to public service and utilities.

Proposed Action Alternative – The Proposed Action Alternative is well within the capacity of existing public service and utilities and would not place significant demands on existing utility infrastructure.

4.5.5 Public Health and Safety

Safety and security issues considered in this document include the area resident's, the general public's, and Proposed Action Alternative construction worker's health and safety.

No Action Alternative – Under the No Action Alternative, there would be no construction and significant negative impacts on the population's health and safety. There would be no improvement in emergency response service, deemed inadequate by CSEPP, in the event of a chemical weapon agent release. Garrard County residents and the general public would remain at current elevated risk during disaster events.

Proposed Action Alternative – Under the Proposed Action Alternative, the new facility would help to better prepare and protect the general public and Garrard County residents and their improved properties before, during, and after a chemical weapon agent release and other disaster events.

Temporary health and safety risks to construction workers would be minimized through the use of appropriate personal protective equipment (PPE), following all applicable Occupational Safety and Health Administration (OSHA) regulations, use of appropriate signage and barriers, proper maintenance and lock-out/tag-out of construction equipment, and through the use of qualified and well trained workers. There would be no disproportionate health or safety risks to children.

4.6 Cumulative Impacts

In accordance with FEMA's NEPA policy and the requirements of the CEQ, the impact of the Proposed Alternative and other actions that impact the resources reviewed herein were

considered for their cumulative effects and the potential to result in a significant cumulative impact. The CEQ (40 CFR 1508.7) defines cumulative impact as...

> *"…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."*

However, not all of the resources directly impacted by a Proposed Project Alternative require a cumulative impact analysis. There needs to exist a potential for an additive or synergistic effect that would result in an increase to the combined impact's significance to the effected resource.

In the Proposed Action Alternative, cumulative impacts are not apparent for resources considered by the EA with the possible exceptions of temporary construction impacts and beneficial impacts to public health and safety. According to the Garrard Building Inspector's office (personal communication with Garrard County Building Inspector, May 23, 2014) the only planned commercial development in the county is the new construction of a small strip center (to include a fast food restaurant and a discount store) and the expansion of a boat mechanic shop. Both construction sites will be located near the intersection of Highways 34 and 27 approximately 6 miles northwest of the proposed Garrard County EOC. The proposed EOC property is surrounded by rural, residential and commercial properties. It is foreseeable that the remaining properties of the Industrial Park will be developed eventually. However, it is unknown if or when the remaining private properties surrounding the proposed EOC will be developed. If construction does occur during the time of the proposed project, then minor temporary cumulative impacts to soil, traffic, noise, and air quality in the area are possible.

The proposed EOC facility may result in a positive cumulative impact on 911 emergency call response capabilities for Garrard County residents and perhaps those of Lincoln County as well. In 2008, Garrard and Lincoln Counties combined their 911 call-in centers to create one regional dispatch control center (911BCC). The Proposed Action Alternative will install new communication technologies and combine the 911BCC and EOC operations into one location. Therefore, the combination of the past formation of 911BCC and the upgrades and efficiencies

of the Proposed Action Alternative can potentially result in a positive cumulative impact to the public health and safety of local residents.

5.0 AGENCY COORDINATION, PUBLIC INVOLVEMENT AND PERMITS

5.1 Agency Coordination

The following agencies were consulted during the preparation of this document. Please refer to Appendix C for specific agency correspondence.

1. Kentucky State Clearinghouse:
   - Kentucky Transportation Cabinet
   - Kentucky Natural Resources Cabinet
   - Kentucky Division of Air Quality
   - Kentucky Division of Water
   - Kentucky Heritage Council
   - Kentucky Department of Fish & Wildlife Resources
   - Kentucky Department of Housing, Buildings, and Construction
   - Kentucky Labor Cabinet
2. Kentucky Department of Fish & Wildlife Resources
3. State Historic Preservation Officer
4. Natural Resources Conservation Service
5. U.S. Fish & Wildlife Service
6. U.S. Army Corps of Engineers

5.2 Public Involvement

This Draft EA will be made available for public review and comment. A copy of the document will be available at the Garrard County Public Library located at 101 Lexington St. Lancaster, KY 40444, and on FEMA's website. The Garrard County EMA will notify the public via the local newspaper; the Garrard Central Record. The public will be provided a thirty-day public comment period, starting on the date of posting. Public comments will be directed to be submitted to:

April Cummings
FEMA Region IV
Acting Regional Environmental Officer
FEMA-R4EHP@fema.dhs.gov

5.3 Permits

- Building Permit, Garrard County, Kentucky.
- Kentucky Pollutant Discharge Elimination System (KPDES) – General Permit for Stormwater Discharges Associated with Construction Activities (KYR10)

6.0 LIST OF PREPARERS

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FEMA Region IV

7.0 LITERATURE CITED AND REFERENCED

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8.0 APPENDICES

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- Figure 2. Existing Conditions Map
- Figure 3. Land Use / Land Cover
- Figure 4. Project Design Map
- Figure 5. Geologic Map
- Figure 6. Hydric Soils and Prime Farmland Soils Map
- Figure 7. Floodplain and Wetland Map

Appendix B – Photographs

Appendix C – Agency Correspondence
- Letter 1. Natural Resources Conservation Service (NRCS)
  Dated: December 19, 2013
- Letter 2. U.S. Army Corps of Engineers (USACE)
  Dated: January 9, 2014
- Letter 3. U.S. Fish & Wildlife Service (USFWS)
  Dated: December 17, 2013
- Letter 3a. U.S. Fish & Wildlife Service (USFWS)
  Dated: April 28, 2014
- Letter 4. Kentucky Department of Fish & Wildlife Resources (KDFWR)
  Dated: December 17, 2013
- Letter 5. Kentucky State Clearinghouse (KSC)
  Dated: February 7, 2014
- Letter 6. State Historic Preservation Office (SHPO)
  Dated: February 27, 2014
- Letter 6a. State Historic Preservation Office (SHPO)
  Dated: April 14, 2014
- Letter 7. Peoria Tribe of Indians of Oklahoma
  Dated: January 29, 2014
- Letter 8. Eastern Shawnee Tribe of Oklahoma
  Dated: February 4, 2014

Appendix D – Farmland Conversion Impact Rating

Appendix E – Design Drawings

Appendix F – Geotechnical Exploration Report (Cardno ATC)

Appendix G – Programming and Planning Study (MCP/SGA)

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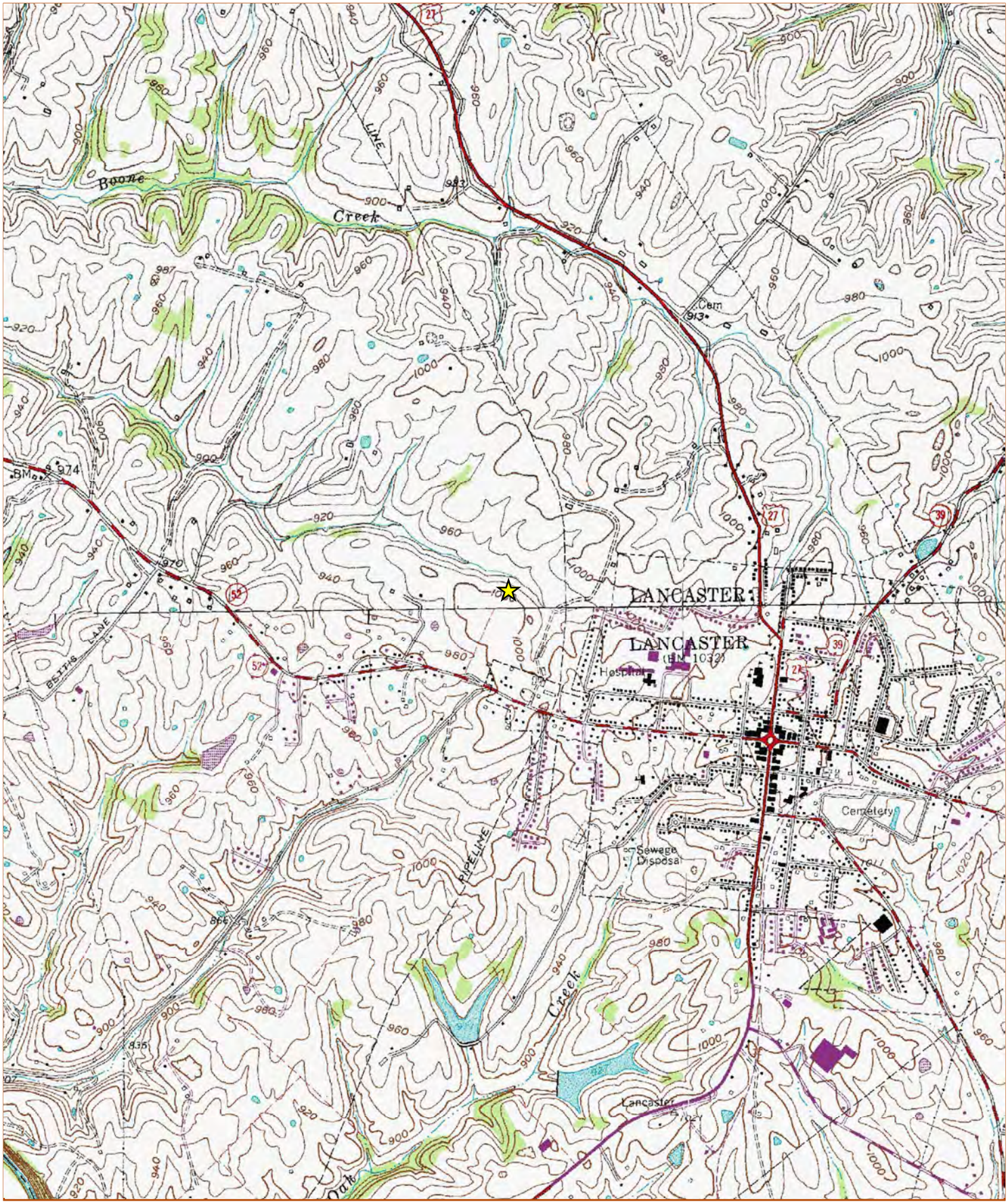
Appendix A

Figures



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★ Site Location

Site Location Map

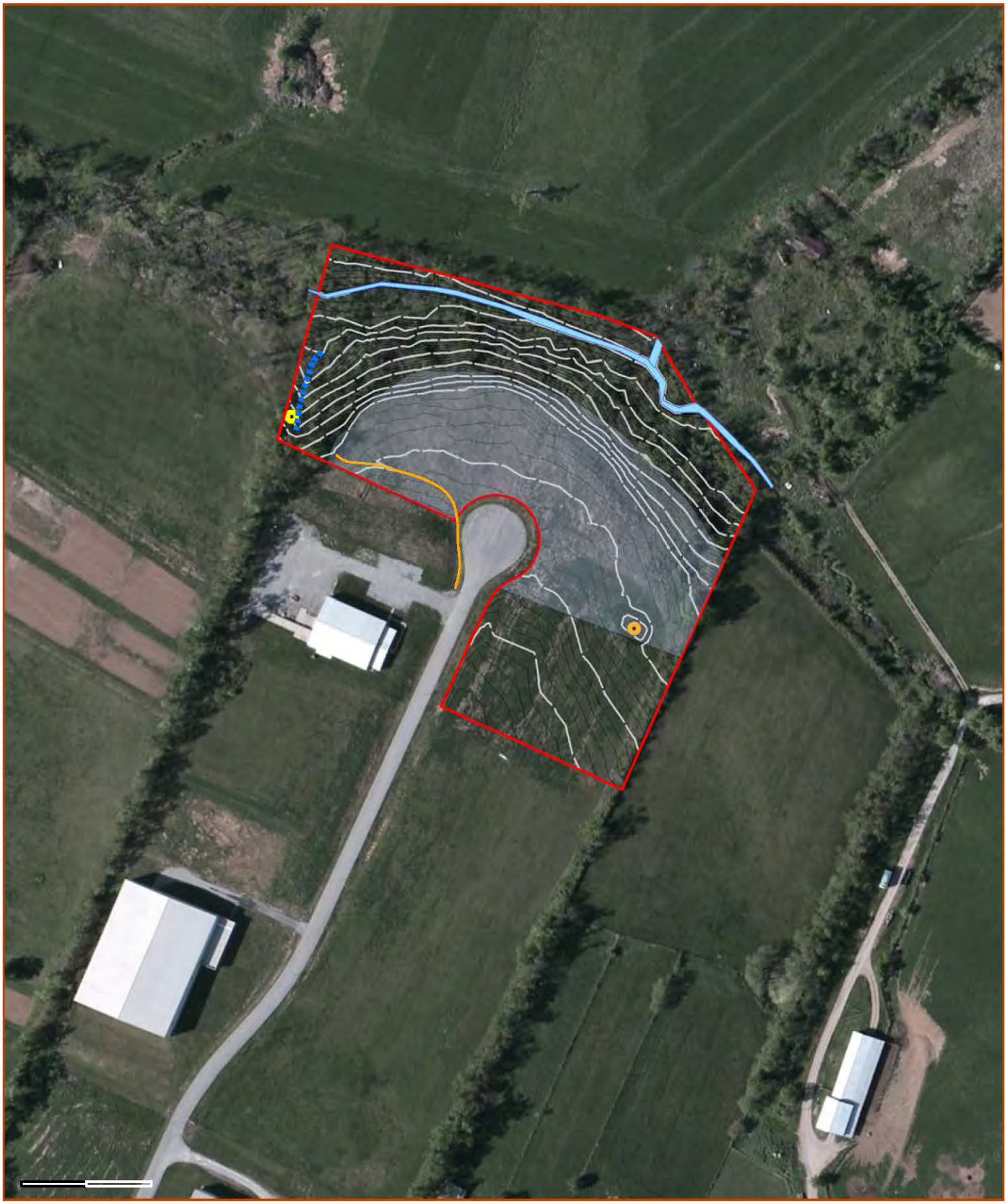
Environmental Assessment
Proposed Emergency Operations Center

Precision Court
Lancaster, Garrard County,
Kentucky

North American Datum
1983 State Plane
Kentucky South US
Lambert Conformal Conic

Source: Brandstetter Carroll Inc., USGS
Date: 4/7/2014

Figure 1



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Property Boundary
Previously Graded Area
Intermittent Stream
Soil Stockpile
Refuse pile
5 ft Contours
1 ft Contours
Ditch
Drain

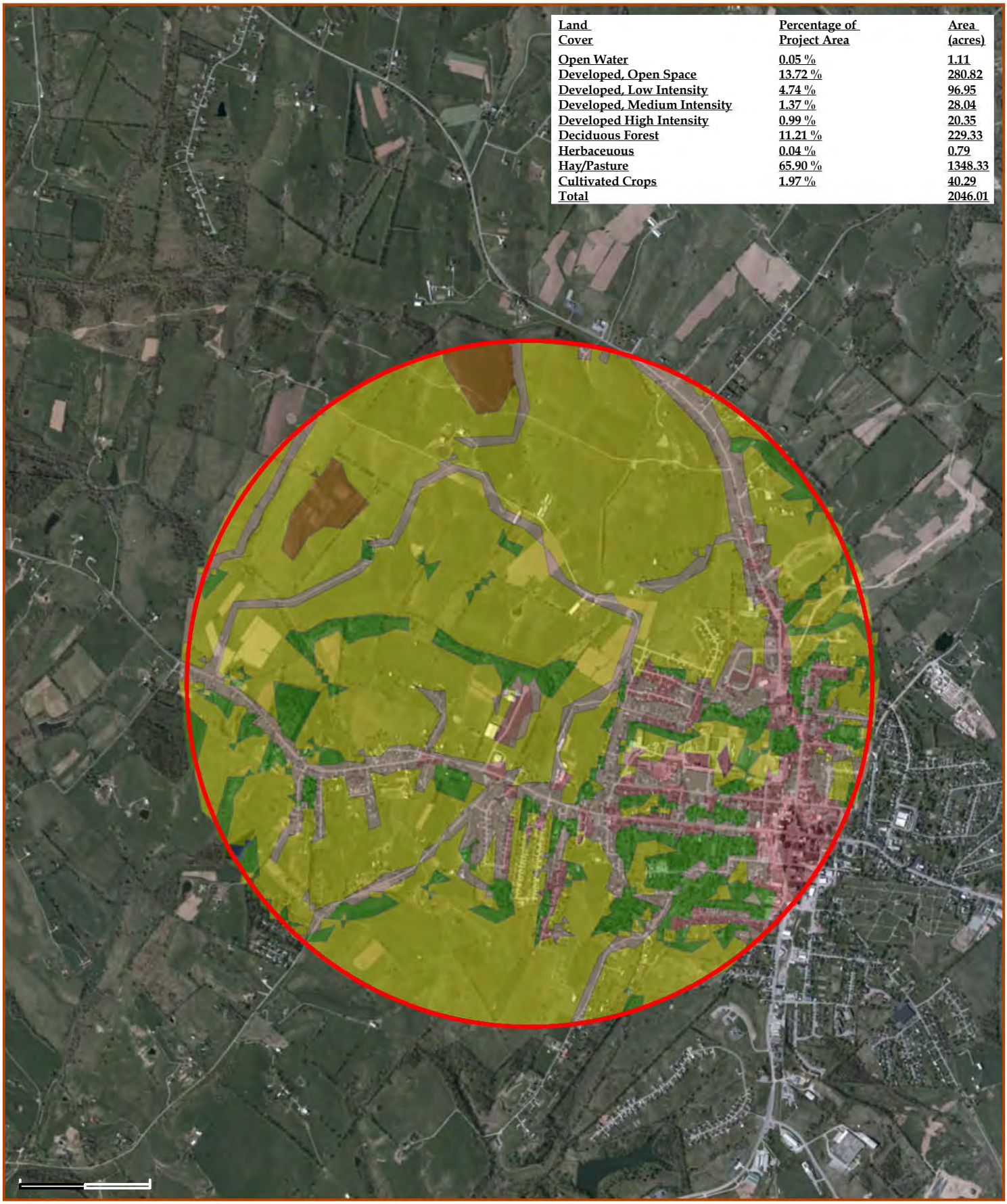
Existing Conditions Map
Environmental Assessment
Proposed Emergency Operations Center

Precision Court
Lancaster, Garrard County, Kentucky

North American Datum
1983 State Plane
Kentucky South US
Lambert Conformal Conic

Source: Brandstetter Carroll Inc.
Date: 4/7/2014

Figure 2



Land Cover	Percentage of Project Area	Area (acres)
Open Water	0.05 %	1.11
Developed, Open Space	13.72 %	280.82
Developed, Low Intensity	4.74 %	96.95
Developed, Medium Intensity	1.37 %	28.04
Developed High Intensity	0.99 %	20.35
Deciduous Forest	11.21 %	229.33
Herbaceuous	0.04 %	0.79
Hay/Pasture	65.90 %	1348.33
Cultivated Crops	1.97 %	40.29
Total		2046.01

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- 1 Mile Buffer
- Cultivated Crops
- Deciduous Forest
- Developed High Intenisty
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
- Hay/Pasture
- Herbaceuous
- Open Water

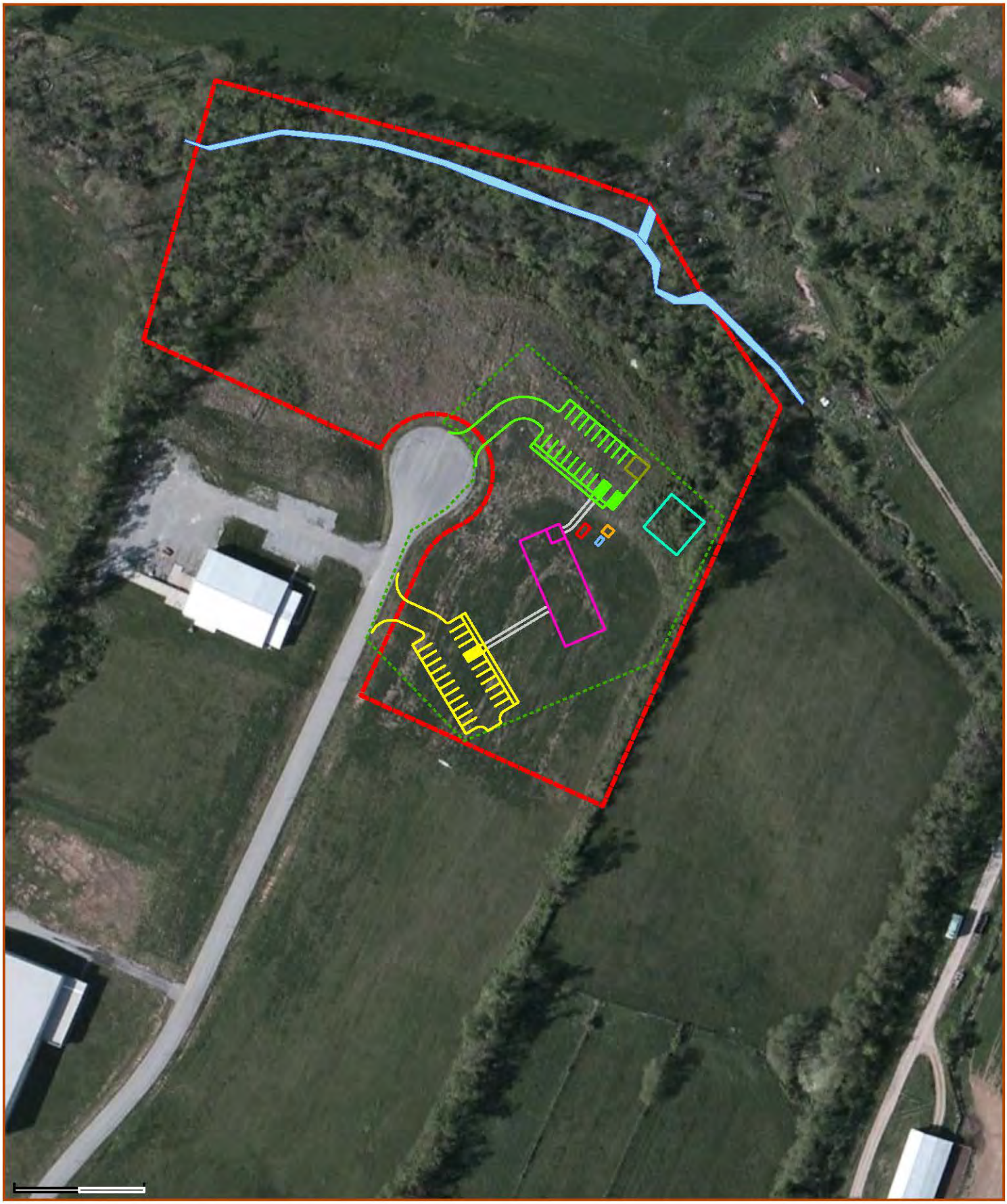
Land Use/ Land Cover Map
Environmental Assessment
Proposed Emergency Operations Center

Precision Court
Lancaster, Garrard County, Kentucky

North American Datum
1983 State Plane
Kentucky South US
Lambert Conformal Conic

Source: Brandstetter Carroll Inc., USGS
Date: 4/7/2014

Figure 3



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- Tower Proposed
- Garrard EOC Building
- 30x30 Concrete Building
- 20x20 Concrete Dumpster Pad
- General Parking
- Staff Parking
- Shelter
- Transformer and Generator Pad
- 6' Sidewalk
- Area of Disturbance
- Project Boundary
- Stream

Project Design Map

Environmental Assessment
Proposed Emergency Operations Center

Precision Court
Lancaster, Garrard County, Kentucky

North American Datum
1983 State Plane
Kentucky South US
Lambert Conformal Conic

Source: Brandstetter Carroll Inc.
Date: 4/7/2014

Figure 4

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- Project Boundary
- Ordovician dolostone (dolomite) (Od)
- Ordovician limestone (Oaf)
- Ordovician shale (Okc)

Geologic Map
Environmental Assessment
Proposed Emergency Operations Center

Precision Court
Lancaster, Garrard County, Kentucky

North American Datum
1983 State Plane
Kentucky South US
Lambert Conformal Conic

Source: Brandstetter Carroll Inc., USGS
Date: 4/7/2014

Figure 5

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- Project Boundary
- All areas are prime
- Farmland of statewide importance
- Not prime farmland
- Prime farmland if protected from flooding or not frequently flooded during the growing season

Hydric Soils and Prime Farmland Soils Map

Environmental Assessment

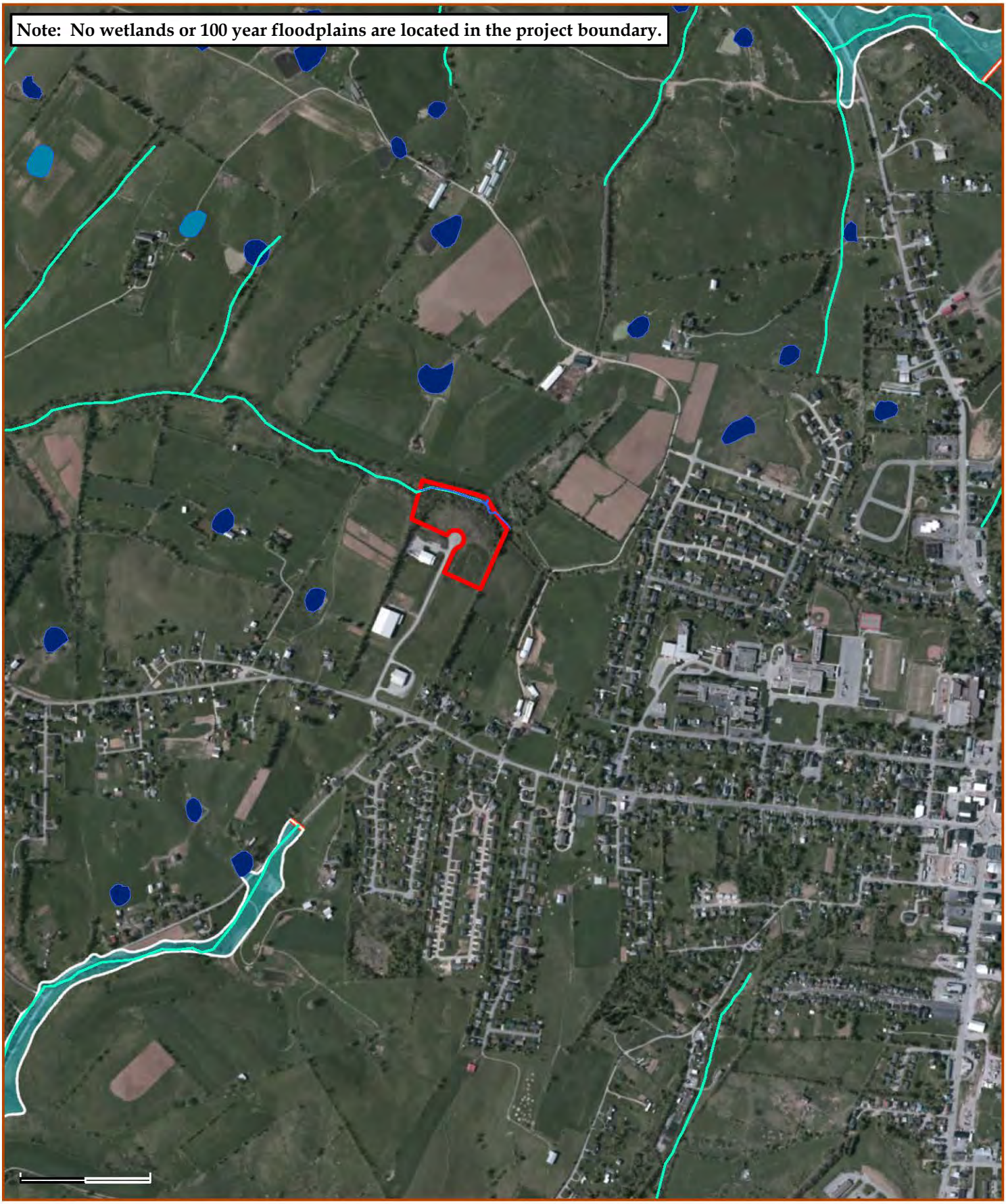
Proposed Emergency Operations Center

Precision Court
Lancaster, Garrard County, Kentucky

North American Datum
1983 State Plane
Kentucky South US
Lambert Conformal Conic

Source: Brandstetter Carroll Inc., NRCS
Date: 4/7/2014

Figure 6



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Project Boundary
100 Year Floodplain
Freshwater Emergent Wetland
Freshwater Pond
Intermittent Stream
NHD Stream Feature

Floodplain and Wetland Map
Environmental Assessment
Proposed Emergency Operations Center

Precision Court
Lancaster, Garrard County, Kentucky

North American Datum
1983 State Plane
Kentucky South US
Lambert Conformal Conic

Source: Brandstetter Carroll Inc., FEMA, National Wetlands Inventory
Date: 4/7/2014

Figure 7

Appendix B

Site Photographs

Site Photographs – Garrard County EOC
Precision Ct., Lancaster, KY: Lot 1A

Panoramic View (PV) of Property – Counterclockwise Sequence

	PV-PHOTO 1: Vantage: Cul-de-sac; Precision Court. View: ESE towards eastern border of Lot 1A.
	PV-PHOTO 2: Vantage: Cul-de-sac; Precision Court. View: ENE towards NE corner of Lot 1A.

	PV-PHOTO 3: Vantage: Cul-de-sac; Precision Court. View: NE towards northern border of Lot 1A.
	PV-PHOTO 4: Vantage: Cul-de-sac; Precision Court. View: NNW towards northern border of Lot 1A.

	PV-PHOTO 5: Vantage: Cul-de-sac; Precision Court. View: WNW towards western border of Lot 1A.

Other Photographs

	PHOTO 6: Vantage: Eastern border of Lot 1A. View: West towards western border of Lot 1A.

	PHOTO 7: Vantage: End of Precision Court at base of cul-de-sac. View: SSW towards building on adjacent Lot 5.
	PHOTO 8: Vantage: Midpoint of Precision Court. View: SSW. Precision Court towards KY 52.

	PHOTO 9: Vantage: Near northeast corner of the property. View: Upstream and east along unnamed tributary that boarders the north side of the property.
	PHOTO 10: Vantage: Near northwest corner of the property. View: Downstream and west along unnamed tributary that boarders the north side of the property.

	PHOTO 11: Vantage: Near north west corner of the property. View: Upstream and east along unnamed tributary that boarders the north side of the property.
	PHOTO 12: Vantage: Near north west corner of the property. View: Downstream and west along unnamed tributary that boarders the north side of the property.

	PHOTO 13: Vantage: Near western border of the property within woodland edge. View: SE towards open and disturbed area: refuse pile including tires.

Appendix C

Agency Correspondence

Letter 1.

Natural Resources Conservation Service

(NRCS), December 19, 2013

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
3032 Alvey Park Drive West, Suite 2
Owensboro, KY 42303

Phone: (270) 685-1707 ext.131
Fax: (270) 926-7808

December 19, 2013

Gregg Shirk
Copperhead Environmental Consulting, Inc.
P.O. Box 73
11641 Richmond Road
Paint Lick, KY 40461

Mr. Shirk:

This letter is in response to your request for assistance on an environmental impact for the construction of a new Garrard County Emergency Operations Center in Lancaster, KY.

From the information that was provided to me, I created a soils map (enclosed) to show the different kind of soils that are on this proposed site. From the 2012 aerial photography that we have available, it appears that the southern part of the property has not been disturbed, whereas the northern part has been manipulated with some possible fill material added to level the construction area. This disturbed area will not be considered as natural agricultural land and the Farmland Protection Policy Act (FPPA) will not apply to this land or to the FeD2 soil type as it is not prime or important farmland. The area on the soils map with yellow hash marks indicates the soils that will need FPPA consideration for FEMA funding as these are Prime Farmland or Statewide Important Farmland (see enclosed Prime Farmland Map). Enclosed also is the AD-1006 that has been started with the NRCS portion completed.

As for soil erosion on this site, water erosion is the big concern. The soil type SaB is considered as "Not Highly Erodible" soil. The other soil types on this site are considered as "Highly Erodible" soil types and soil conservation measures should be used to minimize erosion and sedimentation in nearby streams.

As for wetlands on this site, there are no soils on this site that would be considered as hydric soils or have hydric inclusions. Wetlands should not be a concern for this site.

Enclosed with this letter you will also find two reports. One report is a titled "*Prime and Other Important Farmlands*" and shows which soils on this site are Prime Farmland and Statewide Important Farmland. The other report is titled "*Dwellings and Small Commercial Buildings*" and it shows what soils concerns there might be on this site for the construction of a building. The two main concerns are slope and shrink-swell (high clay content in subsoil) in the LoC2 soil type where the building is being proposed.

If this office may be of additional assistance, please do not hesitate to contact our office in Stanford, KY by calling the District Conservationist, Bo Renfro at 606-365-2214 ext. 3, or myself in Owensboro at 270-685-1707 ext. 131.

David A. Gehring

DAVID A. GEHRING
Resource Soil Scientist, Owensboro, KY

Cc:
Bo Renfro, Lead District Conservationist, Stanford, KY

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 12/04/13
Name of Project Garrard County Emergency Operations Center	Federal Agency Involved FEMA
Proposed Land Use Buildings and parking lots	County and State Garrard, Kentucky
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 12/17/08

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☒	NO ☐	Acres Irrigated / Average Farm Size

Major Crop(s): Corn	Farmable Land In Govt. Jurisdiction: Acres: 76,214 % 51.56	Amount of Farmland As Defined in FPPA: Acres: 57,941 %39.2
Name of Land Evaluation System Used: LESA	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS: 12/19/2013

PART III *(To be completed by Federal Agency)*	Alternative Site Rating: Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	1.8			
B. Total Acres To Be Converted Indirectly	5.5			
C. Total Acres In Site	7.3			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	0.5			
B. Total Acres Statewide Important or Local Important Farmland	1.3			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0.003%			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	9.12			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)	87			

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	Maximum Points	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160				
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	87			
Total Site Assessment *(From Part VI above or local site assessment)*	160				
TOTAL POINTS ***(Total of above 2 lines)***	260				

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

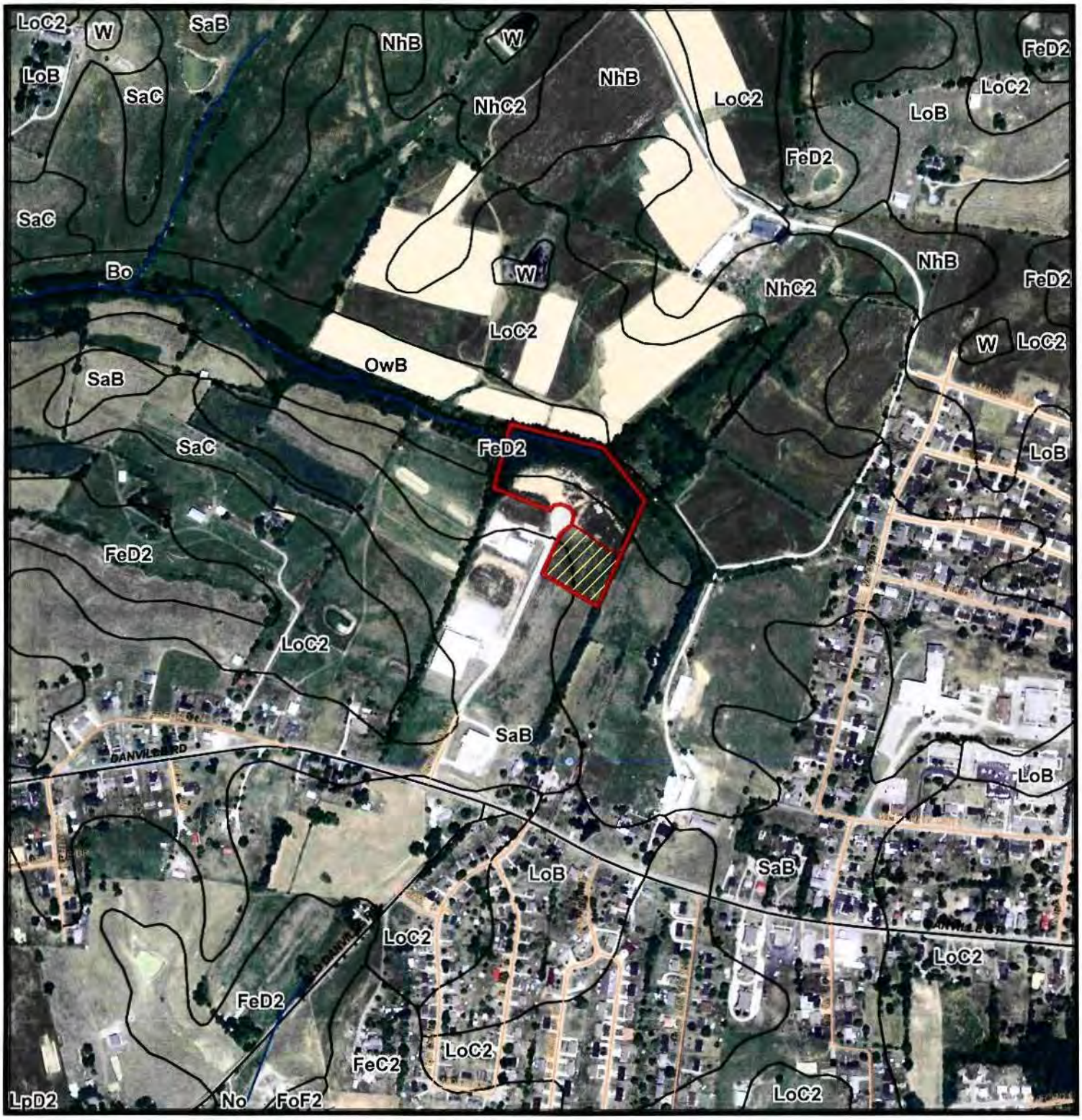
Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side) **Form AD-1006 (03-02)**

Farmland Conversion Impact Rating

Garrard County, KY



Legend

- Boundary
- No FPPA Required
- FPPA Required
- Soils

SOILS MAP

Soils Legend

FeD2--Faywood-Cynthiana complex, 12 to 25 percent slopes, eroded, very rocky
LoC2--Lowell silt loam, 6 to 12 percent slopes, eroded
SaB--Sandview silt loam, 2 to 6 percent slopes

Scale
1:7,920
(1"=660 ft.)

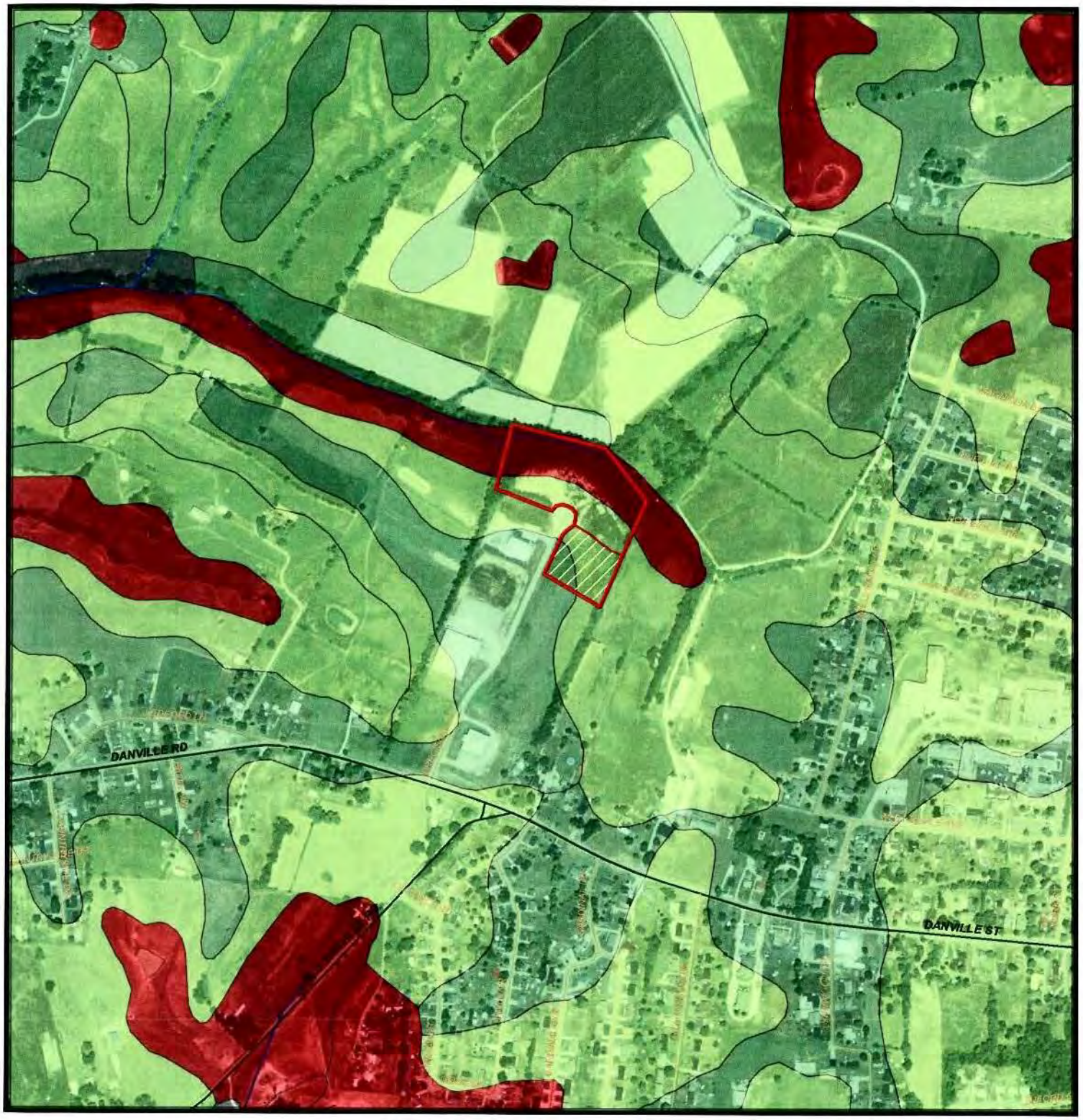
N

United States Department of Agriculture
NRCS Natural Resources Conservation Service
3032 Alvey Park Drive West, Suite 2
Owensboro, KY 42303
(270) 685-1707

Created - 12/19/2013 by David Gehring
Soil Survey of Garrard and Lincoln Counties, Kentucky
Soil Survey Version 7 - 9/14/2012
USDA-NRCS-NCGC 2012 NAIP Ortho MrSid Mosaic

Farmland Conversion Impact Rating

Garrard County, KY



Prime and Important Farmland Soils Legend

- Not prime farmland
- All areas are prime farmland
- Farmland of statewide importance
- Boundary
- No FPPA Required
- FPPA Required

Scale
1:7,920
(1"=660 ft.)

United States Department of Agriculture
NRCS Natural Resources Conservation Service
3032 Alvey Park Drive West, Suite 2
Owensboro, KY 42303
(270) 685-1707

Created - 12/19/2013 by David Gehring
Soil Survey of Garrard and Lincoln Counties, Kentucky
Soil Survey Version 7 - 9/14/2012
USDA-NRCS-NCGC 2012 NAIP Ortho MrSid Mosaic

Prime and Other Important Farmlands

Garrard and Lincoln Counties, Kentucky

Map symbol	Map unit name	Farmland classification
SaB	Sandview silt loam, 2 to 6 percent slopes	All areas are prime farmland
LoC2	Lowell silt loam, 6 to 12 percent slopes, eroded	Farmland of statewide importance

Dwellings and Small Commercial Buildings

Garrard and Lincoln Counties, Kentucky

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The columns that identify the rating class and limiting features show no more than five limitations for any given soil. The soil may have additional limitations. This report shows only the major soils in each map unit]

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
FeD2:							
Faywood	50	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Shrink-swell	0.50	Slope	1.00	Shrink-swell	0.50
		Depth to hard bedrock	0.46	Shrink-swell	0.50	Depth to hard bedrock	0.46
Cynthiana	35	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to hard bedrock	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
LoC2:							
Lowell	85	Somewhat limited		Somewhat limited		Very limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.04	Depth to hard bedrock	0.26	Shrink-swell	0.50
				Slope	0.04		
SaB:							
Sandview	85	Not limited		Not limited		Not limited	

Letter 2.

U.S. Army Corps of Engineers (USACE),

January 9, 2014

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE KY 40201-0059
FAX: (502) 315-6677
http://www.lrl.usace.army.mil/

January 9, 2014

Operations Division
Regulatory Branch (South)
ID No. LRL-2013-1136

Mr. Gregg Shirk
Copperhead Environmental Consulting, Inc.
P.O. Box 73
11641 Richmond Road
Paint Lick, Kentucky 40461

Dear Mr. Shirk:

This is in regard to your letter dated December 4, 2013, requesting comments on behalf of the Garrard County Fiscal Court for the proposed Garrard County Emergency Operations Center. The facility would be constructed at the existing Precision Court Industrial Park off Danville Road east of the city of Lancaster in Garrard County, Kentucky. The proposed project would involve the construction of an institutional facility.

The U.S. Army Corps of Engineers (USACE) exercises regulatory authority under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act, 1972 (33 USC 1344) for certain activities in "waters of the United States (U.S.)." These waters include all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce. "Waters of the U.S." include hydrologically connected lakes, rivers, and stream channels exhibiting an Ordinary High Water Mark (OHWM), wetlands, sloughs, wet meadows and wetlands adjacent to "waters of the U.S."

Based on the information provided by you in the above-referenced request, it appears as though a Department of the Army (DA) Permit MAY BE REQUIRED if the project results in a discharge of fill material into "waters of the U.S." The mapping you provided shows proposed work in or near what appears to be "waters of the U.S." These waters include an unnamed tributary to Boone Creek of the Dix River. When applying for a DA Permit, provide additional details regarding the project's design, scope, photos, construction methods, purpose and a delineation of all "waters of the U.S.," including the coordinates and locations of each "water" within the proposed project area and all impacts to waters (linear feet and acreage).

Further information on the Regulatory Program, including the DA Permit application, can be obtained from our website located at: http://www.lrl.usace.army.mil/Missions/Regulatory.aspx. Please allow sufficient time in your preconstruction schedule for the processing of a DA permit application.

If you have any questions concerning this matter, please contact this office at the above address, ATTN: CELRL-OP-FS or call me at (502)315-6683.

Sincerely,

Todd E. Hagman
Project Manager
Regulatory Branch

Letter 3.

U.S. Fish & Wildlife Service (USFWS),

December 17, 2013

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

December 17, 2013

Mr. Gregg Shirk
Copperhead Environmental Consulting, Inc.
P.O. Box 73
Paint Lick, KY 40461

Re: FWS 2014-B-0136; FEMA; Garrard County Fiscal Court; Emergency Operations Center; located in Garrard County, Kentucky

Dear Mr. Shirk:

Thank you for the opportunity to provide comments on the above-referenced project. The U.S. Fish and Wildlife Service (Service) has reviewed this proposed project and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). This is not a concurrence letter. Please read carefully, as further consultation with the Service may be required.

In accordance with the provisions of the Fish and Wildlife Coordination Act, the Service has reviewed the project with regards to the effects the proposed actions may have on wetlands and/or other jurisdictional waters. We recommend that project plans be developed to avoid impacting wetland areas and/or streams, and reserve the right to review any required federal or state permits at the time of public notice issuance. The U.S. Army Corps of Engineers should be contacted to assist you in determining if wetlands or other jurisdictional waters are present or if a permit is required.

In order to assist you in determining if the proposed project has the potential to impact protected species we have searched our records for occurrences of listed species within the vicinity of the proposed project. Based upon the information provided to us and according to our databases, we believe that the following federally listed species have the potential to occur within the project vicinity. The listed species are:

Group	Species	Common name	Legal* Status
Mammals	*Myotis grisescens*	gray bat	E
	Myotis sodalis	Indiana bat	E
	Myotis septentrionalis	Northern long-eared bat	P
Plants	*Trifolium stoloniferum*	running buffalo clover	E
	Lesquerella globosa	Short's bladderpod	C

* *Key to notations: E = Endangered, T = Threatened, P = Proposed, C = Candidate, CH = Critical Habitat*

We must advise you that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitats and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.

Gray bat

Gray bats roost, breed, rear young, and hibernate in caves year round. They migrate between summer and winter caves and will use transient or stopover caves along the way. Gray bats eat a variety of flying aquatic and terrestrial insects present along streams, rivers, and lakes. Low-flow streams produce an abundance of insects and are especially valuable to the gray bat as foraging habitat. For hibernation, the roost site must have an average temperature of 42 to 52 degrees F. Most of the caves used by gray bats for hibernation have deep vertical passages with large rooms that function as cold air traps. Summer caves must be warm, between 57 and 77 degrees F, or have small rooms or domes that can trap the body heat of roosting bats. Summer caves are normally located close to rivers or lakes where the bats feed. Gray bats have been known to fly as far as 12 miles from their colony to feed.

Because we have concerns relating to the gray bat on this project and due to the lack of occurrence information available on this species relative to the proposed project area, we have the following recommendations relative to gray bats.

- Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter/summer habitat for gray bats. Therefore, we would recommend that the project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as gray bat habitat by this office.

- Sediment Best Management Practices (BMPs) should be utilized and maintained to minimize siltation of the streams located within and in the vicinity of the project area, as these streams represent potential foraging habitat for the gray bat.

Indiana bat

The proposed project site is located within habitat designated as "potential habitat" for the Indiana bat and we believe that: (1) forested areas in the vicinity of and on the project area may potentially provide suitable summer roosting and foraging habitat for the Indiana bat; and (2) caves, rockshelters, and abandoned underground mines in the vicinity of and on the project area may potentially provide suitable wintering habitat for the Indiana bat. Our belief that potentially suitable habitat may be present is based on the information provided in your correspondence, the fact that much of the project site and/or surrounding areas contain forested habitats that are within the natural range of this species, and our knowledge of the life history characteristics of the species.

The Indiana bat utilizes a wide array of forested habitats, including riparian forests, bottomlands, and uplands for both summer foraging and roosting habitat. Indiana bats typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (*i.e.*, dead trees or dead portions of live trees). Trees in excess of 16 inches diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat. Male Indiana bats have been observed roosting in trees as small as 5 inches DBH.

Prior to hibernation, Indiana bats utilize the forest habitat around the hibernacula (*i.e.* cave) to feed and roost until temperatures drop to a point that forces them into hibernation. This "swarming" period is dependent upon weather conditions and lasts from about September 15 to about November 15. This is a critical time for Indiana bats, since they are acquiring additional fat reserves and mating prior to hibernation. Research has shown that bats exhibiting this "swarming" behavior will range up to five miles from chosen hibernacula during this time. For hibernation, the Indiana bat prefers limestone caves, sandstone rockshelters, and abandoned underground mines with stable temperatures of 39 to 46 degrees F and humidity above 74 percent but below saturation.

Because we have concerns relating to the Indiana bat on this project and due to the lack of occurrence information available on this species relative to the proposed project area, we have the following recommendations:

- Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter habitat for Indiana bats. Therefore, we would recommend that the project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as Indiana bat habitat by this office.

- The project proponent can modify the proposed project to eliminate or reduce impacts to potential Indiana bat roost trees. If the project cannot be modified to eliminate impacts to potential Indiana bat roost trees, the project proponent can address these impacts with one or more of the following options:

    - The project proponent can commit to only removing potential roost trees within the project area between October 15 and March 31 to avoid directly impacting summer roosting Indiana bats. Removing trees during the specified "unoccupied" period avoids direct effects to Indiana bats. However, sometimes additional measures, including, but not limited to, further analysis, surveys, and/or mitigation, are necessary to address indirect and cumulative effects to ensure that the project is in full compliance with the ESA relative to the Indiana bat.

- The project proponent can survey the project site to determine the presence or absence of Indiana bats within the project area in an effort to determine if potential effects are likely. A qualified biologist who holds the appropriate collection permits for the Indiana bat must undertake such surveys, and we would appreciate the opportunity to approve the biologist's survey plan prior to the survey being undertaken and to review all survey results, both positive and negative. If any Indiana bats are identified, we would request written notification of such occurrence(s) and further coordination and consultation.

- The project proponent can assume presence of the Indiana bat in the proposed project area and mitigate for the impacts of habitat removal on the species by entering into a Conservation Memorandum of Agreement (MOA) with the Service. By entering into an MOA, the Cooperator can gain flexibility in project timing with regard to the removal of suitable Indiana bat habitat and/or avoid the need for surveys or additional analysis. In exchange, the Cooperator provides recovery-focused conservation benefits to the Indiana bat through the implementation of minimization and mitigation measures as set forth in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky. For additional information about this option, please notify our office.

Northern long-eared bat

The northern long-eared bat is currently proposed for federal listing under the ESA. No designated critical habitat has been proposed at this time. The entire state of Kentucky is considered potential habitat for the northern long-eared bat. During the summer, northern long-eared bats typically roost singly or in colonies in a wide-variety of forested habitats, where they seek shelter during daylight hours underneath bark or in cavities/crevices of both live trees and snags, including relatively small trees and snags that are less than 5 inches in diameter at breast height (DBH). Northern long-eared bats have also been documented roosting in man-made structures (i.e., buildings, barns, etc.) during the summer. According to current winter occurrence data, northern long-eared bats predominately winter in hibernacula that include caves, tunnels, and underground mine passages.

Although species proposed for listing are not afforded protection under the ESA, when a species is listed, the prohibitions against jeopardizing its continued existence and unauthorized take are effective immediately, **regardless of an action's stage of completion**. Therefore, to avoid significant project delays, we recommend that you contact our office to identify and resolve potential conflicts regarding the northern long-eared bat in your project area.

Running buffalo clover

Running buffalo clover has the potential to occur within Garrard County. This species requires periodic, moderate disturbances to reduce competition and maintain open or semi-open habitat conditions. Disturbed areas such as old pastures, moderately grazed fields, road rights-of-way, and power line rights-of-way that are mechanically maintained are known to provide suitable habitat for these species. Additionally, running buffalo clover is known to occur in habitats ranging from stream banks and low mesic (moderately moist) forests to lawns and cemeteries. If the proposed project(s) require alteration of habitat that coincides with the habitat required for

required for this species, an on-site inspection or survey of the area must be conducted to determine if the listed species is present or occurs seasonally. Surveys should be done by qualified personnel and be conducted during the appropriate time of day and/or year to ensure confidence in survey results. A survey for running buffalo clover would not be necessary if sufficient site-specific information was available that showed that: (1) there is no potentially suitable habitat within the project area or its vicinity or (2) the species would not be present within the project area or its vicinity due to site-specific factors.

Short's bladderpod

Short's bladderpod is one of the rarest plants in Kentucky. It typically grows on steep, rocky, wooded slopes and talus areas and on areas associated with bluffs, usually near rivers or streams. Habitat loss, including transportation right-of-way-construction and maintenance, is believed to be one of the current threats to the species.

On August 2, 2013, the Service proposed to list Short's bladderpod as endangered under the ESA. Although species proposed for listing are not afforded protection under the ESA, when a species is listed, the prohibitions against jeopardizing its continued existence and unauthorized take are effective immediately, **regardless of an action's stage of completion**. Therefore, to avoid significant project delays, we recommend that you contact our office to identify and resolve potential conflicts regarding the northern long-eared bat in your project area.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact Jessi Miller at (502) 695-0468 extension 104.

Sincerely,

Virgil Lee Andrews, Jr.
Field Supervisor

Letter 3a.

U.S. Fish & Wildlife Service (USFWS),

April 28, 2014

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

April 28, 2014

Mr. Vincent J. Attardi
Copperhead Environmental Consulting, Inc.
P.O. Box 73
Paint Lick, KY 40461

Re: FWS 2014-B-0136; FEMA; Garrard County Fiscal Court; Garrard County Emergency Operations Center; located in Garrard County, Kentucky

Dear Mr. Attari:

The U.S. Fish and Wildlife Service (Service) has reviewed your April 24, 2014 correspondence and attachments regarding the above-referenced project. The Service offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Migratory Bird Treaty Act (MBTA) (40 Stat. 775, as amended; 16 U.S.C. 703 *et seq.*).

ESA comments

According to your correspondence, listed species' habitat is either not present on the property or the construction and/or operation of the facility will not impact that habitat. Based on this, the Service concurs that the proposed project is not likely to adversely affect currently listed federally endangered or threatened species.

In view of these findings we believe that the requirements of section 7 of the Endangered Species Act have been fulfilled for this project. Your obligations under section 7 must be reconsidered, however, if: (1) new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated.

MBTA comments

Your correspondence indicates that the proposed facility will include a 185-foot radio communications tower. This tower will be self-supporting and will not include guy wires or navigation safety lighting. The Service believes that constructing towers less than 200 feet in height without guy lines or lights minimizes impacts on protected bird species.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact Jessi Miller at (502) 695-0468 extension 104.

Sincerely,

Virgil Lee Andrews, Jr.
Field Supervisor

Letter 4.

Kentucky Department of Fish & Wildlife Resources (KDFWR), December 17, 2013

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES

Steven L. Beshear
Governor

#1 Sportsman's Lane
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov

Bob Stewart
Secretary

17 December 2013

Copperhead Environmental Consulting, Inc.
Attn: Gregg Shirk
P.O. Box 73
11641 Richmond Rd.
Paint Lick, KY 40461

RE: Garrard County Emergency Operations Center – CSEPP Project
Garrard County, Kentucky

Dear Mr. Shirk:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for information pertaining to the subject project. The Kentucky Fish and Wildlife Information System indicates that federally and state-listed species are known to occur within close proximity to the project site. However, the KDFWR does not anticipate impacts to these species or any associated critical habitat as a result of this project. This project does not occur within known Indiana bat habitat according to the U.S. Fish and Wildlife Service Kentucky Field Office. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

To minimize impacts to the aquatic environment the Kentucky Dept. of Fish & Wildlife Resources recommends that erosion control measures be developed and implemented prior to construction to reduce siltation into waterways located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed.

I hope this information is helpful to you, and if you have questions or require additional information, please call me at (502) 564-7109 extension 4453.

Sincerely,

Donald Steffen

Dan Stoelb
Wildlife Biologist

Cc: Environmental Section File

Letter 5.

Kentucky State Clearinghouse (KSC),

February 7, 2014

STEVEN L. BESHEAR
GOVERNOR

DEPARTMENT FOR LOCAL GOVERNMENT
OFFICE OF THE GOVERNOR
1024 CAPITAL CENTER DRIVE, SUITE 340
FRANKFORT, KENTUCKY 40601-8204
PHONE (502) 573-2382 FAX (502) 573-2939
TOLL FREE (800) 346-5606
WWW.DLG.KY.GOV

TONY WILDER
COMMISSIONER

February 7, 2014

Mr. Vincent Attardi
Copperhead
11641 Richmond Road
Paint Lick, KY 40461

RE: Garrard County Emergency Operation Center
SAI# KY20140115-0053
CFDA# "97.040"

Dear Mr. Attardi:

The Kentucky State Clearinghouse, which has been officially designated as the Commonwealth's Single Point of Contact (SPOC) pursuant to Presidential Executive Order 12372, has completed its evaluation of your proposal. The clearinghouse review of this proposal indicates there are no identifiable conflicts with any state or local plan, goal, or objective. Therefore, the State Clearinghouse recommends this project be approved for assistance by the cognizant federal agency.

Although the primary function of the State Single Point of Contact is to coordinate the state and local evaluation of your proposal, the Kentucky State Clearinghouse also utilizes this process to apprise the applicant of statutory and regulatory requirements or other types of information which could prove to be useful in the event the project is approved for assistance. Information of this nature, if any, concerning this particular proposal will be attached to this correspondence.

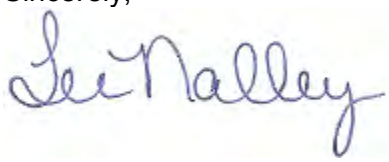
You should now continue with the application process prescribed by the appropriate funding agency. This process may include a detailed review by state agencies that have authority over specific types of projects.

This letter signifies only that the project has been processed through the State Single Point of Contact. It is neither a commitment of funds from this agency or any other state of federal agency.

The results of this review are valid for one year from the date of this letter. Continuation or renewal applications must be submitted to the State Clearinghouse annually. An application not submitted to the funding agency, or not approved within one year after completion of this review, must be re-submitted to receive a valid intergovernmental review.

If you have any questions regarding this letter, please feel free to contact my office at 502-573-2382.

Sincerely,



Lee Nalley
Kentucky State Clearinghouse

Attachments

The KY Dept. of Transportation has made the following advisory comment pertaining to State Application Identifier Number KY201401150053

Blair (7), Bret: In the event construction activities encroach upon state maintained right of way, it may become necessary to obtain a standard encroachment permit. Permit requests and questions may be directed to: Ricky Sizemore, District Seven Highway Dept. Permits Engineer, 763 W New Circle Road, Lexington, KY 40512 (859.246.2355 / ricky.sizemore@ky.gov).
[Reviewer: Bret Blair, D7-Planning / 859.246.2355 / bret.blair@ky.gov]

The Natural Resources has made the following advisory comment pertaining to State Application Identifier Number KY201401150053

This review is based upon the information that was provided by the applicant through the Clearinghouse for this project. An endorsement of this project does not satisfy, or imply, the acceptance or issuance of any permits, certifications, or approvals that may be required from this agency under Kentucky Revised Statutes or Kentucky Administrative Regulations. Such endorsement means this agency has found no major concerns from the review of the proposed project as presented other than those stated as conditions or comments.

Kentucky Division for Air Quality Regulation 401 KAR 63:010 Fugitive Emissions states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at http://www.air.ky.gov/homepage_repository/e-Clearinghouse.htm

Kentucky Division for Air Quality Regulation 401 KAR 63:005 states that open burning is prohibited. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Fact Sheet located at http://www.air.ky.gov/homepage_repository/e-Clearinghouse.htm

All solid waste generated by this project must be disposed at a permitted facility. If underground storage tanks are encountered, they must be properly addressed. If asbestos, lead paint, and/or other contaminants are encountered during this project, they must be properly addressed.

If the proposed project site is in a designated flood hazard area, application must be made to the Division of Water for a floodplain construction permit. Permission, or exemption, depends upon design and the exact site.

Utility line projects that cross a stream will require a Section 404 permit from the US Army Corps of Engineers and a 401 Water Quality Certification from DOW.

If the construction area disturbed is equal to or greater than 1 acre, the applicant will need to apply for a Kentucky Pollutant Discharge Elimination System (KPDES) stormwater discharge permit from the Division of Water.

Best Management Practices (BMPs) should be utilized to control storm water runoff and sediment damage to water quality and aquatic habitat. For technical assistance on the kinds of BMPs most appropriate for housing and related construction, please contact the local Soil and Water Conservation District or the Division of Conservation.

WATER SUPPLY - If an existing water server is to be utilized for new water tap-ons (rehabilitations, new constructions), ascertain the capacity and operating condition of the originating water treatment plant and of the server (if different) in comparison to the water needs of the proposed housing. DOW cannot permit connections to water servers under tap-on bans, Agreed Orders, or Court Orders. DOW may not give approval to connections to water systems operating near, at, or over capacity. If a new water source is to be utilized, ascertain the source's (stream's or well's) low flow ability to serve the proposed project. Prior

approval from DOW is required for water withdrawals of over 10,000 gallons per day and for all public drinking water. Final plans and specifications are subject to review by DOW.

WASTEWATER TREATMENT - If an existing wastewater server is to be utilized for new wastewater tap-ons (rehabilitations, new construction), ascertain the capacity and operating conditions of the receiving wastewater treatment facility (wastewater treatment plant or package sewage treatment plant) and of the server (if different) in comparison to the wastewater needs of the proposed housing. DOW cannot permit connections to wastewater servers under tap-on bans, Agreed Orders, or Court Orders. DOW may not give approval to connections to wastewater systems at or over hydraulic capacity. If a new wastewater treatment facility is to be utilized, ascertain the discharge stream's ability to absorb the proposed projects treated wastewater.

DOW notes the requirements of onsite sewage disposal legislation, KRS 211.350 to 211.380, and administrative regulations, 902 KAR 10:060 to 10:110, must be met. DOW requests provisions are made for future connections to a wastewater treatment system. A Groundwater Protection Plan, as required by 401 KAR 5:037, needs to be prepared by all onsite wastewater system owners. Contact the DOW regarding requirements.

Prior approval from DOW is required for all discharges into streams and for all wastewater treatment facilities. DOW reminds the applicant to seal abandoned wastewater service connections.

The Heritage Council has made the following advisory comment pertaining to State Application Identifier Number KY201401150053

The applicant must ensure compliance with the Advisory Council on Historic Preservation's Rules and Regulations for the Protection of Historic and Cultural Properties (36CFR, Part 800) pursuant to the National Historic Preservation Act of 1966, the National Environmental Policy Act of 1969, and Executive Order 11593.

Based on the information provided, all work will be limited to a relatively small and previously disturbed portion of the property. Therefore, no archaeology is recommended at this time. Contractors performing site preparation and construction should still be advised of their responsibilities under 36 CFR Part 800.13 and the Kentucky Antiquities Act to stop work and contact our office in the event any archaeological features, artifacts or remains are inadvertently uncovered.

We do not currently have enough information to comment on the age or National Register eligibility of buildings along Danville Road in the vicinity of the industrial park, although based on what is visible in aerials, a number appear to be over 50 years of age. Because the proposed EOC site is at the end of Precision Court, as far removed from Danville Road as possible, we anticipate no historic properties will be affected if any do exist. Should any owners of buildings along Danville Road in the vicinity of the industrial park express concerns about historic properties or potential effects of this undertaking, Section 106 consultation with our office should resume.

If you have questions regarding these comments, please contact Jill Howe at (502) 564-7005, extension 121.

The KY State Fish & Wildlife has made the following advisory comment pertaining to State Application Identifier Number KY201401150053

To minimize impacts to the aquatic environment the Kentucky Dept. of Fish & Wildlife Resources recommends that erosion control measures be developed and implemented prior to construction to reduce siltation into waterways located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed. Please contact Dan Stoelb @ 502-564-7109 ex. 4453 or Daniel.Stoelb@ky.gov if you have further questions or require additional information.

The Housing, Building, Construction has made the following advisory comment pertaining to State Application Identifier Number KY201401150053

Prior to any additions, alterations or construction, drawings shall be submitted to the Department of Housing, Buildings and Construction for review and approval. A submittal guide or plan application form with the address can be downloaded from our web site at www.dhbc.ky.gov for your convenience. You can contact Dale Spicer or Winnie Blythe for more information at 502-573-0373.

The Labor Cabinet has made the following advisory comment pertaining to State Application Identifier Number KY201401150053

PW RATES MAY APPLY TO CONSTRUCTION PROJECTS EXCEEDING $250K. CONTACT KY LABOR CABINET AT 502 564 3534

The Kentucky Housing Corporation has made the following advisory comment pertaining to State Application Identifier Number KY201401150053
No comments.

Letter 6.

State Historic Preservation Office (SHPO),

February 27, 2014

STEVEN L. BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL

BOB STEWART
SECRETARY

THE STATE HISTORIC PRESERVATION OFFICE
300 WASHINGTON STREET
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-7005
FAX (502) 564-5820
www.heritage.ky.gov

CRAIG A. POTTS
EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

February 27, 2014

Eric Thurston
FEMA, Region IV
3003 Chamblee Tucker Road
Atlanta, GA 30341-4130

Re: Initiation of Section 106 Process for FEMA Projects:
Garrard County Emergency Operations Center (EOC)
Lancaster, Garrard County, Kentucky

Dear Mr. Thurston:

On February 6, the State Historic Preservation Office received information on the above-referenced undertaking. The project consists of construction of an EOC and radio tower. The project site has been previously disturbed. Four resources over 50 years of age were identified in the area of potential effect (APE) for indirect effects. These resources were not assessed for National Register eligibility. It is FEMA's determination that the work will result in no adverse effect to historic properties if any or all of the resources were found to be eligible.

While we concur with FEMA's determination of effect for this undertaking based on the information available at this time, please note the following for future submissions:

- Our office had previously issued comments on this undertaking through the State e-Clearinghouse (SAI # KY201401150053.) The Clearinghouse application mentioned the EOC only, and did not mention a tower. This is problematic, given that the presence of a tower can substantially increase the APE for indirect effects. For future reference, if you receive Clearinghouse comments from consultants or applicants as documentation of consultation with our office, it would be important to verify that the project was described appropriately (and in full) in the Clearinghouse application.

- Given the 0.5-mile APE called for by the presence of a tower, our GIS records did not correspond with the information you provided regarding the presence of historic properties in the APE. Upon researching this, we found that the consultant only ran a preliminary site check with our office. Presently our office offers two versions of site checks – a full version designed for consultants preparing cultural resource reports and assessments, and a preliminary version designed more for

agencies and applicants who are very familiar with their project areas and local resources, and who have primary responsibility for compliance activities (as with Part 58 undertakings for HUD.) Preliminary site checks do not allow the requestor to specify an APE and do not provide site numbers or maps. Staff who put the reports together for preliminary site checks rely on the project description given in the online request to decide what size area to capture. In this case, the consultant again only mentioned the EOC and did not note a tower, so their results do not reflect a 0.5-mile APE. Had a full site check been run on the correct APE, results would have shown the presence of at least one National Register listed property and numerous other surveyed historic resources around this project site. Please consider advising consultants in the future to utilize full site checks to ensure the APE you expect is captured, particularly when towers are part of project plans.

While no archaeology has been recommended, contractors should still be advised of their obligations regarding inadvertent discoveries, as this project appears to be subject to both Section 106 and the Kentucky Antiquities Act. Additional consultation with our office for the undertaking currently proposed would only be necessary if the project changes, FEMA receives comments from the public regarding cultural resource concerns, or there is a post-review discovery.

If you have questions regarding these comments, please contact Jill Howe of my staff at (502) 564-7005, extension 121.

Sincerely,

Craig A. Potts
Executive Director and
State Historic Preservation Officer

CP:jh

Letter 6a.

State Historic Preservation Office (SHPO),

April 14, 2014

From: Howe, Jill (Heritage Council) [mailto:Jill.Howe@ky.gov]
Sent: Monday, April 14, 2014 12:33 PM
To: Kurzweil, Ashley
Subject: RE: Section 106 Consultation for FEMA Project: CSEPP Garrard County EOC and Tower - Change in Dimensions

Good afternoon, Ashley!

Thanks for notifying us of the change in this project.

I agree with your assessment that we would not need to see additional information at this time, as the APE for indirect effects would not change, and it was the opinion of archaeologists looking at the project here that the location had been previously disturbed and did not merit a recommendation for survey. Additional consultation with our office would only be necessary if plans change again in such a way that a new APE would be appropriate, FEMA receives comments from the public regarding cultural resource concerns, or there is a post-review discovery.

Thanks again – please let me know if I can be of further assistance.

Jill A. Howe
Kentucky Heritage Council/State Historic Preservation Office
P (502) 564-7005, ext. 121
F (502) 564-5820

From: Kurzweil, Ashley [mailto:Ashley.Kurzweil@fema.dhs.gov]
Sent: Friday, April 11, 2014 8:13 AM
To: Howe, Jill (Heritage Council)
Subject: Section 106 Consultation for FEMA Project: CSEPP Garrard County EOC and Tower - Change in Dimensions

Good morning, Jill:

We (FEMA and consultants) had previously consulted your office regarding the Garrard County EOC and communications tower, however, CSEPP has just notified me of a change in the dimensions of the tower from what was stated in our letters.

Previously, it was stated that the tower would be 140' tall and I don't believe the concrete pad measurements were specified. Now, the tower will be 185' (180' with a 5' lightning arrestor) with a concrete pad that will be 2' larger in width and length.

We based our original determination of "No Adverse Effect" (FEMA letter dated 1/27/14, see attached) on an APE of ½ mile for towers under 200', so I don't believe that any additional information is needed, but I wanted to inform you of the changes and make sure. Please let me know if you require additional information from me on this project.

Thanks so much, have a great weekend!

Ashley

Ashley Kurzweil
Environmental and Historic Preservation
DHS - FEMA Region IV
Office: (770) 220-8842
BB: (919) 628-6613
ashley.kurzweil@fema.dhs.gov

FEMA

Letter 7.

Peoria Tribe of Indians of Oklahoma,

January 29, 2014

PEORIA TRIBE OF INDIANS OF OKLAHOMA
118 S. Eight Tribes Trail (918) 540-2535 FAX (918) 540-2538
P.O. Box 1527
MIAMI, OKLAHOMA 74355

CHIEF
John P. Froman

SECOND CHIEF
Jason Dollarhide

January 29, 2014

April Cummings
Deputy Regional Environmental Officer
FEMA Region IV
3003 Chamblee-Tucker Road
Atlanta, GA 30341

Re: Gerrard County Emergency Operations Center (EOC)
Lancaster, Gerrard County, Kentucky

Dear Mr. Mueller,

Thank you for providing notice of the referenced project. The Peoria Tribe of Indians of Oklahoma is unaware of any documentation directly linking Indian Religious Sites to the proposed project location. There appear to be no objects of cultural significance or artifacts linked to our tribe located on or near the project location.

The Peoria Tribe of Indians of Oklahoma is unaware of items covered under NAGPRA (Native American Graves Protection and Repatriation Act) to be associated with the proposed project site. These items include: funerary or sacred objects; objects of cultural patrimony; or ancestral human remains.

The Peoria Tribe has no objection at this time to the proposed EOC construction project. If, however, at any time items are discovered which fall under the protection of NAGPRA, the Peoria Tribe requests immediate notification and consultation. In addition state, local and tribal authorities should be advised as to the findings and construction halted until consultation with all concerned parties has occurred.

Thank you,

Cynthia Stacy
Special Projects Manager/NAGPRA

Letter 8.

Eastern Shawnee Tribe of Oklahoma,

February 4, 2014

EASTERN SHAWNEE TRIBE OF OKLAHOMA

12755 S. 705 Road, Wyandotte, OK 74370
Bluejacket Building (918) 666-2435, Fax: (918) 666-2186

February 4, 2014

Eric M. Thurston
Historic Preservation Specialist
DHS/FEMA Region IV
eric.thurston@fema.dhs.gov

RE: FEMA Consultation Request: EOC Construction

Dear Mr. Thurston

Thank you for the correspondence dated January 27, 2014. We have reviewed the enclosed project proposal.

We are not currently aware of existing documentation directly linking Shawnee religious, cultural, or historic sites to Gerrard County, Kentucky.

We have no objection to the above referenced construction project, but ask for the stipulation to be included that the Eastern Shawnee Tribe of Oklahoma wishes to be consulted if any inadvertent discoveries are made, work will cease and we will be contacted.

Best regards,

Robin Dushane

Robin Dushane
Tribal Historic Preservation Officer

Appendix D

Farmland Conversion Impact Rating

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 12/04/13
Name of Project Garrard County Emergency Operations Center	Federal Agency Involved FEMA
Proposed Land Use Buildings and parking lots	County and State Garrard, Kentucky
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 12/17/08

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☒	NO ☐	Acres Irrigated	Average Farm Size
Major Crop(s): Corn	Farmable Land In Govt. Jurisdiction: Acres: 76,214 % 51.56		Amount of Farmland As Defined in FPPA: Acres: 57,941 %39.2	
Name of Land Evaluation System Used: LESA	Name of State or Local Site Assessment System		Date Land Evaluation Returned by NRCS: 12/19/2013	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating: Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	1.8			
B. Total Acres To Be Converted Indirectly	5.5			
C. Total Acres In Site	7.3			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	0.5			
B. Total Acres Statewide Important or Local Important Farmland	1.3			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0.003%			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	9.12			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)	87			

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	Maximum Points	Site A	Site B	Site C	Site D
1. Area In Non-urban Use 79%	(15)	12			
2. Perimeter In Non-urban Use 28%	(10)	7			
3. Percent Of Site Being Farmed 0%	(20)	Ø			
4. Protection Provided By State and Local Government 0%	(20)	Ø			
5. Distance From Urban Built-up Area < 1mi - Not Adjacent	(15)	5			
6. Distance To Urban Support Services < 1/2 mi	(15)	Ø			
7. Size Of Present Farm Unit Compared To Average $\bar{x}$ = 148ac - Site is 5% of $\bar{x}$	(10)	1			
8. Creation Of Non-farmable Farmland 100%	(10)	10			
9. Availability Of Farm Support Services Assumed Present	(5)	5			
10. On-Farm Investments None	(20)	Ø			
11. Effects Of Conversion On Farm Support Services None	(10)	Ø			
12. Compatibility With Existing Agricultural Use No Conflict	(10)	Ø			
TOTAL SITE ASSESSMENT POINTS	160	40			
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	87			
Total Site Assessment *(From Part VI above or local site assessment)*	160	40			
TOTAL POINTS ***(Total of above 2 lines)***	260	127			

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

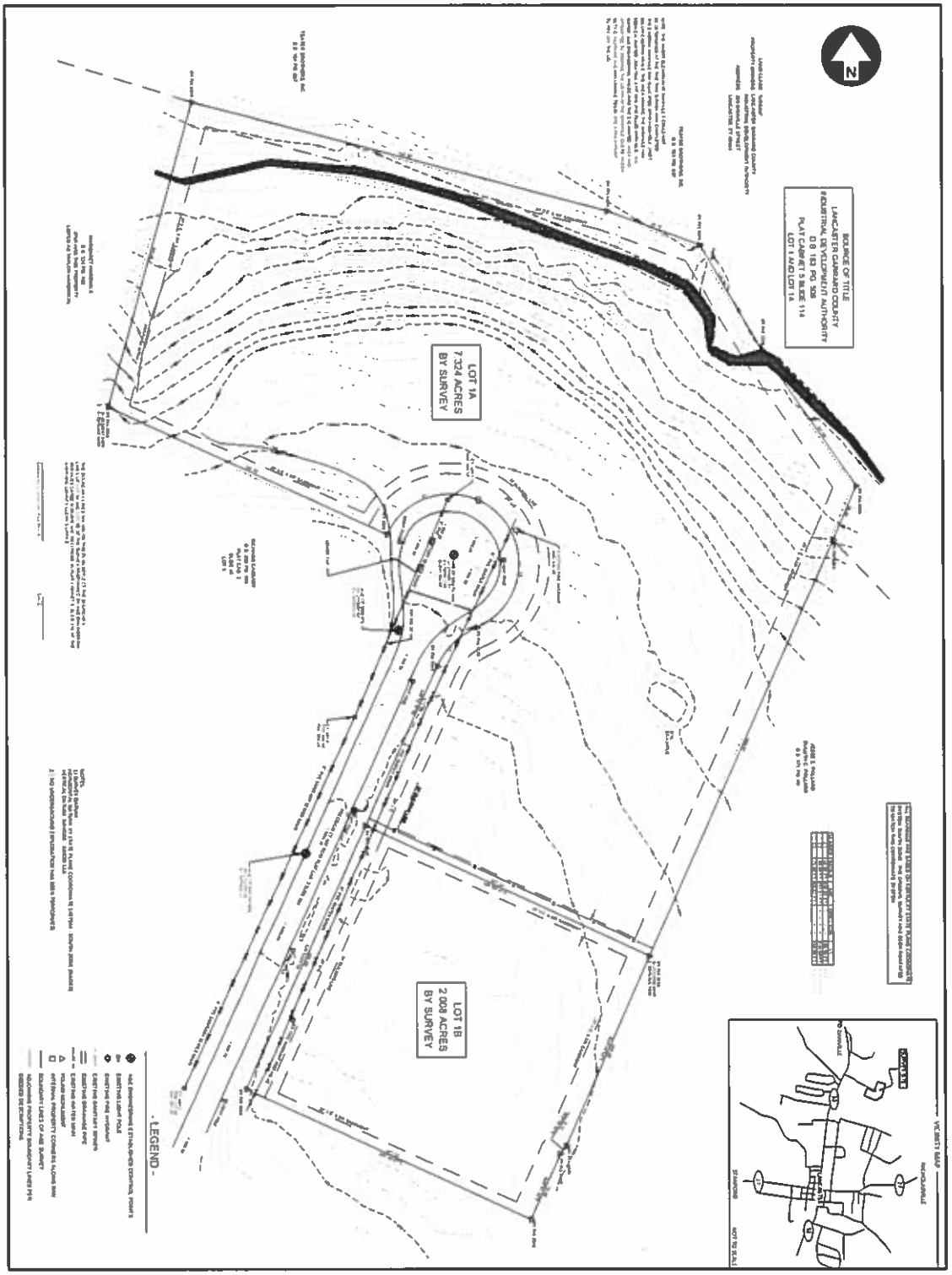
(See Instructions on reverse side)

Form AD-1006 (03-02)

Appendix E

Design Drawings

P:\engrem\4203\CAD\HMB-Garrard EOC Site Plan.dwg, 1/30/2014 8:42:37 AM, DWG To PDF.pc3



C-100

Garrard County EOC
278 Precision Court
Lancaster, Kentucky 40444
Garrard County Fiscal Court

Sheet Name

Brandstetter Carroll Inc.
We enhance Community & Quality of Life
2360 Chaumont Drive Lexington Kentucky 40517 (859) 269-1933

Revisions

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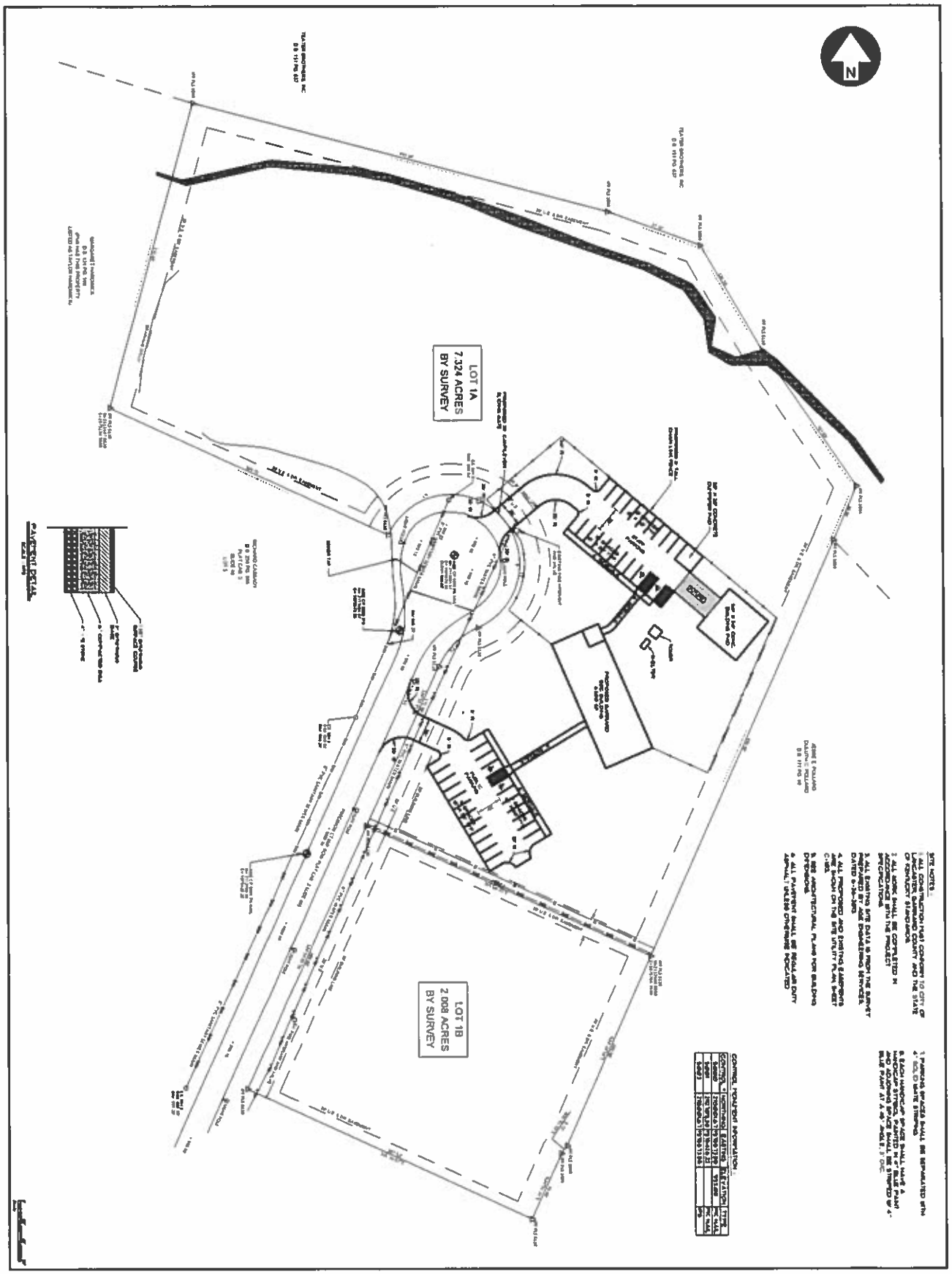

C-101

Garrard County EOC
278 Precision Court
Lancaster, Kentucky 40444
Garrard County Fiscal Court

Site Plan

Brandstetter Carroll Inc.
We enhance Community & Quality of Life
2360 Chauvin Drive, Lexington, Kentucky 40517 (859) 268-1933

Revisions

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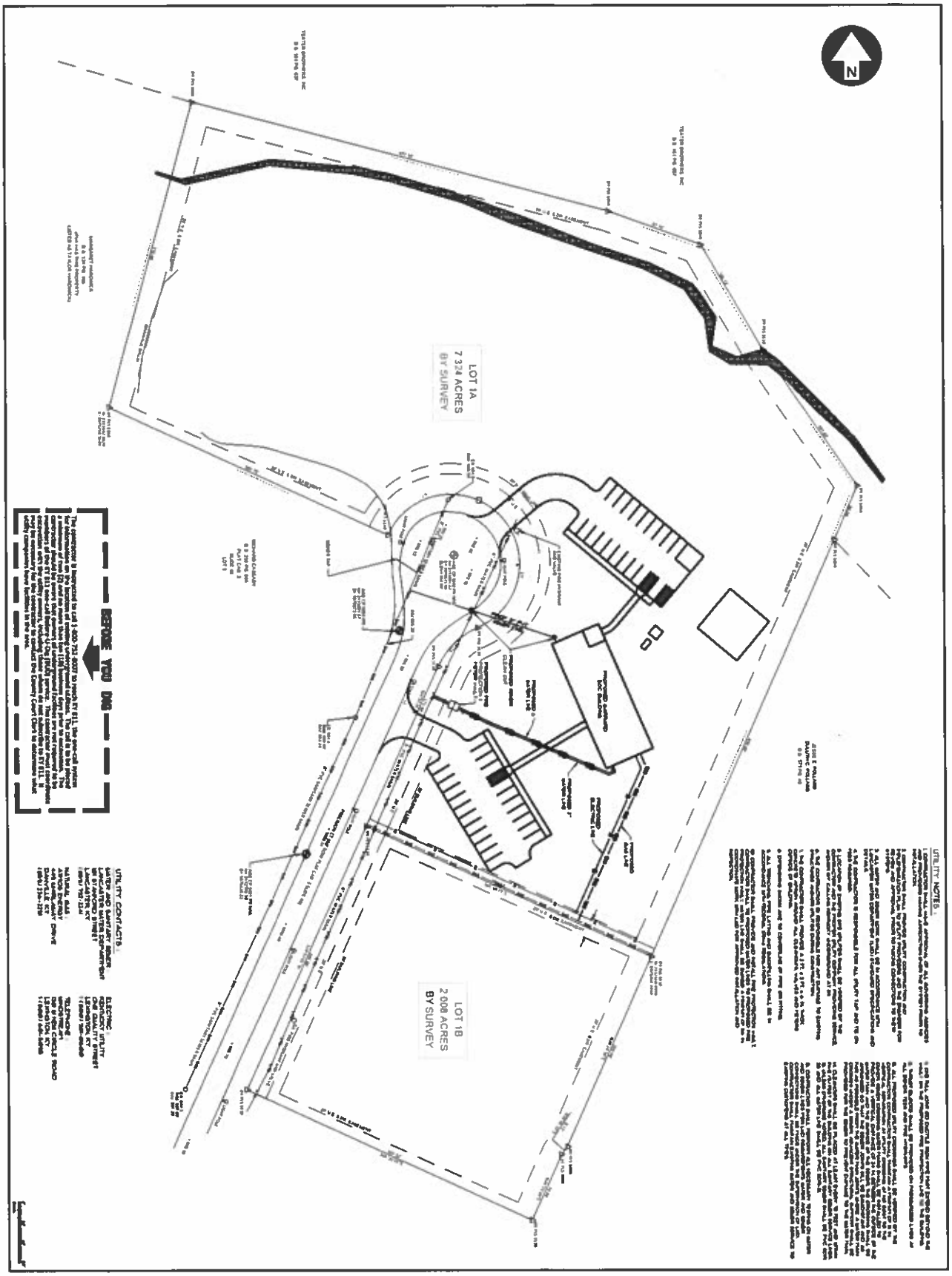

C-102

Garrard County EOC
278 Precision Court
Lancaster, Kentucky 40444
Garrard County Fiscal Court

Site Utility Plan

Brandstetter Carroll Inc.
We enhance Community & Quality of Life
2360 Chaparral Drive, Lexington, Kentucky 40517 (859) 268-1033

Revisions

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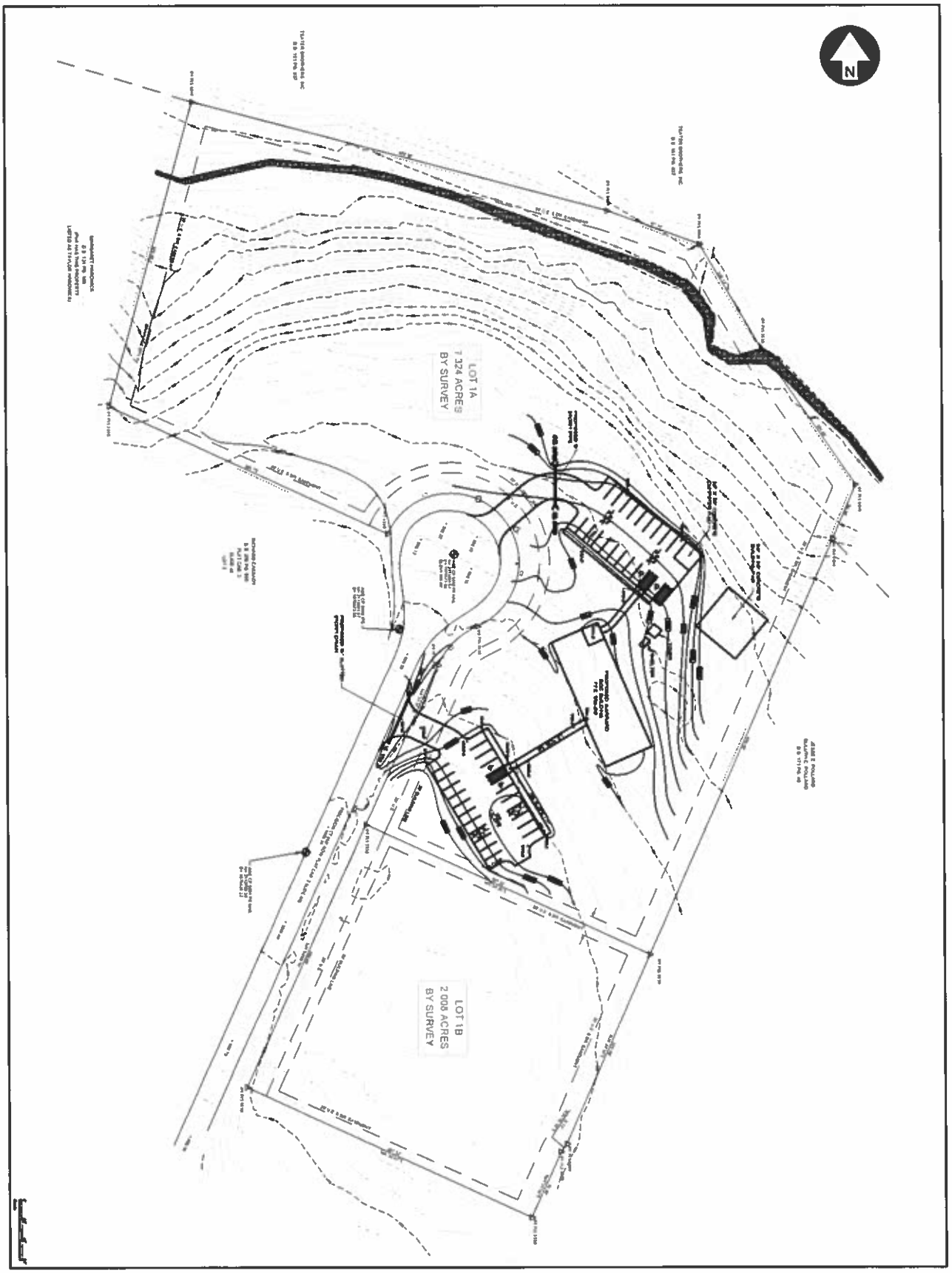

C-103

Garrard County EOC
278 Precision Court
Lancaster, Kentucky 40444
Garrard County Fiscal Court

Grading and Drainage Plan

Brandstetter Carroll Inc.
We enhance Community & Quality of Life
2360 Chauvin Drive, Lexington, Kentucky 40517 (859) 268-1933

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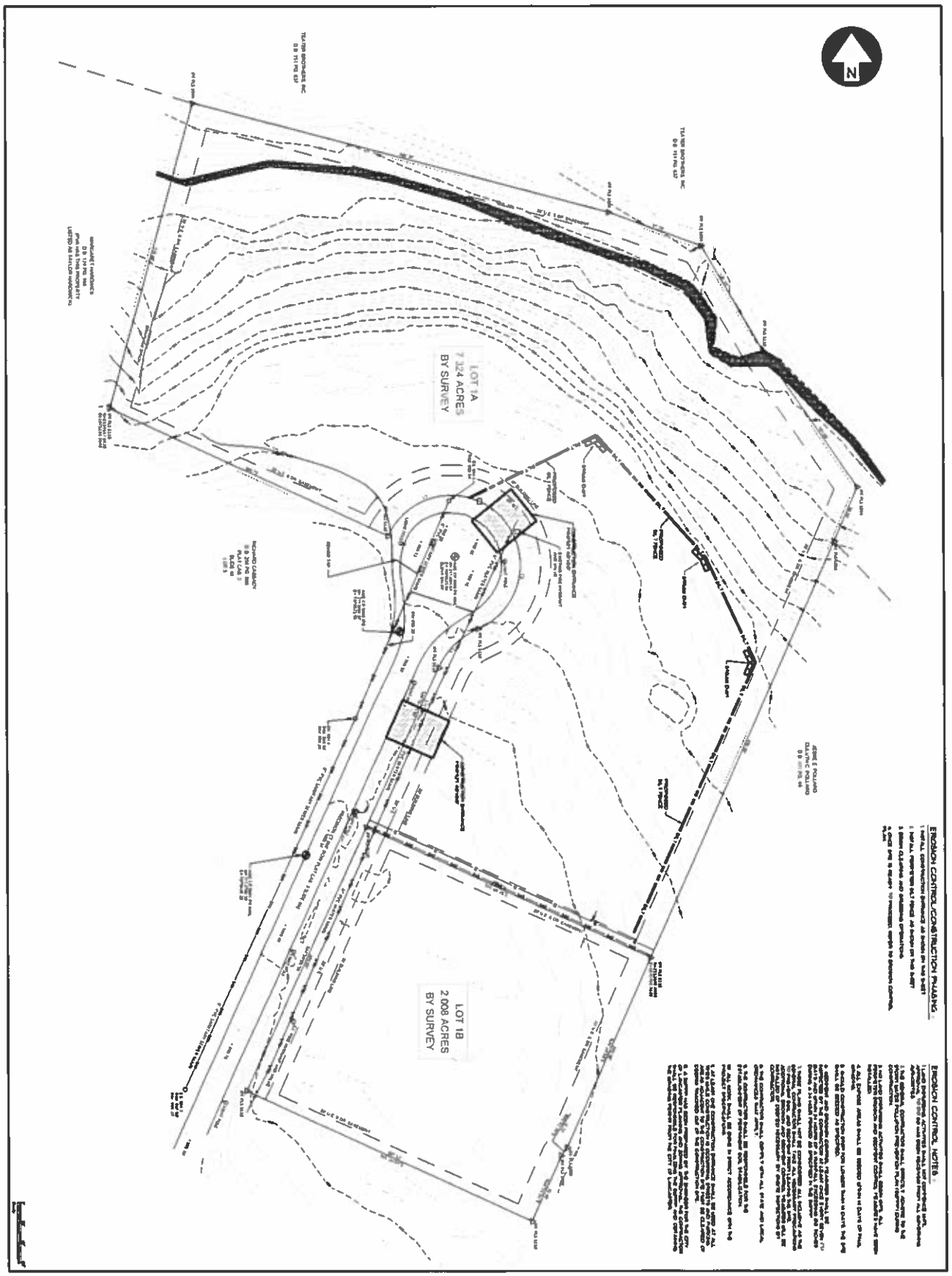

C-104

Garrard County EOC
278 Precision Court
Lancaster, Kentucky 40444
Garrard County Fiscal Court

Erosion Control Plan

Brandstetter Carroll Inc.
We enhance Community & Quality of Life
2360 Chauvin Drive, Lexington, Kentucky 40517 (859) 268-1933

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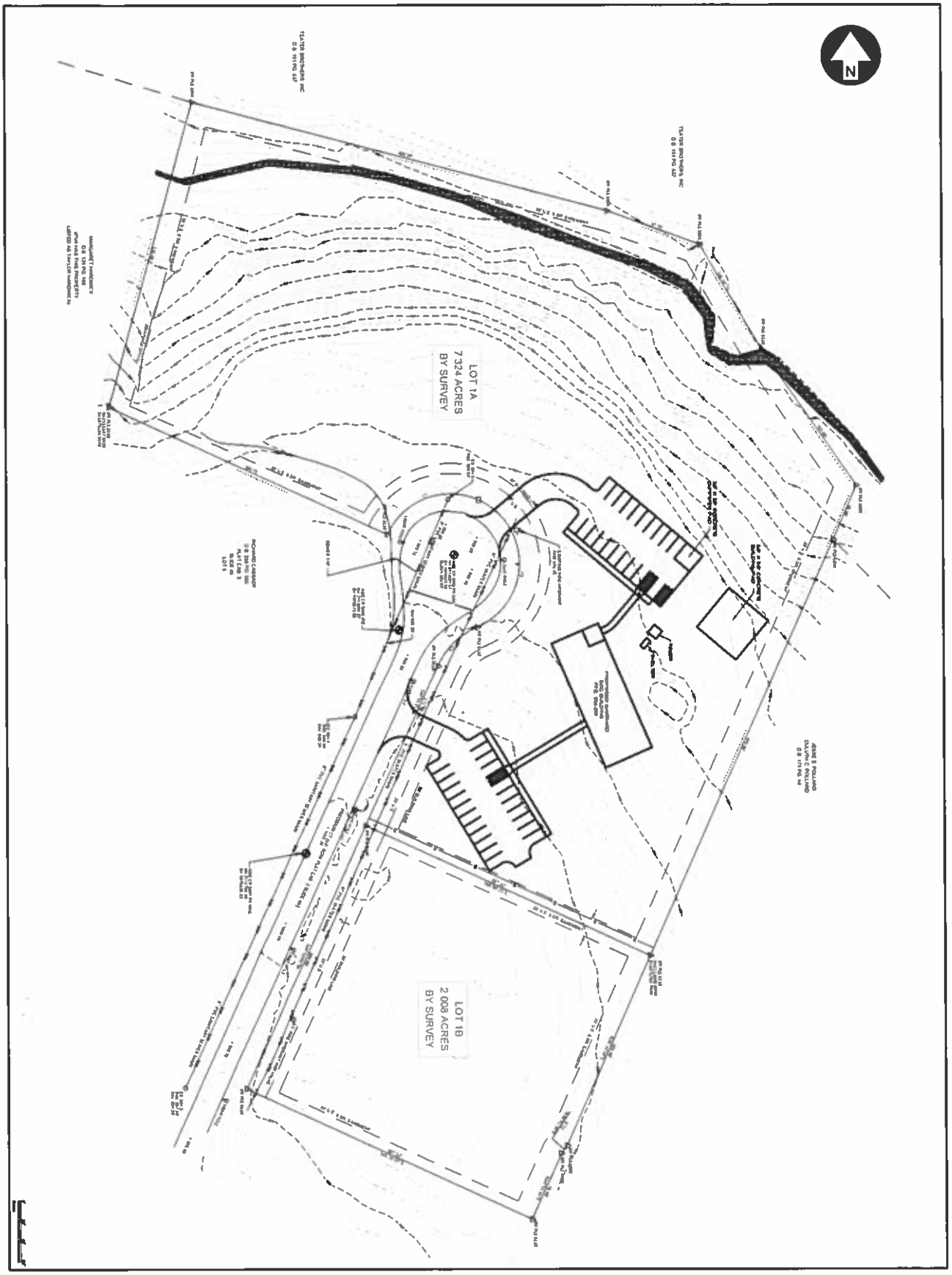

L-100

Garrard County EOC
278 Precision Court
Lancaster, Kentucky 40444
Garrard County Fiscal Court

Landscape Plan

Brandstetter Carroll Inc.
We enhance Community & Quality of Life
2360 Chauvin Drive, Lexington, Kentucky 40517 (859) 268-1833

Revisions

Appendix F

Geotechnical Report (Cardno ATC)

Cardno ATC
Shaping the Future

Cardno ATC

11001 Bluegrass Parkway
Suite 250
Louisville, KY 40299

Phone +1 502 722 1401
Fax +1 502 267 4072
www.cardno.com

www.cardnoatc.com

December 4, 2013

Garrard County CSEPP
15 Public Square, Suite 3
Lancaster, Kentucky 40444
(859) 339-4552
garrardcsepp@gmail.com

Attn: Mr. Jay Overman

Subject: Report of Geotechnical Exploration
Garrard County EOC/CSEPP
Lancaster, Garrard County, Kentucky

Dear Mr. Overman:

Cardno ATC has completed a geotechnical exploration in support of the referenced project. The attached report presents a summary of project information provided to us, descriptions of observed site and subsurface conditions, and our foundation and earthworks recommendations for use in design and construction of the proposed basin. The report Appendix contains site and test boring location plans, and results of our field and laboratory testing.

Cardno ATC appreciates the opportunity to have provided this service and we look forward to serving as your geotechnical consultant throughout project execution. Please contact us if you have any questions regarding the information presented.

Sincerely,
CARDNO ATC

Travis Andres, P.E.
Senior Geotechnical Engineer
Licensed Kentucky 29429

Malcolm D. Barrett, P.E.
Principal Geotechnical Engineer
Licensed Kentucky 17566

Attachment: Report of Geotechnical Exploration

cc: Mr. Eric Chambers
Brandstetter Carroll, Inc.
echambers@brandstettercarroll.com

Geotechnical Exploration Report

Garrard County EOC

Lancaster, Garrard County, Kentucky

Cardno ATC Project 27.38065.1401

December 4, 2013

Prepared For:

Garrard County CSEPP
15 Public Square, Suite 3
Lancaster, KY
Attn: Mr. Jay Overman

TABLE OF CONTENTS

1. PURPOSE AND SCOPE OF EXPLORATION

Cardno ATC has completed a geotechnical exploration in support of a new EOC center planned for a site in Lancaster, Garrard County, Kentucky. The purpose of this exploration has been to obtain site specific subsurface data, to review available site development and geologic information, and to develop foundation and site preparation recommendations for use in project design and construction. Geotechnical services reported herein included drilling nine soil test borings, analysis of resulting data, and our geotechnical recommendations.

2. PROJECT INFORMATION

Project information was provided by Mr. Eric Chambers of Brandstetter Carroll, Inc. through a request for proposal (RFP) dated October 28, 2013. The RFP included the following:

- Document titled *Request for Proposal for Soil Exploration and Construction Inspection and Testing Services* outlining the exploration scope of work.
- A site survey (final Plat Amendment) titled *Lancaster Garrard County County Industrial Development Authority.*, prepared by AGE Engineering Services, dated 5/6/13.
- A site plan showing the proposed new EOC/CSEPP facility layout, and
- An untitled building plan showing the proposed building layout.

Cardno ATC understands a new EOC Center with administration and Dispatch Facilities is planned for a site located in an industrial park off Danville Road in Lancaster, Garrard County, Kentucky. A site location map, Figure 1, appears in Appendix A. The facility will be a one story structure with load bearing masonry and/or concrete walls, and a concrete roof deck. No below grade structures (basements) are planned. The building will have a rectangular footprint covering 6,100 to 6,500 square feet. Parking lots will support public and staff parking and drive aisles. A free standing, 125 ft. tall radio antenna tower and associated tower shelter are planned northeast of the proposed building. Building loads are not available at this writing. We have assumed maximum wall and column loads to be less than 4 kips per lineal foot and 30 kips, respectively.

3. EXPLORATORY FINDINGS

3.1 SURFACE CONDITIONS

Cardno ATC conducted a reconnaissance on November 20, 2013 to observe and document site surface conditions. Information gathered was used to aid subsurface data interpretation and to identify conditions which could affect geotechnical recommendations. At the time of this study the site is described as a well-drained, slightly sloped (to the north) open field with a downhill slope to the north. The northern and eastern boundaries are marked by tree lines. An existing roadway

marks the west side of the site, and an undeveloped open field borders the south. A soil stockpile was located in the east central portion of the site. The northern one-third of the property appears to have been filled. Fill materials are described as orange-brown fat clay with intermixed limestone fragments ranging in size from gravel to boulders. Fill depths are estimated up to 10 feet deep. The site is described as well drained with a mown grass surface in the southern half and exposed soil (fill) in the north.

3.2 SITE GEOLOGY

A review of the *Geologic Map of the Lancaster and Buckeye Quadrangles, Garrard Counties, Kentucky*, published by the United States Geological Survey (USGS), indicates the site is underlain by rocks associated with the upper Ordovician aged Tate Member of the Ashlock formation. Rocks of this formation are described as limestone, light gray to light olive gray, fine grained, fossiliferous and thin to thick bedded.

3.3 SUBSURFACE CONDITIONS

Subsurface conditions were explored via nine soil test borings drilled in general accordance with procedures described in Appendix B. Boring locations and depths were selected by Cardno ATC. The boring sites were located by measuring from existing site features using a fiberglass cloth tape. Ground surface elevations at the sites were measured using conventional differential leveling techniques with elevations measured relative to a nail driven into the surface of the asphalt in a cul-de-sac in the existing industrial park roadway adjacent to the site (Elev. 993.08). The boring, and benchmark locations appear on a Boring Location Plan, Figure 2, in Appendix A.

Subsurface conditions encountered in the borings are described on test boring logs in Appendix B. Subsurface strata descriptions represent our interpretation of subsurface conditions based on the field logs prepared during drilling and on visual examination of recovered samples. Contacts between various strata on the logs represent approximate contact positions as transitions between strata may be gradual. A boring summary is presented in the following table.

Table 1: Boring Summary

Boring	Boring Elev. (ft.)	Depth to Top of Rock (ft.)	Top of Rock Elev. (ft.)	Depth to Auger Refusal (ft.)	Auger Refusal Elev. (ft.)	Boring Termination Depth (ft.)	Boring Termination Elev. (ft.)
B-1	994.0	-	-	-	-	15.5	978.5
B-2	991.0	14.0	977.0	14.2	976.8	14.2	976.8
B-3	999.0	7.9	991.1	8.4	990.6	8.4	990.6
B-4	993.0	11.3	981.7	11.3	981.7	11.3	981.7
P-1	990.0	-	-	-	-	5.5	984.5
P-2	990.0	-	-	-	-	7.0	983.0
P-3	1001.0	2.6 *	998.4	2.6	998.4	2.6	998.4
P-4	1003.0	-	-	-	-	5.5	997.5
T-1	990.0	19.5	970.5	19.5	970.5	29.5	960.5

** Boulder Encountered in P-3, P-4 added in vicinity*

Prepared by: *TA*
Checked by: *MB*

The subsurface exploration generally reveals 6 inches of topsoil over natural soils consistent with residuum associated with the underlying rock in borings B-3, B-4, P-3, and P-4. Exposed natural soil was encountered at the surface in borings B-1 and B-2. Fill was encountered in borings P-1, P-2, and T-1. Detailed descriptions of encountered subsurface materials follow:

Fill: Fill soils were encountered at the ground surface in borings P-1, P-2, and T-1. The fill is described mostly as orange-brown fat clay, moist, and firm to stiff, containing limestone fragments varying from gravel to boulder sized. Standard penetration test "N"-values range from 7 to 30 blows per foot (bpf) with blow counts between 7 and 11 bpf considered representative. Blow counts above 11 bpf are generally associated with the presence of rock in the fill. The depth of fill extends to 2.5 feet in boring P-1, 6.5 feet in P-2, and 6.5 feet in T-1. A layer of limestone rock fill was encountered in boring P-2 from 3.0 feet to 5.5 feet. A limestone boulder was encountered in boring T-1 at a depth of 4.0 feet. The boring was offset 3 feet in order to avoid the boulder and advance the boring further.

Stratum I: Stratum I soils are naturally occurring lean clay typical of the area and were encountered just below the topsoil in borings B-3, B-4, P-3, and P-4, and below the fill in boring P-1 and P-2. This soil is described as dark brown to orange-brown lean clay, silty, moist, and stiff to very stiff. "N"-values range from 10 to 20 blows per foot (bpf) with blow counts between 15 and 20 bpf considered representative. The lean clay layers extend to 4.0 feet in borings B-1, B-2, and

B-3, to 1.5 feet in boring B-4, to 4.5 feet in boring P-1, and to the boring termination depth 7.0 feet in boring P-2.

Stratum II: Stratum II soils are naturally occurring fat clay and are encountered just below Stratum I in borings B-1, B-2, B-3, B-4, below the topsoil in borings P-3, and P-4, and below the fill in boring T-1. This soil is described as orange-brown to yellow-brown and gray fat clay with oxidized mineral concretions, moist, and firm to very stiff. Standard penetration test "N"-values range from 6 to 34 blows per foot (bpf) with blow counts between 13 and 17 bpf considered representative. Blow counts below 10 bpf are generally associated with the presence of groundwater near the soil/rock contact. This stratum extends to the termination depths in borings B-1, P-1, and P-4, and to refusal depths in the remaining test holes.

Rock: Rock was encountered in the test holes at depths ranging from 7.9 to 19.5 ft., with auger refusal occurring at depths up to six inches below the rock line. Refusal was encountered at a depth of 2.6 feet in boring P-3, likely on a boulder, so boring P-4 was added in the area. A boulder was encountered in boring B-4 from 4.9 to 5.3 feet. Another boulder was encountered in boring T-1 at a depth of 4.0 feet so this boring was offset about 3 feet. Rock coring was performed in boring T-1 extending 10.0 feet below the rock line. Recovered rock is described as limestone, gray, fine grained, hard, thin to thick bedded with shale partings between 24.5 feet and 25.5 feet. Rock core recoveries and rock quality designation (RQD) values appear in the following table.

Table 2: Rock Core Summary

Boring	Core Run Depth (ft to ft)	Core Run Elevation (ft to ft)	Recovery (%)	RQD (%)
T-1	19.5 - 29.5	970.5 - 960.5	98	83

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3.4 GROUNDWATER CONDITIONS

Groundwater was encountered near the rock surface at 14.5 feet in boring B-1 and 14.7 feet in boring T-1. It is noted that groundwater conditions may vary with weather, season, and construction activity. Although not encountered in any of the borings advanced, perched groundwater may be encountered in open excavations especially during prolonged wet periods. Groundwater volumes should be easily managed by the use of small sumps and pumps.

3.5 SEISMIC SITE CLASSIFICATION

A seismic site classification was performed and design spectral responses were calculated in accordance with the 2012 International Building Code. The classification is based upon a 12.0 foot depth to bedrock with soils exhibiting an average standard penetration resistance value of 15 blows per foot above the bedrock. A shear wave velocity of 2,500 fps is assumed for the underlying rock. Based upon this subsurface profile, we recommend design based on a seismic Site Class "C". Design should be performed using the following parameters:

Table 3: Seismic Site Design Parameters

Seismic Design Parameter	Parameter Value
Seismic Site Classification	C
Design Spectral Response at Short Periods (SD_S)	0.144g
Design Spectral Response at 1-Second Periods (SD_1)	0.102g

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Checked by: *MB*

4. GEOTECHNICAL EVALUATION

Two significant geotechnical conditions, the presence of highly plastic clays and existing fill, affects the proposed EOC facility. These conditions are addressed in the following paragraphs.

4.1 PLASTIC CLAYS

A soil sample taken from B-3 (within the proposed building footprint) at a depth of approximately 4.0 feet, displayed a Liquid Limit (LL) of 68 and plasticity index (PI) of 41. This corresponds to a fat clay soil classification, i.e. a clay soil of high plasticity. Fat clays encountered in the borings are firm to very stiff in consistency and generally orange-brown to yellow-brown and gray in color. Fat clays are prone to volume change with moisture fluctuations such as shrinkage with drying and swelling with added moisture. Recommendations to reduce the risk of structural distress due to volume changes appear in the following report sections.

4.2 EXISTING FILL

Based on our visual observations and on observed subsurface conditions, the northern portion of the project site had been filled and graded to create a relatively level surface. Fill materials encountered in borings P-1, P-2, and T-1 are variable in depth, composition, and consistency. The fill appears to begin at the ground surface near the proposed north wall of the proposed structure and increases with depth to the north. Reliance of the fill to support the anticipated structural loads of the EOC facility and antenna tower is not recommended since no documented control of the placed fill is available. Recommendations to reduce the risk of foundation settlement in the filled area appear in the following report sections.

5. GEOTECHNICAL RECOMMENDATIONS

The following recommendations were developed on the basis of previously described Project Information (Section 2.0), Subsurface Conditions (Section 3.0), and our experience. If there is any change in the project criteria, including the tower and building positions on the site, foundation loading, etc, a review should be made by this office and modifications to our recommendations should be made accordingly. Foundation and other design recommendations presented herein are based, in part, on the assumption that the site will be prepared as recommended in this report.

5.1 SITE PREPARATION

Adequate site preparation and earthwork construction will determine the performance of site structures and pavements. We recommend the following site activities be incorporated in the project specifications:

- Strip all organic material from the construction area. Waste these materials from the site or use as topsoil in landscape areas.
- Proofroll fill area and exposed subgrades after stripping to verify the exposed soil materials are suitable for fill placement. Undercut areas of soft, wet, or loose soils encountered during proofrolling operations.
- Proofroll after a suitable period of dry weather to avoid degrading the subgrade.
- Perform proofrolling with a heavily loaded dump truck or similar equipment judged acceptable by the geotechnical engineer.
- Make several passes over each section with the proofrolling equipment.
- Retain the geotechnical engineer to observe the proofrolling operations and make recommendations for any unstable or unsuitable conditions encountered.
- Scarify, moisture condition, and recompact exposed subgrade soils to a depth of at least 12 inches prior to fill placement or pavement construction.
- Place and compact engineered fill within the proposed building and parking areas consisting of lean clay or other suitable material approved in advance by the owner.

5.2 COMPACTED FILL

Prior to beginning fill construction, we recommend representative samples of the proposed fill materials be collected and tested to determine their laboratory compaction characteristics, plasticity, and natural moisture content. These tests are needed to determine if the proposed fill material is acceptable and for quality control during compaction. The following criteria are recommended for structural fill construction:

- Limit borrow fill materials to a Liquid Limit less than 50, a standard maximum dry density of at least 95 pounds per cubic foot (ASTM D698), a maximum particle size of 6 inches, and less than 3 percent by weight fibrous, organic matter. The fat clays encountered on-site do not meet these criteria and will likely be difficult to place as compacted structural fill; the lean clays encountered on-site should be a suitable fill material

- Construct compacted fill by spreading suitable soil in maximum 8-inch-thick loose lifts.

- Compact fill within structural areas to at least 98 percent of the standard maximum dry density (ASTM D698). Compact backfill or fill within paved areas to at least 95 percent of the standard maximum dry density.

- Maintain the moisture content of the fill soils to within $\pm$ 2 percentage points of the soil's optimum moisture content.

- Perform one in-place density test in every 5,000 square feet for each one-foot-thick fill layer, with a minimum of two tests per lift.

- Retain the geotechnical engineer to observe, document and test fill placement and compaction operations.

5.3 EXISTING FILL

Based on our visual observations of the site and on the subsurface conditions encountered in the borings advanced, the northern portion of the project site had been filled and graded to create a relatively level surface. Fill materials encountered in borings P-1, P-2, and T-1 are variable in depth, composition, and consistency. As noted previously, reliance of the fill to support the anticipated structural loads of the EOC facility and antenna tower is not recommended since no documented control of the placed fill is available. It is recommended that the EOC facility be constructed outside of the fill limits. It appears, based on the plan provided, that the proposed location of the facility is just south of the fill limits. However, the proposed north pavement area and tower location are located within the fill limits. Fill should be explored further during construction by advancing test-pits to confirm the consistency. The subgrade in the proposed pavement and slab areas of the proposed fill should be undercut at least 24 inches and replaced and compacted using the compacted fill recommendations outlined in Section 5.2. Additionally, the condition of the exposed subgrade should be observed by the geotechnical engineer so further recommendations may be provided if warranted based on the consistency of the fill.

5.4 GENERAL

- Maintain positive surface drainage to prevent water from ponding on the surface during all earthwork operations.

- Roll the fill surface with a rubber-tired or smooth steel-drummed roller to improve surface runoff, if precipitation is expected.

- Contact the geotechnical engineer should the subgrade soils become excessively wet, dry, or frozen.

5.5 DESIGN RECOMMENDATIONS

- **5.5.1 Civil Design**

Near surface soils in the proposed southern pavement area and building pad consist of "low plasticity" or "lean" clay, but soils described as "high plasticity" or "fat" clay are encountered with depth and at the surface of the existing fill area. These soils are subject to volume changes with changes in moisture content. Measures to mitigate damage to structures and pavements constructed over fat clays are varied, and recommendations to mitigate potential problems with soils at the subject site are presented below. Proper moisture conditioning of the soils during fill placement is essential during earthwork operations. In addition, design features to control soil moisture fluctuations at the foundation and pavement subgrade level will serve to minimize the potential for distress in environments such as this. We recommend the following design features be incorporated into site Civil Design:

- Provide rapid and efficient surface runoff of surface water in a manner that will minimize infiltration within 10 ft. of building edges;

- Place deep rooted shrubs and trees and any irrigation piping at least 10 feet away from the building edges;

- Place plantings that require watering at least 5 feet away from building edges;

- Install exterior footings at minimum depths of 36 inches below exterior grades;

- Provide efficient drainage of pavements and pavement subgrades, and provide weep-holes in drainage drop inlets to keep water from accumulating outside of these structures.

- Specify that the native soil or structural fill in footing, pavement, or slab subgrades be prevented from excessive drying prior to placement of concrete or aggregate base material.

- **5.5.2 Shallow Spread Footing and Floor Slab Recommendations**
  - **5.5.2.1 Design Considerations**

We recommend the proposed EOC facility be supported on conventional spread foundations bearing on stiff, native soil or newly placed and properly compacted soil fill. Column and wall footings bearing on these materials may be sized for a maximum allowable net bearing pressure of 3,000 pounds per square foot (psf). For the shelter associated with the tower, which is proposed to

be located within the existing fill area, we recommend conventional spread footings bearing on the firm to stiff existing fill or a thickened slab on grade foundation. Column and wall footings bearing on these materials may be sized for a maximum allowable net bearing pressure of 2,000 psf. In using net pressure, the weight of the footing and backfill over the footing including the weight of the floor slab need not be considered; hence, only loads applied at or above the finished floor need to be used for dimensioning footings. Additional design considerations for project foundations follow:

- Design continuous wall footings with minimum widths of 18 inches.
- Design column footings with minimum horizontal dimensions of 24 inches.
- Provide reinforcing steel in strip foundations to make them sufficiently stiff to span any relatively soft zones in the bearing material.
- Place the bearing depth for exterior footings at least 36 inches below finished exterior grades to provide protective embedment and to reduce the potential for damage from frost heave, shrinkage or swelling due to moisture fluctuations.
- Interior footings not subjected to freezing weather, severe drying, or severe wetting either during or after construction may be founded at nominal depths.
- Include control joints at frequent intervals in the walls of the structures to help accommodate differential foundation movements.

Detailed settlement analysis is beyond the scope of this study; however, based on previously listed structure loads, recommended bearing pressures, results of laboratory testing, and empirical correlations for the soil types encountered during our field activities, we estimate that total post-construction foundation settlements of the EOC facility will be less than about one-inch, with differential settlements up to about ½-inch. We recommend the structures be designed to accommodate these settlement magnitudes. If these settlement estimates are considered excessive, or if the structures are settlement sensitive, we recommend a more detailed settlement analysis be performed.

Floor slabs should be designed based on a modulus of subgrade reaction value (K) of 100 pounds per square inch per inch (psi/in) for soil subgrade and 140 psi/in for a minimum of six-inches of granular aggregate base.

- **5.5.2.2 Construction Considerations**

Soils encountered during this exploration may lose strength if they become wet during construction. Therefore, we recommend the foundation subgrades be protected from exposure to water. The following guides address protection of footing subgrades and our recommended remediation for any soft soils encountered.

- Protect foundation support materials exposed in open excavations from freezing weather, severe drying, and water accumulation.
- Remove any soils disturbed by exposure prior to foundation concrete placement.
- Place a "lean" concrete mud-mat over the bearing soils if the excavations must remain open overnight or for an extended period of time.
- Level or suitably bench foundation bearing surfaces to create level and horizontal bearing surfaces.
- Remove loose soil, debris, and excess surface water from bearing surfaces prior to concrete placement.
- Retain the geotechnical engineer to observe all foundation excavations and provide recommendations for treatment of any unsuitable conditions encountered.
- Contact the geotechnical engineer should the subgrade soils become excessively wet, dry, or frozen.

- **5.5.2.2 Grade Supported Floor Slabs**

Grade-supported floor slabs can be supported on stiff natural soils or on compacted structural fill. We recommend all floor slabs be “floating”, that is, fully ground supported and not structurally connected to walls or foundations. This feature should minimize the possibility of cracking and displacement of the slabs due to differential movements between slabs and foundations. Although foundation movements are expected to be within tolerable limits, such movements could be detrimental to the slabs that are rigidly connected to foundations. Floor slab design using a subgrade reaction modulus of 100 pounds per cubic inch is recommended.

- Provide joints in slabs around columns and along footing supported walls to separate the slabs from the building structure, allowing for independent movement of slabs relative to building structural components.
- Use joints containing dowels or keys to permit rotation between parts of the slabs while reducing sharp vertical displacements. This detail does not apply to joints at foundation elements.

- Place a layer of clean, compacted gravel or crushed stone beneath slabs to provide uniform support, a capillary break between slabs and subgrades, and a working base for slab construction. The actual thickness of the gravel layer should be based on design requirements.

- Keep crushed stone or gravel slab base stone moist but not wet immediately prior to slab concrete placement in order to minimize slab curling due to differential curing conditions between slab tops and bottoms.

- Retain the geotechnical engineer to review subgrade conditions prior to slab construction and to make recommendations for any unsuitable conditions encountered.

5.6 RADIO TOWER FOUNDATION

Cardno ATC understands the proposed radio tower foundation will need to provide uplift resistance as well as downward vertical foundation support. Subsurface conditions at the tower site (boring T-1) indicate variable fill from the ground surface down to 6.5 feet. The fill is underlain by very stiff to firm clay down to sound rock at a depth of 19.5 feet. Additionally, groundwater was encountered at 14.7 feet. Two foundation alternatives have been recommended in the following paragraphs. If other approaches are of interest to the design team, Cardno ATC is at your service to address geotechnical matters associated with these.

5.6.1 Soil Supported Dead Man Anchorage System

The likely best alternative is a foundation system designed to resist uplift through the combined weight of the foundation itself and the weight of soil overburden placed on top of the foundation. For downward vertical loading, foundations should bear on the residual clay materials encountered below the fill at an approximate depth 6.5 feet below the surface. We recommend an allowable soil bearing pressure of 4,000 psf be used in design of the tower foundation if this alternative is implemented.

The biggest concern associated with this foundation alternative will be total and differential settlement. For purposes of design, we have estimated foundation total and differential settlements of less than one half inch based on the following: footings bearing on very stiff residual clay encountered, depth to rock 19.5 feet below existing grade, and laboratory test results of soil samples obtained from the borings. Additional recommendations for use in design and planning of soil bearing foundations follow:

- Provide reinforcing steel in the foundation to make it sufficiently stiff to span relatively soft zones in the bearing material.

- Foundation concrete should not be placed over excessively soft or frozen soils, or in foundation excavations that are inundated.

- Exterior footings subject to freezing temperatures should bear at least 36 inches below finished exterior grades to provide protective embedment and to reduce the potential for damage from frost heave, shrinkage or swelling due to moisture fluctuations.

- It is recommended the geotechnical engineer or his qualified agent check the foundation bearing surface prior to placement of foundation reinforcing steel or concrete to confirm that there is no fill present and that bearing conditions are suitable for the proposed loading.

Ultimate uplift resistance should be computed as the weight of the concrete foundation plus the moist unit weight of soils placed over the top of the foundation. The soil volume used is computed as the volume contained in a wedge defined by lines extending from the top edges of the footings, at an angle 30˚ from the vertical (away from the footings), to the ground surface. It is noted that this soil wedge should be placed with compaction following foundation construction operations. A minimum safety factor of 1.5 is recommended to compute the allowable uplift resistance.

Soils placed in the wedge zone above the foundation should be placed in maximum 6-inch lifts, with each lift compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D698 (the Standard Proctor test). A moist unit soil weight of 120 pounds per cubic foot is recommended for design. This unit weight was calculated from an undisturbed Shelby tube sample obtained at 3.0 feet in boring B-3. However, this unit weight should be confirmed by Proctor testing. If off-site soils are used for fill, the unit weight of the soil chosen should be determined and used in design.

Prior to beginning fill construction, we recommend representative samples of proposed fill materials be collected and tested to determine their laboratory compaction characteristics, plasticity, and natural moisture contents. These tests are needed to determine if proposed fill materials are acceptable and for quality control during compaction. Structural fill should be constructed using the recommended criteria in section 5.2.

5.6.2 Rock Supported Drilled Pier Foundations

Another tower support alternative is rock supported drilled pier foundations. If elected, drilled piers should be designed to resist both uplift and axial loads. For purposes of this study, axial load is defined as the downward vertical load imparted to the foundation. Cardno ATC recommends

drilled piers be designed to bear on clean un-weathered rock using an allowable bearing value 20 tons per square foot. The rock surface should be defined as competent, intact rock below weathered zones, cavities, or clay filled voids, at a minimum depth of approximately 20 feet below the surface. Piers should be designed based upon end bearing alone with no allowance for side friction.

In order to resist uplift, the weight of the reinforced portion of the piers and soil skin friction acting on the piers should be utilized. Skin friction should be limited to that portion of the shafts extending from the depth 5 feet below the ground surface to a depth equal to one pier diameter above the rock line. A 1 kip per square foot ultimate skin friction value is recommended. A minimum safety factor of 1.5 applied to the total uplift capacity is recommended to determine allowable design values.

5.6.2.1 Drilled Pier Construction Considerations

We recommend subsurface conditions in pier excavations be monitored until concrete is placed to verify that an otherwise competent bearing condition is not compromised by ground water seepage, surface water infiltration, or sidewall cave-in. Probe holes into the rock below the bearing elevation are not necessary as the allowable design load is relatively low. However, it is recommended that pier excavations be observed by qualified personnel in order to confirm an acceptable bearing surface is constructed and to identify significant deviations from the specified or anticipated conditions. Observed soil conditions suggest steel casing will be required to provide stable shaft excavations above the rock line. Due to their depths, the potential for groundwater entering shaft excavations should be considered likely; casing will serve to preclude water from filling the shaft. Construction phase observations and documentation should include:

- Pier top locations within tolerances,
- Correct plan dimensions,
- Plumbness within tolerances,
- Materials excavated match boring data,
- Construction procedures with respect to excavation, groundwater management and concreting,
- Correct placement of steel reinforcing and anchorage bolts,
- Sampling and testing of plastic concrete,
- Concrete placement procedures,
- Proper temporary casing removal.

Significant deviations from specified or anticipated conditions should be reported immediately to the owner's representative and the project design team.

If pier excavations are to be entered, temporary casing will be required through the soil portion and all local, state and federal safety regulations regarding confined space entry should be followed. No open flame should be permitted on the site near a drilled pier excavation and no personnel should be allowed to enter the excavation until proper safety precautions for confined space entry have been taken. Such precautions should include proper personal protective equipment and monitoring of the excavations for explosive vapors and oxygen deficiency. Additional safety measures may be needed depending upon specific conditions at the foundation location, construction procedures employed and applicable local, state and federal Occupational Health and Safety Regulations. The following recommendations are provided to aid in the successful construction of drilled shafts at this site:

- Retain the project geotechnical consultant to observe drilled shaft construction.

- Make provisions for ground water removal from the drilled shaft excavations. Use appropriate measures to remove water accumulation from the drilled shaft excavations. If the shaft can be fully dewatered (i.e., less than 2 in. of water on the bottom of the shaft) and concrete can be placed in the shaft quickly (i.e., more than 1 truck discharging into the shaft at one time) then the concrete can be placed by conventional methods. If the shaft cannot be fully dewatered and/or if there is continual flow of water into the shaft, then the concrete should be placed by tremie methods. If this condition should occur, it should be evaluated and excavation methods should be revised accordingly.

- Place concrete in the drilled shafts immediately upon completion of excavation. To minimize the potential for lateral movement of the drilled shafts during loading, the contractor must place the drilled shaft concrete in direct contact with undisturbed natural soil and rock, filling any voids or enlargements in the drilled shaft excavations with concrete at the time of concrete placement.

- Utilize drilled shaft concrete with a mix designed for a slump of 5 to 7 inches to reduce the potential for arching and to provide a workable material, Should tremie placement of the concrete be required, the concrete mix should be designed with a slump ranging from 7 to 9 inches, without reduction in design strength, to facilitate placement with the tremie tube. A means of preventing concrete from intermixing with the water or slurry, such as a bottom discharge gate or rubber ball for a tremie pipe, or a pig for use in a concrete pump must be provided. In no case should concrete be placed through standing water in the drilled shaft excavation or tremie pipe.

- Maintain a positive head of concrete within the temporary casing, relative to water trapped outside the casing, to reduce the risk of water and/or soil from infiltrating into the drilled shaft excavation and contaminating the concrete. An improper head balance could potentially cause water and/or soil to flow into the shaft and compromise the concrete integrity. Should tremie placement be required, water which typically becomes intermixed with the uppermost portion of the concrete, contaminating the concrete, must be completely removed, down to fresh concrete, prior to final concrete placement to complete the drilled shaft. The drilled shaft

contractor must be experienced and prepared to deal with potentially difficult soil, rock and groundwater conditions.

- Install a temporary protective steel casing to prevent side wall collapse, prevent excessive mud and water intrusion, and to allow workers to safely enter, clean and inspect the drilled shaft.

- Direct the concrete placement into the drilled hole through a centering chute to reduce side flow or segregation.

- Extract the protective steel casing as the concrete is placed, to provide a sufficient head of concrete to prevent soil or water intrusion into the newly placed concrete.

- Maintain the shaft reinforcing steel cage in the proper position and at the correct elevation during removal of the temporary casing in order to permit the proper location of the structure anchor bolts.

5.7 EXCAVATION SAFETY

Excavations of depth greater than five feet require protective systems; if less than five feet in depth a *competent person* may evaluate the excavation and determine that protective measures are not necessary. For purposes of trenching and excavations, a competent person is a person who is capable of identifying existing and predictable hazards or working conditions that are hazardous to workers. For design purposes, the natural site soils meet the requirements of OSHA soil type "A", and trenches less than 20 feet in height may be sloped or benched at a rate of ¾H to 1V. The fill soils in the area of the tower location and north pavement area meet the requirements of OSHA soil type "B", and trenches less than 20 feet in height may be sloped or benched at a rate of 1H to 1V. If excavations are benched, steps may be no greater than 4 feet in height. If required, these conditions should be confirmed by a competent person during the excavation process. Additional excavation safety requirements typically include:

- Keep heavy equipment away from trench edges with distance a function of trench height and vehicle type.
- Identify sources, such as ground water, external factors associated with construction operations, or natural subsurface conditions that may affect sidewall stability.
- Keep excavated spoils and equipment a minimum of two feet beyond trench edges.
- Identify and stabilize underground utilities.
- Perform LEL and O_2 testing while personnel are in the excavation.
- Check trench edges and condition for stability prior to the start of work shifts, following precipitation events, and if excavations become inundated.

These recommendations are presented as guidelines for trenching and excavation operations and do not constitute an excavation safety plan. A complete excavation safety plan is recommended for any excavations over five feet in depth.

5.8 PAVEMENT RECOMMENDAITONS

- **5.8.1 General**

Pavement design loading has not been provided. Therefore, the minimum section recommendations presented should be considered nominal and typical for projects of this size. A site specific design can be prepared, based upon actual traffic loading, if required.

In order for pavements to perform satisfactorily, supporting subgrade soils must have sufficient strength and stability to resist deterioration from construction traffic while supporting paving equipment. In addition, completed pavement sections must resist freeze/thaw cycles and wheel loads from traffic. Generally, construction traffic loading is more severe than post construction traffic. Pavement sections recommended herein have been developed, in part based on the assumption that pavement subgrade soils have been compacted to at least 95 percent of the soil's standard Proctor maximum dry density at moisture contents recommended herein.

Minimizing infiltration of water into the subgrade and rapid removal of water entering the subgrade is essential for successful long-term pavement performance, especially in the existing fill area. Both the subgrade and the pavement surfaces should have minimum slopes of one-quarter-inch per foot to promote drainage. Pavement edges should be provided a means of water outlet by extending the aggregate base course through to daylight or to surface drainage features such as storm inlets. Storm water inlets should have weep holes to preclude water accumulation beneath pavements on the outside of inlet drop piping.

All paving materials should conform to and be placed and compacted in accordance with applicable sections of the Kentucky Transportation Cabinet (KTC) Standard Specifications for Road and Bridge Construction. Minimum recommended pavement sections presented herein are based upon soil types observed in the test borings and AASHTO design guidelines for small (less than 50 lot) parking lots.

The subgrade in all proposed pavement areas should be proofrolled and observed by the geotechnical engineer prior to construction of the pavement section.

- **5.8.2 Flexible Pavement**

The total flexible pavement thickness requirement is a function of the resilient modulus (M_r) of the subgrade soils. We have estimated M_r through an empirical correlation with the California Bearing Ratio (CBR) suggested by AASHTO for fine-grained soils with a soaked CBR of 10 or less. No laboratory CBR tests were performed for this project. Our experience indicates a soil subgrade prepared as recommended in this report may be modeled using a CBR value less than 3. The following pavement sections are recommended as guidelines. Actual section recommendations should be based upon design.

Table 4: Flexible Pavement

Material	Layer Thickness		Kentucky DOH Specification
	Light Duty Pavement Section	Heavy Duty Pavement Section	
Asphalt Surface	1.5 inch	1.5 inch	Section 403
Asphalt Binder	3 inches	4 inches	Section 403
Crushed Stone Base	6 inches	8 inches	Section 805

Prepared by: *TA*
Checked by: *MB*

- **5.8.3 Rigid Concrete Pavement**

The flexible pavement analysis does not include conditions for loading of dumpster trucks which generate high pavement stresses or for other areas where concrete pavements may be desired. For a dumpster loading area, we recommend using a reinforced concrete pad at least 6 inches thick underlain by at least 6 inches of crushed stone. Prior to placing the crushed stone base for the rigid pavement, the dumpster and truck approach areas should be thoroughly proofrolled. We recommend the concrete pad be large enough to accommodate the entire length of the truck while loading. In addition, we recommend a thickened curb be constructed around the perimeter of the dumpster pad to reduce the potential for pad damage associated with overstressing pad edges.

We normally make the following recommendations for concrete pavements required to support light industrial and vehicle loading:

Table 5: Rigid Concrete Pavement

Material	Light Duty		Heavy Duty	
Concrete Strength	4,000	5,000 psi	4,000 to 5,000 psi	5,500 psi
Concrete Air Entrainment	5.0 to 6.0 (%)*	5.0 to 6.0 (%)*	5.0 to 6.0 (%)*	5.0 to 6.0 (%)*
Concrete Thickness	5 inches	4-1/2 inches	6 inches	5-1/2 inches
Crushed Stone Base	4 inches	4 inches	4 inches	4 inches
Maximum Joint Spacing	12.5 ft.	10 ft.	15 ft.	12.5 ft.

**Subject to mix design.*

Prepared By: TA
Checked By: MB

5.9 GROUNDWATER CONTROL

Typically, groundwater encroaching upon construction excavations can be removed by placing a sump near the source of seepage and then pumping from the sump. Should heavy seepage occur, or should there be evidence of soil particle migrations, such as silting of the sump, then the geotechnical engineer should be informed. Difficulties constructing foundation structures due to the presence of groundwater is not expected.

6. BASIS FOR RECOMMENDATIONS

The recommendations provided are based in part on project information provided to Cardno ATC and only apply to the specific project and site described in this report. If the project information section in this report contains incorrect information or if additional information is available, please convey the correct or additional information to Cardno ATC and retain us to review the recommendations within this report. Cardno ATC can then modify recommendations if they are inappropriate for the proposed project.

Neither assessment of site environmental conditions nor efforts to check for the presence of contaminants in the soil, rock, surface water or ground water of the site are included the scope of this exploration.

Regardless of the thoroughness of a geotechnical exploration, there is always a possibility that conditions between borings will be different from those at specific boring locations and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team along

with timely recommendations to solve the problems created. We recommend that the owner retain Cardno ATC to provide this service based upon our familiarity with the project, the subsurface conditions and the intent of the recommendations.

Cardno ATC recommends that this complete report be provided to the various design team members, the contractors and the project owner. Potential contractors should be informed of this report in the "instructions to bidders" section of the bid documents. The report should not be included or referenced in the actual contract documents.

We wish to remind you that our exploration services include storing the samples collected and making them available for inspection for 30 days. The samples are then discarded unless you request otherwise.

APPENDICES:

APPENDIX A

"Important Information about Your Geotechnical Engineering Report"

Figure 1: Site Location Plan

Figure 2: Boring Location Plan

APPENDIX B

Legend to Soil Classification and Symbols

Test Boring Logs

Test Boring Profiles

Field Testing Procedures

Summary of Laboratory Test Data

Laboratory Testing Procedures

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
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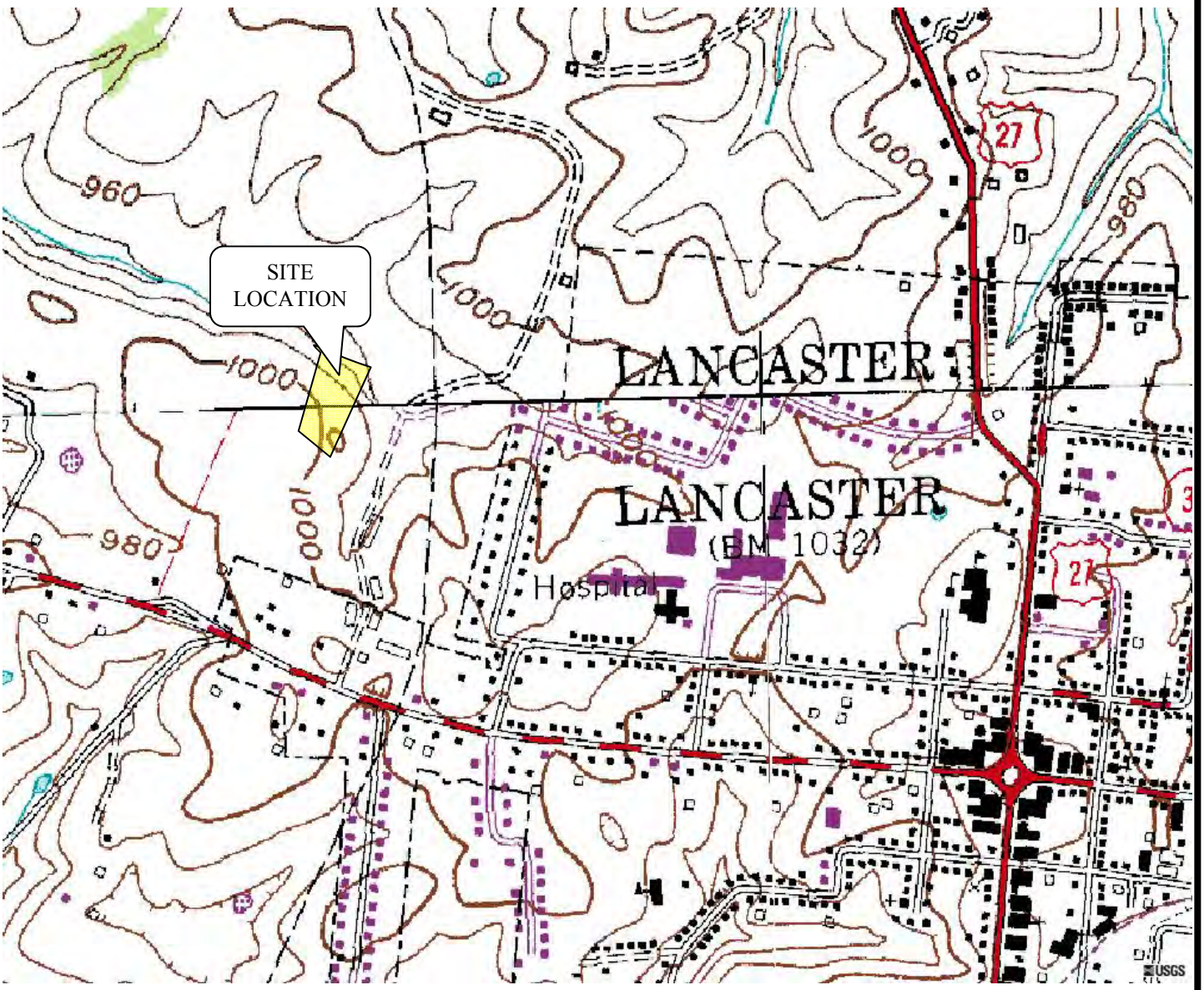

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Cardno ATC
Shaping the Future

11001 Bluegrass Parkway, Suite 250
Louisville, KY 40299
Phone: (502) 722-1401
Fax: (502) 267-4072

PROJECT NO:		
DESIGNED BY: TA		REVIEWED BY: MB
DRAWN BY: TA	DATE:11-21-13	FIGURE: 1

SITE LOCATION PLAN

Garrard County EOC/CSEPP
Garrard County EOC
278 Precision Ct.
Lancaster, Kentucky

Location	Offset E/W	Offset N/S	Latitude	Longitude	Elevation NavD88
Pin (nail in Pavement)	0	0	37°37'32.63N	84°35'33.76W	993
B-1	113' E	93' S	37°37'31.69N	84°35'32.32W	994
B-2	152' E	122' S	37°37'31.40N	84°35'31.85W	991
B-3	75' E	200' S	37°37'30.65N	84°35'32.82W	999
B-4	113' E	224' S	37°37'30.43N	84°35'32.35W	996
T-1	197' E	27' S	37°37'32.34N	84°35'31.31W	990
P-1	72' E	36' N	37°37'33.02N	84°35'32.86W	990
P-2	131' E	18' S	37°37'32.45N	84°35'32.1W	990
P-3	51' E	299' S	37°37'29.71N	84°35'33.14W	1001
P-4	51' W	284' S	37°37'29.86N	84°35'34.37W	1003

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11001 Bluegrass Parkway, Suite 250
Louisville, KY 40299
Phone: (502) 722-1401
Fax: (502) 267-4072

PROJECT NO: 27.38065.1401

DESIGNED BY: TA		REVIEWED BY: MB
DRAWN BY: TA	DATE: 11-21-13	FIGURE: 2

BORING LOCATION PLAN

Garrard County EOC/CSEPP
Garrard County EOC
278 Precision Ct.
Lancaster, Kentucky

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)


Fill


Asphalt


Topsoil


Gravel


Sand


Silt


Lean Clay


Fat Clay


Silty Sand


Clayey Sand


Sandy Silt


Clayey Silt


Sandy Clay


Silty Clay


Limestone


Sandstone


Siltstone


Shale

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Soft	0 to 2
Soft	3 to 4
Firm	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	Over 30

RELATIVE DENSITY OF COHESIONLESS SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Loose	0 to 4
Loose	5 to 10
Firm	11 to 20
Very Firm	21 to 30
Dense	31 to 50
Very Dense	Over 50

ESTIMATED RELATIVE MOISTURE CONDITION

(Visual classification relative to assumed optimum moisture content (OMC) of standard proctor)

Dry	- Air dry to dusty
Slightly Moist	- Dusty to approximately -2% OMC
Moist	- Approximately between ±2% OMC
Very Moist	- From approximately +2% to nearly saturated
Wet	- Contains free water or nearly saturated

PARTICLE SIZE IDENTIFICATION

Boulders	Over 6"
Gravel	
Coarse	6" - ½"
Fine	½" - 2 mm
Sand	
Coarse	2 mm - 0.6 mm
Medium	0.6 mm - 0.2 mm
Fine	0.2 mm - 0.06 mm
Silt	0.06 mm - 0.005 mm
Clay	Less than 0.005 mm

RELATIVE HARDNESS OF ROCK

Very soft	Pieces 1 inch or more in thickness can be broken by finger pressure; can be scratched readily by fingernail.
Soft	May be broken with fingers.
Medium	May be scratched with a nail; corners and edges may be broken with fingers.
Moderately Hard	Moderate blow of hammer required to break sample.
Hard	Hard blow of hammer required to break sample.
Very Hard	Several hard blows of hammer required to break sample.

SAMPLER TYPES

(Shown in Sampler Column)


Shelby Tube


Split Spoon


Rock Core


Grab Sample


No Recovery

TERMS

Standard Penetration Resistance The Number of Blows of a 140 lb. Hammer Falling 30 in. Required to Drive a 1.4 in. I.D. Split Spoon Sampler 1 Foot. As Specified in ASTM D-1586. Also commonly referred to as an "N" value.

REC Recovery - Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%

RQD Rock Quality Designation - Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.

VATC ASSOCIATES INC.

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # B-1
JOB # 27.38065.1401
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GeoDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 994.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
LEAN CLAY, Dark Brown, silty, very stiff, moist			1	SS					5-9-8		
			2	SS					8-8-12		
	4.0										
FAT CLAY, Orange-Brown, very stiff, moist, contianed oxidized minerals		5	3	SS					5-8-9		
			4	SS					5-7-11		
		10	5	SS					6-8-11		
	14.0										
FAT CLAY, Yellow-Brown and Gray, firm, moist, contained oxidized minerals and rock fragments Wet at 14.5 feet	15.5	15	6	SS			▽		2-2-4		
Boring Terminated at 15.5 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
▽ Noted on Drilling Tools 14.5 ft.
▽ At Completion (in augers) ____ ft.
▽ At Completion (open hole) ____ ft.
▽ After ____ hours ____ ft.
▽ After ____ hours ____ ft.
Cave Depth ____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # B-2
JOB # 27.38065.1401
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GeoDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 991.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
LEAN CLAY, Dark Brown, silty, very stiff, moist			1	SS					5-9-11		
Orange-Brown at 2.0 feet			2	SS					7-9-10		
	4.0										
FAT CLAY, Orange-Brown, very stiff, moist, contained oxidized minerals		5	3	SS					9-11-16		
	6.5										
FAT CLAY, Yellow-Brown and Gray, hard, moist, contained oxidized minerals			4	SS					12-15-19		
very stiff at 9.0 feet		10	5	SS					6-7-10		
	14.0										
ROCK Augered, Weathered	14.2		6	SS					50/2"		
Auger Refusal at 14.2 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # B-3
JOB # 27.38065.1401
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GeoDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 999.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
TOPSOIL (6-Inches)	0.5		1	SS					3-6-8		
LEAN CLAY, Dark Brown, silty, stiff, moist	1.5		2	SS					9-10-10		
LEAN CLAY, Orange-Brown, very stiff, moist	4.0		3	ST							UCS: 1.85 tsf
FAT CLAY, Orange-Brown, stiff, moist, contained oxidized minerals		5	4	SS					4-6-8		LL: 69% PI: 41%
			5	SS					5-8-50/5"		
ROCK Augered, weathered	7.9 8.4										
Auger Refusal at 8.4 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # B-4
JOB # 27.38065.1401
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GeoDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

SOIL CLASSIFICATION / SURFACE ELEVATION 993.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
TOPSOIL (6-Inches)	0.5		1	SS					2-5-5		
LEAN CLAY, Dark Brown, silty, stiff, moist	1.5		2	SS					6-8-9		
FAT CLAY, Orange-Brown, very stiff, moist, contained oxidized minerals											
	4.9		3	SS					6-50/5"		
ROCK Augered, weathered, floater	5.3	5									
FAT CLAY, Yellow-Brown and Gray, stiff, moist, contained oxidized minerals			4	SS					5-6-8		
		10	5	SS					5-7-8		
	11.3										
Auger Refusal at 11.3 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # P-1
JOB # 27.38065.1401
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GeoDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

SOIL CLASSIFICATION / SURFACE ELEVATION 990.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
FILL, FAT CLAY, Orange-Brown, firm, moist, contained rock fragments			1	SS					4-3-4		
	2.5		2	SS					7-7-7		Approximately 2.5 Feet of Fill
LEAN CLAY, Dark Brown, silty, sitff, moist											
	4.5		3	SS					5-5-6		
FAT CLAY, Orange-Brown, stiff, moist, contained oxidized minerals	5.5	5									
Boring Terminated at 5.5 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # P-2
JOB # 27.38065.1401
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GeoDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 990.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
FILL, FAT CLAY, Orange-Brown, stiff, moist, contained rock fragments			1	SS					3-4-7		
			2	SS					7-11-19		
	3.0										
ROCK FILL, Augered											
	5.5	5									
FILL, FAT CLAY, Orange-Brown, stiff, moist, contained rock fragments	6.5		3	SS					3-4-7		
LEAN CLAY, Dark Brown, silty, stiff, moist	7.0										Approximately 6.5 Feet of Fill
Boring Terminated at 7 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # P-3
JOB # 27.38065.1401
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started 11/20/13
Date Completed 11/20/13
Drill Foreman GeoDrill
Inspector TA
Boring Method HSA, MH

Hammer Wt. 140 lbs.
Hammer Drop 30 in.
Spoon Sampler OD 2 in.
Rock Core Dia. 2 in.
Shelby Tube OD 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 1001.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
TOPSOIL (6-inches)	0.5		1	SS					3-5-6		
FAT CLAY, Orange-Brown, stiff, moist, contianed oxidized minerals	2.6		2	SS					8-50/3"		
Auger Refusal at 2.6 feet											Refusal Likely on Floater

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # P-4
JOB # 27.38065.1401
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GeoDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 1003.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
TOPSOIL (6-inches)	0.6		1	SS					4-7-8		
FAT CLAY, Orange-Brown, stiff, moist, contained oxidized minerals			2	SS					3-6-7		
		5	3	SS					4-6-7		
	5.5										
Boring Terminated at 5.5 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

Fax

TEST BORING LOG

CLIENT: Garrard Co. CSEPP
PROJECT NAME: Garrard Co. EOC
PROJECT LOCATION: Garrard County Industrial Park, Lancaster, KY

BORING #: T-1
JOB #: 27.38065.1401
DRAWN BY: TA
APPROVED BY: MB

DRILLING and SAMPLING INFORMATION

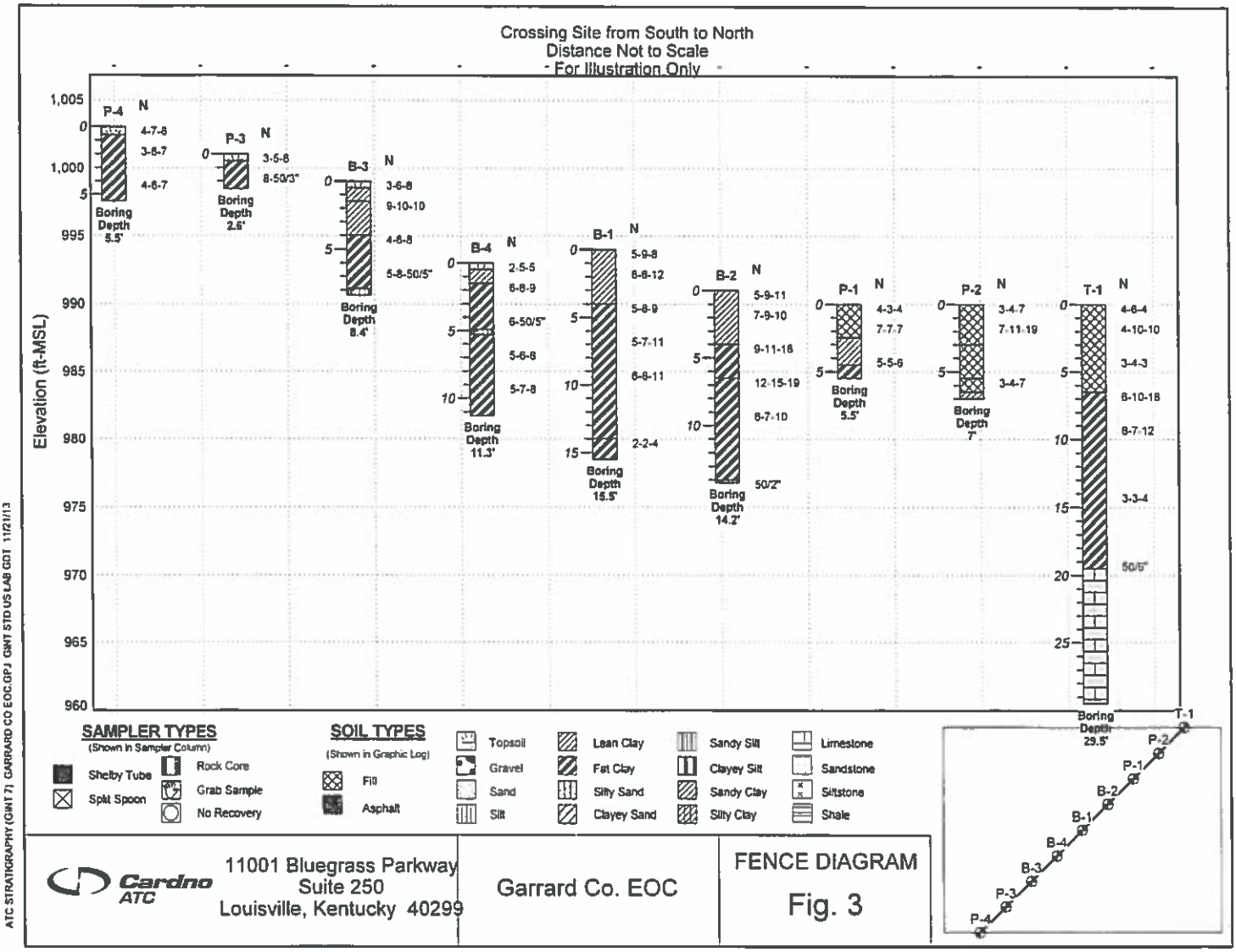
Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GeoDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

SOIL CLASSIFICATION / SURFACE ELEVATION 990.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
FILL, FAT CLAY, Orange-Brown, stiff, moist, contained rock fragments			1	SS					4-6-4		
			2	SS					4-10-10		Auger Refusal Encountered at 4.0 feet (Boulder in Fill), Boring Offset 3 Feet West
		5	3	SS					3-4-3		
FAT CLAY, Yellow-Brown and Gray, very stiff, moist, contained oxidized minerals	6.5		4	SS					6-10-18		Resistivity: 23061 Ohm-cm
		10	5	SS					8-7-12		
Firm at 14.0 feet Groundwater Encountered at 14.7 feet		15	6	SS			▼		3-3-4		
LIMESTONE, Gray, fine grained, hard, thin to thick bedded	19.5	20	7	SS					50/6"		Rec: 98% RQD: 83% UCS: 3,200 psi
			8	CORE							
Thin shale partings 24.5 feet to 25.5 feet		25									
Boring Terminated at 29.5 feet	29.5										

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools 14.7 ft.
At Completion (in augers) ____ ft.
At Completion (open hole) ____ ft.
After ____ hours ____ ft.
After ____ hours ____ ft.
Cave Depth ____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



ATC STRATIGRAPHY (GINT 7) GARRARD CO EOC.GPJ GINT STD US LAB GDT 11/21/13

Cardno ATC

11001 Bluegrass Parkway
Suite 250
Louisville, Kentucky 40299

Garrard Co. EOC

FENCE DIAGRAM

Fig. 3

FIELD TESTING PROCEDURES

Field Operations: The general field procedures employed by ATC Associates, Inc., (ATC) are summarized in ASTM D420 which is entitled *Investigating and Sampling Soils and Rocks for Engineering Purposes*. This recommended practice lists recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Borings are drilled to obtain subsurface samples using one of several alternative techniques depending upon the subsurface conditions. These techniques are:

a. Continuous 2½ or 3¼ inch inside diameter (I.D.) hollow stem augers;
b. Wash borings using roller cone or drag bits (using drilling mud or water);
c. Continuous flight augers (ASTM D1425).

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

The subsurface conditions encountered during drilling are reported on a field test boring record by the chief driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soils in general accordance with the procedures outlined in ASTM D2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designating the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

The detailed data collection methods used during this exploration are discussed below.

Soil Test Borings: Soil test borings were made at the site at locations shown on the attached Boring Location Plan. Soil sampling and penetration testing were performed in accordance with ASTM D1586.

At regular intervals, soil samples obtained with a standard 1.4 inch I.D., 2 inch outside diameter (O.D.), split tube sampler. The sampler was first seated 6 inches to penetrate any loose cuttings, then driven an additional foot with blows of a 140-pound hammer free falling 30 inches. The number of hammer blows required to drive the sampler the final foot was recorded and is designated the "penetration

FIELD TESTING PROCEDURES (continued)

resistance." The penetration resistance, when properly evaluated, is an index to the soil strength and foundation supporting capability.

Representative portions of the soil samples, thus obtained, were placed in glass jars and transported to the laboratory. In the laboratory, the samples were examined to verify the driller's field classifications. Test Boring Records are attached which graphically show the soil descriptions and penetration resistances.

Undisturbed Sampling: Split tube samples are suitable for visual examination and classification tests but are not sufficiently intact for quantitative laboratory testing. For quantitative testing, relatively undisturbed samples are obtained by pushing sections of 3 inch O.D., 16 gauge, steel or brass tubing (Shelby tube) into the soil at the desired sampling levels. This procedure is described by ASTM D1587. Each tube, together with the encased soil, is carefully removed from the ground, made airtight and transported to the laboratory. Locations and depths of undisturbed samples are shown on the Test Boring Record.

Water Level Readings: Water table readings are normally taken in conjunction with borings and are recorded on the Test Boring Records. These readings indicate the approximate location of the hydrostatic water table at the time of our field investigation. Where impervious (more clayey) soils are encountered the amount of water seepage into the boring is small, and it is generally not possible to establish the location of the hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring, water level reported on the boring records is determined by field crews as the drilling tools are advanced. The time of boring water level is detected by changes in the drilling rate, soil samples obtained, or by measurement after the drilling tools are withdrawn. Additional water table readings may be obtained after the borings are completed. A time lag of 24 hours may allow stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using an electrical probe to detect the water level surface.

Occasionally, the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is also measured and recorded on the boring records.

Borehole	Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class-ification	Water Content (%)	Unconfined Compressive Strength (tsf)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	k (cm/sec)	% Finer #200
B-2	0.0	SS					17.4											
B-2	1.5	SS					20.7											
B-2	4.0	SS					27.8											
B-2	6.5	SS					24.1											
B-2	9.0	SS					25.3											
B-2	14.0	SS					21.4											
B-3	3.0	ST					20.1	1.85	106.1	127.4								
B-3	4.0	SS	69	28	41	CH	31.7											
B-4	0.0	SS					22.5											
B-4	4.0	SS					26.9											
B-4	6.5	SS					24.8											
B-4	9.0	SS					26.0											
B-4	1.5	SS					29.1											92.2
T-1	6.5	SS					28.4											

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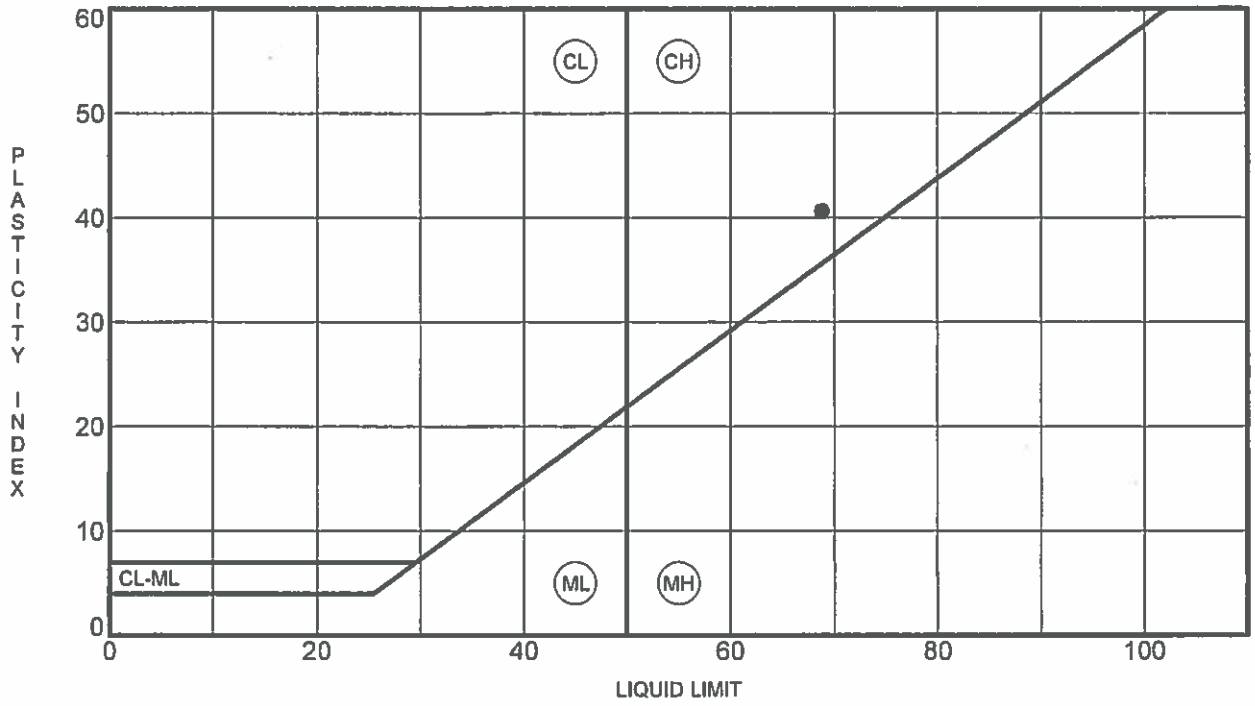
Fax: (502) 267-4072

SPT - Split Spoon Sample
BG - Bulk Grab Sample
k - Coefficient of Permeability
- See Attached test Results

Summary of Laboratory Results

Client: Garrard Co. CSEPP
Project: Garrard Co. EOC
Location: Garrard County Industrial Park
City, State: Lancaster, KY
Number: Date: 11/26/2013



	Specimen Identification		LL	PL	PI	Water Content	Description
●	B-3	4.0	69	28	41	31.7	Fat clay brown

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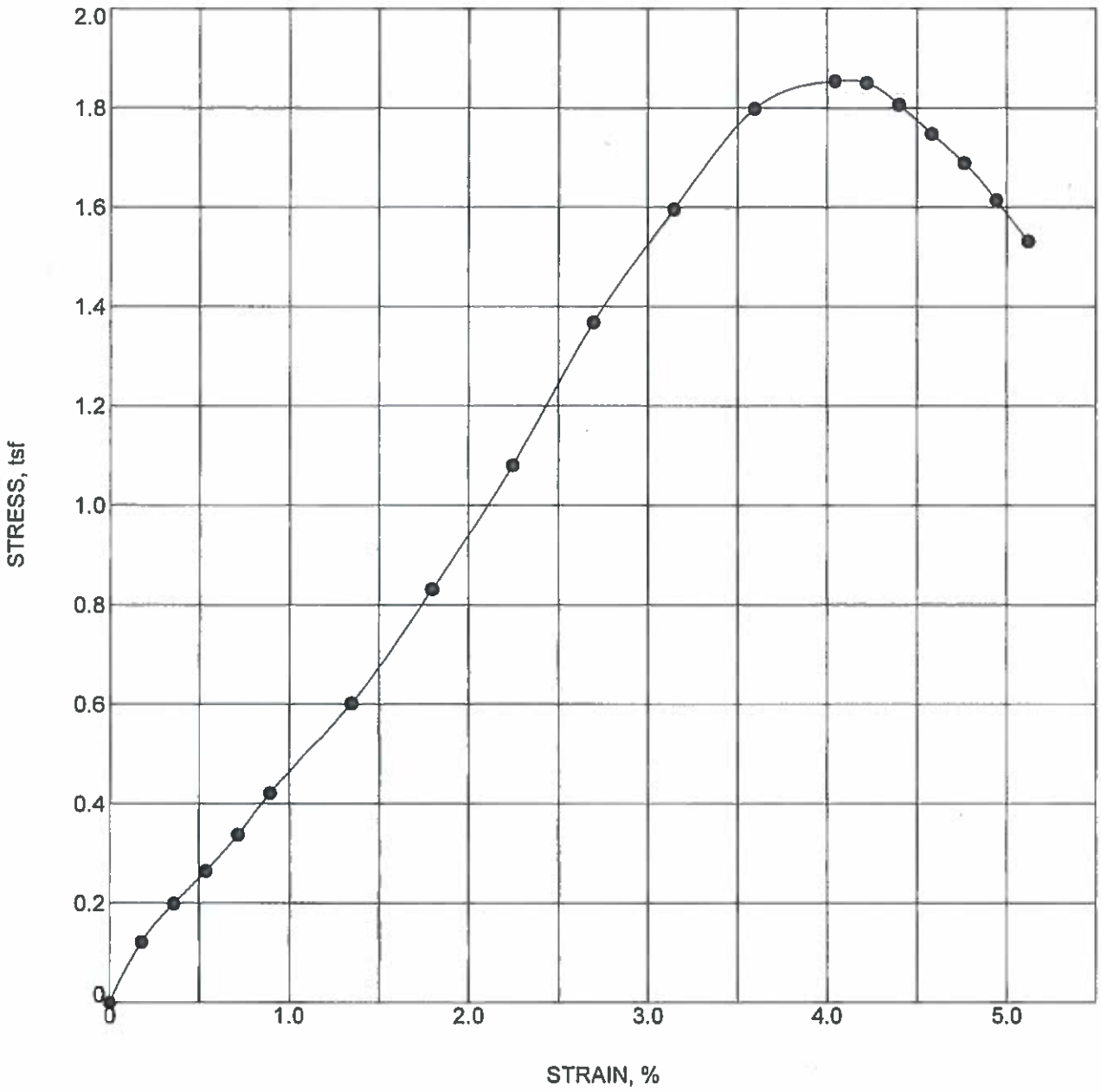
11001 Bluegrass Parkway, Suite 250
Louisville, KY 40299
Telephone: (502) 722-1401
Fax: (502) 267-4072

ATTERBERG LIMITS RESULTS

Client: Garrard Co. CSEPP
Project: Garrard Co. EOC
Location: Garrard County Industrial Park
City, State: Lancaster, KY
Number:
Date: 11/26/2013



Specimen Identification		Description	Unconfined Compressive Strength (tsf)	Failure Strain (%)	γ_d	MC%
● B-3	3.0	Brown	1.85	4.0	106	20

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Louisville, KY 40299
Telephone: (502) 722-1401
Fax: (502) 267-4072

UNCONFINED COMPRESSION TEST

Client: Garrard Co. CSEPP
Project: Garrard Co. EOC
Location: Garrard County Industrial Park
City, State: Lancaster, KY
Number:
Date: 11/26/2013

US UNCONFINED GARRARD CO EOC.GPJ GINT STD US LAB.GDT 11/26/13

Cardno ATC

Shaping the Future

Project: Garrard Co. EOC
Project No.:
By: LJ/SP Date: 11/21/13
Checked By: Date:

Unconfined Compression Test on Rock Cores

ASTM D2938 Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens

Equipment Usage: **Calipers, Scale, Rhiel Compression Machine**

Compression Test Results

Core ID	Depth (feet)	Diameter (inches)	Area (in^2)	Length (inches)	L/D Ratio	Maximum Test Load (lbs)	Compressive Strength (psi)	Strength Correction Factor	Corrected Compressive Strength (psi)
T-1	19.85-20.25	1.99	3.12	3.93	1.97	10045	3224	1.00	3,200

Unit Weight Determination

Core ID	Depth (feet)	Core Description	Diameter (inches)	Initial Length as Received (inches)	Length (inches)	Weight (grams)	Unit Weight (pcf)
T-1	19.85-20.25	Limestone	1.99	12.38	3.93	528.49	164.3
							#DIV/0!
							#DIV/0!
							#DIV/0!
							#DIV/0!
							#DIV/0!

Version 01172001
Revised 9/17/01

LABORATORY TESTING PROCEDURES

Soil Classification: Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply past experience to current situations. In our explorations, samples obtained during drilling operations are examined in our laboratory and visually classified by an engineer. The soils are classified according to consistency (based on number of blows from standard penetration tests), color and texture. These classification descriptions are included on our Test Boring Records.

The classification system discussed above is primarily qualitative. A detailed soil classification requires two laboratory tests: grain size tests and plasticity tests. Using these test results the soil can be classified according to the AASHTO or Unified Classification Systems (ASTM D2487). Each of these classification systems and the in-place physical soil properties provide an index for estimating the soil's behavior. The soil classification and physical properties determined are presented in this report.

Rock Classification: Rock classifications provide a general guide to the engineering properties of various rock types and enable the engineer to apply past experience to current situations. In our explorations, rock core samples obtained during drilling operations are examined in our laboratory and visually classified by an engineer. The rock cores are classified according to relative hardness and RQD (see *Guide to Rock Classification Terminology*), color, and texture. These classification descriptions are included on our Test Boring Records.

Soil Classification Tests

Atterberg Limits: Portions of the samples are taken for Atterberg limits testing to determine the plasticity characteristics of the soil. The plasticity index (PI) is the range of moisture content over which the soil deforms as a plastic material. It is bracketed by the liquid limit (LL) and the plastic limit (PL). The liquid limit is the moisture content at which the soil becomes sufficiently "wet" to flow as a heavy viscous fluid. The plastic limit is the lowest moisture content at which the soil is sufficiently plastic to be manually rolled into tiny threads. The liquid limit and plastic limit are determined in accordance with ASTM D4318.

Percent Finer Than 200 Sieve: Selected samples of soils are washed through a number 200 sieve to determine the percentage of material less than 0.074 mm in diameter.

Moisture Content: The Moisture Content is determined according to ASTM D2216.

Physical Soil Properties: The in-place physical properties are described by the specific gravity, wet unit weight, moisture content, dry unit weight, void ratio, and percent saturation of the soil. The specific gravity and moisture content are determined according to ASTM D854 and D2216, respectively. The wet unit weight is found by obtaining a known volume of the soil and dividing the wet sample weight by the known volume. The dry unit weight, void ratio and percent saturation are calculated values.

Undisturbed Sample Preparation: In the laboratory each undisturbed sample, still in its steel tube, is cut into sections 6 inches long. Each section is weighed and portions of the soil removed for moisture and specific gravity determinations. From these data, the soil void ratio and weight per cubic foot are computed.

LABORATORY TESTING PROCEDURES (continued)

Strength Tests

Unconfined Compression Tests: The unconfined compression test is an unconsolidated-undrained triaxial shear test with no lateral confining pressure. This test is used to determine the shear strength of clayey soils. An unconfined compression test is performed according to ASTM D2166 on a single section of an undisturbed sample extruded from a sampling tube. The sample is trimmed to a length-to-diameter ratio of about 2 and placed in the testing device. Incrementally increasing vertical loads are applied until the sample fails. Test results are provided in the form of a stress-strain curve or a value representing the unconfined compressive strength of the sample.

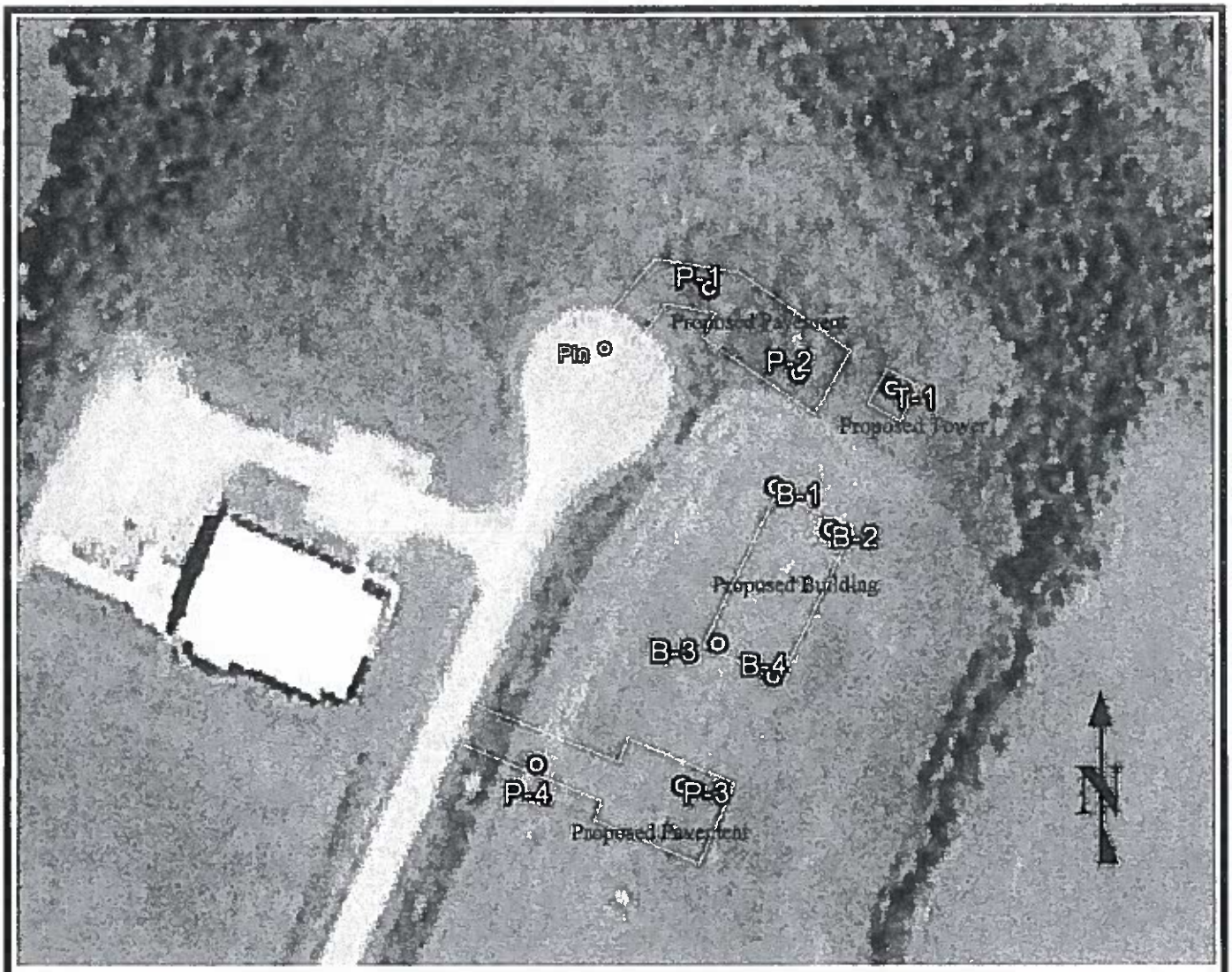
Corrosion Potential

Laboratory Soil Resistivity Tests: The method used to measure the resistivity of soils in the laboratory is the California Division of Highways Test Method Number 643-C, 1972.

The test apparatus consists of a plexiglassbox. Two stainless steel electrodes line opposite sides of the test box. A representative soil sample passing the Number 8 sieve is thoroughly mixed with a small amount of distilled water and lightly compacted in the test box. The resistance of the soil is then measured with an ohm meter. Based on the geometry of the test box, the resistance is then converted to resistivity. A small amount of distilled water is again added to the soil and the test repeated. This procedure is repeated until a curve of moisture content versus resistivity is established. The reported resistivity value is the minimum value of soil resistivity at any moisture content.

Rock Tests

Rock Strength Tests: To obtain strength data for rock materials encountered, unconfined compression tests are performed on selected samples. In the unconfined compression test, a cylindrical portion of the rock core is subjected to increasing axial load until it fails. The pressure required to produce failure is recorded, corrected for the length to diameter ratio of the core and reported.



Location	Offset E/W	Offset N/S	Latitude	Longitude	Elevation NavD88
Pin	0	0	37°37'32.63N	84°35'33.76W	993
B-1	113' E	93' S	37°37'31.69N	84°35'32.32W	994
B-2	152' E	122' S	37°37'31.40N	84°35'31.85W	991
B-3	75' E	200' S	37°37'30.65N	84°35'32.82W	999
B-4	113' E	224' S	37°37'30.43N	84°35'32.35W	996
T-1	197' E	27' S	37°37'32.34N	84°35'31.31W	990
P-1	72' E	36' N	37°37'33.02N	84°35'32.86W	990
P-2	131' E	18' S	37°37'32.45N	84°35'32.1W	990
P-3	51' E	299' S	37°37'29.71N	84°35'33.14W	1001
P-4	51' W	284' S	37°37'29.86N	84°35'34.37W	1003

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Shaping the Future
11001 Bluegrass Parkway, Suite 250
Louisville, KY 40299
Phone: (502) 722-1401
Fax: (502) 267-4072

PROJECT NO:

DESIGNED BY: TA		REVIEWED BY: MB
DRAWN BY: TA	DATE: 11-21-13	FIGURE: 2

BORING LOCATION PLAN

Garrard County EOC/CSEPP
Garrard County EOC
278 Precision Ct.
Lancaster, Kentucky

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # B-1 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 994.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
LEAN CLAY, Dark Brown, silty, very stiff, moist			1	SS					5-9-8		
			2	SS					8-8-12		
	4.0										
FAT CLAY, Orangish Brown, very stiff, moist, contianed oxidized minerals		5	3	SS					5-8-9		
			4	SS					5-7-11		
		10	5	SS					6-8-11		
	14.0										
FAT CLAY, Yellowish Brown and Gray, firm, moist, contained oxidized minerals and rock fragments Wet at 14.5 feet	15.5	15	6	SS			●		2-2-4		
Boring Terminated at 15.5 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools 14.5 ft.
At Completion (in augers) ____ ft.
At Completion (open hole) ____ ft.
After ____ hours ____ ft.
After ____ hours ____ ft.
Cave Depth ____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # B-2 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 991.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
LEAN CLAY, Dark Brown, silty, very stiff, moist			1	SS					5-9-11		
Orangish Brown at 2.0 feet			2	SS					7-9-10		
	4.0										
FAT CLAY, Orangish Brown, very stiff, moist, contained oxidized minerals		5	3	SS					9-11-16		
	6.5										
FAT CLAY, Yellowish Brown and Gray, hard, moist, contained oxidized minerals			4	SS					12-15-19		
very stiff at 9.0 feet		10	5	SS					6-7-10		
	14.0										
ROCK Augered, Weathered	14.2		6	SS					50/2"		
Auger Refusal at 14.2 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # B-3 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 999.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
TOPSOIL (6-Inches)	0.5		1	SS					3-6-8		
LEAN CLAY, Dark Brown, silty, stiff, moist	1.5		2	SS					9-10-10		
LEAN CLAY, Orangish Brown, very stiff, moist	4.0		3	ST							UCS: 1.85 tsf
FAT CLAY, Orangish Brown, stiff, moist, contained oxidized minerals		5	4	SS					4-6-8		LL: 69% PI: 41%
			5	SS					5-8-50/5"		
ROCK Augered, weathered	7.9 8.4										
Auger Refusal at 8.4 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # B-4 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 993.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
TOPSOIL (6-Inches)	0.5		1	SS					2-5-5		
LEAN CLAY, Dark Brown, silty, stiff, moist	1.5		2	SS					6-8-9		
FAT CLAY, Orangish Brown, very stiff, moist, contained oxidized minerals	4.9	5	3	SS					6-50/5"		
ROCK Augered, weathered, floater	5.3										
FAT CLAY, Yellowish Brown and Gray, stiff, moist, contained oxidized minerals			4	SS					5-6-8		
		10	5	SS					5-7-8		
Auger Refusal at 11.3 feet	11.3										

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # P-1 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 990.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
FILL, FAT CLAY, Orangish Brown, firm, moist, contained rock fragments			1	SS					4-3-4		
	2.5		2	SS					7-7-7		Approximately 2.5 Feet of Fill
LEAN CLAY, Dark Brown, silty, sitff, moist	4.5										
FAY CLAY, Orangish Brown, stiff, moist, contained oxidized minerals	5.5	5	3	SS					5-5-6		
Boring Terminated at 5.5 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # P-2 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 990.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
FILL, FAT CLAY, Orangish Brown, stiff, moist, contained rock fragments			1	SS					3-4-7		
			2	SS					7-11-19		
	3.0										
ROCK FILL, Augered											
	5.5	5									
FILL, FAT CLAY, Orangish Brown, stiff, moist, contained rock fragments	6.5		3	SS					3-4-7		
LEAN CLAY, Dark Brown, silty, stiff, moist	7.0										Approximately 6.5 Feet of Fill
Boring Terminated at 7 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # P-3 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 1001.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
TOPSOIL	0.5		1	SS					3-5-6		
FAT CLAY, orangish brown, stiff, moist, contianed oxidized minerals	2.6		2	SS					8-50/3"		
Auger Refusal at 2.6 feet											Refusal Likely on Floater

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # P-4 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 1003.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
TOPSOIL	0.6		1	SS					4-7-8		
FAT CLAY, Orangish Brown, stiff, moist, contained oxidized minerals			2	SS					3-6-7		
			3	SS					4-6-7		
	5.5	5									
Boring Terminated at 5.5 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
Noted on Drilling Tools _____ ft.
At Completion (in augers) _____ ft.
At Completion (open hole) _____ ft.
After _____ hours _____ ft.
After _____ hours _____ ft.
Cave Depth _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

Cardno ATC

TEST BORING LOG

Fax

CLIENT Garrard Co. CSEPP
PROJECT NAME Garrard Co. EOC
PROJECT LOCATION Garrard County Industrial Park
Lancaster, KY

BORING # T-1 DRAFT
JOB #
DRAWN BY TA
APPROVED BY MB

DRILLING and SAMPLING INFORMATION

Date Started	11/20/13	Hammer Wt.	140 lbs.
Date Completed	11/20/13	Hammer Drop	30 in.
Drill Foreman	GoeDrill	Spoon Sampler OD	2 in.
Inspector	TA	Rock Core Dia.	2 in.
Boring Method	HSA, MH	Shelby Tube OD	3 in.

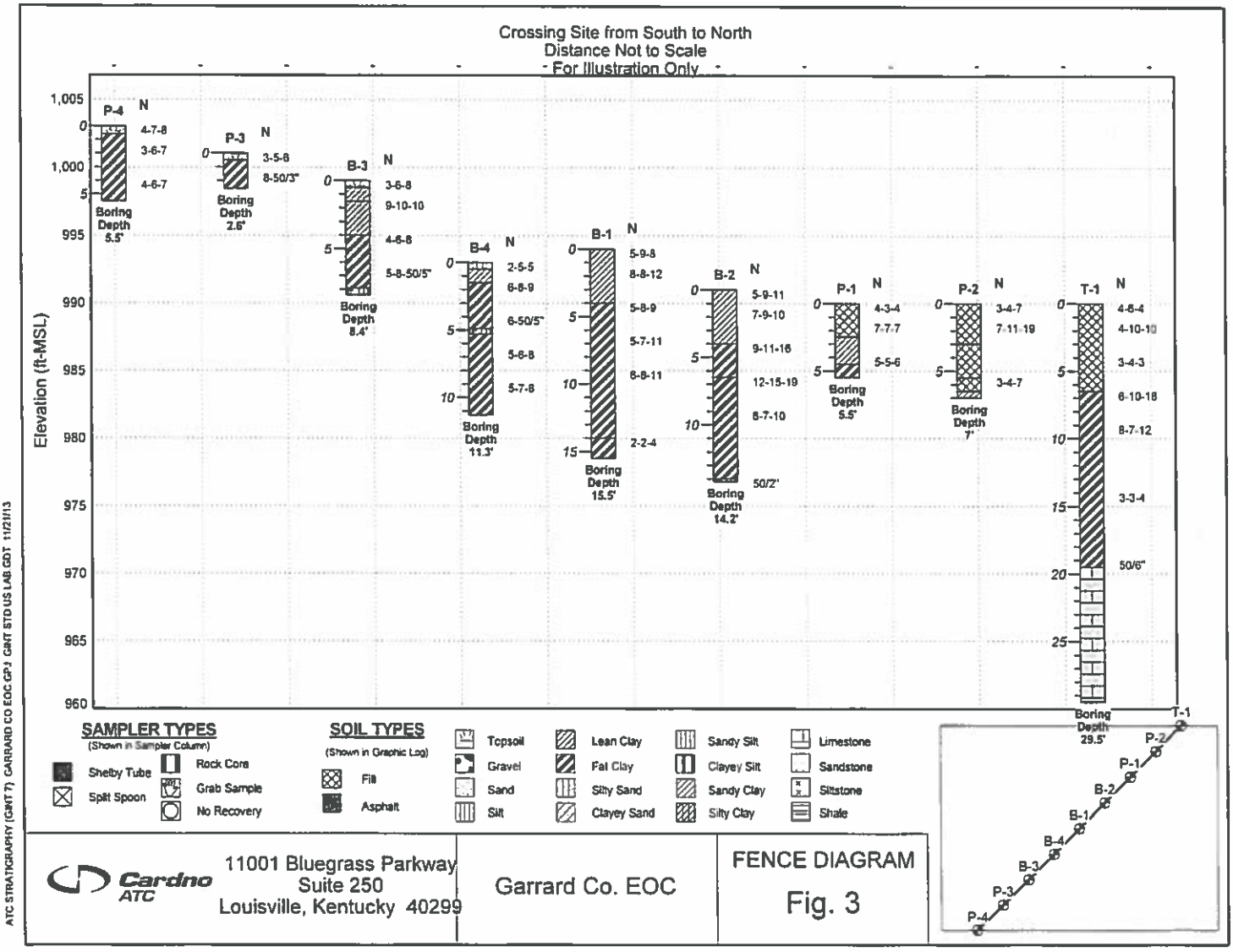
TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 990.0	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Recovery %	Groundwater	Moisture Content	Standard Penetration Test N, Blows/6 inches	Pocket Penetrometer (tsf)	Remarks
FILL, FAT CLAY, Orangish Brown, stiff, moist, contained rock fragments			1	SS					4-6-4		
			2	SS					4-10-10		
		5	3	SS					3-4-3		Auger Refusal Encountered at 4.0 feet (Boulder in Fill), Boring Offset 3 Feet West
	6.5										
FAT CLAY, Yellowish Brown and Gray, very stiff, moist, contained oxidized minerals			4	SS					6-10-18		
		10	5	SS					8-7-12		
Firm at 14.0 feet Groundwater Encountered at 14.7 feet		15	6	SS			▽		3-3-4		
	19.5		7	SS					50/6"		
LIMESTONE, Gray, fine grained, hard, thin to thick bedded		20	8	CORE							Rec: 98% RQD: 83% UCS: 3,200 psi
Thin shale partings 24.5 feet to 25.5 feet		25									
	29.5										
Auger Refusal at 29.5 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater
▽ Noted on Drilling Tools 14.7 ft.
At Completion (in augers) ft.
At Completion (open hole) ft.
After hours ft.
After hours ft.
Cave Depth ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



ATC STRATIGRAPHY (GINT 7) GARRARD CO EOC.GPJ GINT STD US LAB.GDT 11/21/13

Cardno ATC

11001 Bluegrass Parkway
Suite 250
Louisville, Kentucky 40299

Garrard Co. EOC

FENCE DIAGRAM

Fig. 3

Cardno ATC
Shaping the Future

Project:	Garrard County EOC		
Project No.:	27.43548.2G01		
By:	TA	Date:	11/25/13
Checked By:	TH	Date:	11/25/13

Laboratory Resistivity Results

Boring	Depth (ft)	Moisture Content at Test (%)	Wet Density at Test (pcf)	Resistivity (ohm - cm)
T-1	6.5-8.0	28.4	127	2,306

Appendix G

Programming and Planning Study (MCP/SGA)

For information on Appendix G: Programming and Planning Study (MCP/SGA), please contact FEMA Region IV Environmental Planning and Historic Preservation at FEMA-R4EHP@fema.dhs.gov.