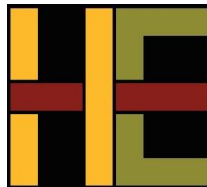


Review and Evaluation of the Horus Kentucky 1, LLC Site Assessment Report

**Kentucky Public Service Commission and
Kentucky State Board on Electrical Generation and
Transmission Siting**

October 14, 2021





Harvey Economics ♦ 469 South Cherry Street, Suite 100 ♦ Denver, Colorado 80246
tel. 720.889.2755 ♦ fax 720.889.2752 ♦ www.harveyeconomics.com ♦ he@harveyeconomics.com

October 14, 2021

Ms. Jennifer Fell
Staff Attorney
Kentucky Public Service Commission
211 Sower Blvd.
Frankfort, KY 40601

Re: Harvey Economics' Review of Horus Kentucky 1, LLC's Site Assessment Report for Solar Facilities in Simpson County, Kentucky

Dear Ms. Fell,

Harvey Economics is pleased to provide you with our final report, *Review and Evaluation of the Horus Kentucky 1, LLC Site Assessment Report*.

Yours truly,

Edward F. Harvey
Principal

Report

October 14, 2021

Review and Evaluation of the Horus Kentucky 1, LLC Site Assessment Report

Prepared for

Kentucky Public Service Commission and
Kentucky State Board on Electrical Generation and Transmission Siting
211 Sower Boulevard
Frankfort, Kentucky 40602

Prepared by

Harvey Economics
469 South Cherry Street, Suite 100
Denver, Colorado 80246
720.889.2755 fax 720.889.2752
www.harveyeconomics.com
he@harveyeconomics.com



Harvey Economics

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SECTION 1

Introduction

This document provides a review of the Site Assessment Report (SAR) for the proposed Horus Kentucky 1, LLC solar facility (Project or Solar Project) submitted to the Kentucky State Board on Electric Generation and Transmission Siting (Siting Board). Horus Kentucky 1, LLC submitted the SAR to the Siting Board on July 5, 2021. Siting Board staff retained Harvey Economics (HE) to perform a review of the SAR. Horus Kentucky 1, LLC (Horus Kentucky 1 or Applicant) submitted the SAR as part of its application for a construction certificate to construct a merchant electric generating facility under KRS 278.706 and 807 KAR 5:110. Requirements specific to the SAR are defined under KRS 278.708, detailed below.

Statutes Applicable to the SAR Review

KRS 278.706 outlines the requirements for an application to receive a certificate to construct a merchant electric generating facility. Section (2)(l) of that statute requires the Applicant to prepare a SAR, as specified under KRS 278.708. The Horus Kentucky 1 SAR is the main focus of HE's review. However, the Siting Board also requested that HE review the economic impact report prepared by the Applicant. The economic impact report is a requirement of the application under KRS 278.706(2)(j), separate from the SAR.

KRS 278.708(3) states the following:

A completed site assessment report shall include:

- (a) A description of the proposed facility that shall include a proposed site development plan that describes:
 - 1. Surrounding land uses for residential, commercial, agricultural, and recreational purposes;
 - 2. The legal boundaries of the proposed site;
 - 3. Proposed access control to the site;
 - 4. The location of facility buildings, transmission lines, and other structures;
 - 5. Location and use of access ways, internal roads, and railways;
 - 6. Existing or proposed utilities to service facility;
 - 7. Compliance with applicable setback requirements as provided under KRS 278.704(2), (3), (4), or (5); and
 - 8. Evaluation of the noise levels expected to be produced by the facility.
- (b) An evaluation of the compatibility of the facility with scenic surroundings;

- (c) The potential changes in property values and land use resulting from the siting, construction, and operation of the proposed facility for property owners adjacent to the facility;
- (d) Evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary; and
- (e) The impact of the facility's operation on road and rail traffic to and within the facility, including anticipated levels of fugitive dust created by the traffic and any anticipated degradation of roads and lands in the vicinity of the facility.

KRS 278.708(4) states that “the site assessment report shall also suggest any mitigating measures to be implemented by the applicant to minimize or avoid adverse effects identified in the site assessment report.”

KRS 278.706(2)(j) states that a completed application shall include “an analysis of the proposed facility's economic impact on the affected region and the state.”

KRS 278.706(2)(d) addresses specific setback requirements, as related to distances from adjacent property owners of various types (i.e., residential neighborhoods, schools, hospitals, nursing homes).

SAR Review Process and Methodology

HE completed the following tasks as part of the review of the Horus Kentucky 1 SAR and certain other components of the Horus Kentucky 1 application:

- Review of the contents and information provided in the site assessment report, application and other documents provided by the Applicant;
- Brief review of secondary data sources to obtain background information and geographic setting for the Horus Kentucky 1 Solar Project;
- Limited review of relevant evaluation criteria to identify potential issues and assessment approaches to serve as benchmarks for the adequacy review;
- Identification of additional information we deemed useful for a thorough review, and submittal of questions to the Applicant via Kentucky Public Service Commission General Counsel;
- Review of additional information supplied by the Applicant in response to first submitted HE questions, and discussion of responses with the Siting Board staff;
- Completion of interviews and data collection with outside sources as identified in this document;

- Review of additional information supplied by the Applicant in response to a second set of questions submitted by HE, and discussion of responses with the Siting Board staff;
- Participation in a site visit, including a tour of the Project site with the Applicant and in-person meetings with local officials;
- Completion of analyses and evaluation of the impacts upon each of the previous identified resources; and
- Preparation of this report, which provides HE’s conclusions as to potential Project impacts and mitigation recommendations.

Components of the Horus Kentucky 1 Facility SAR

Horus Kentucky 1, LLC’s application package to the Siting Board (Application) consists of multiple documents, including several appendices:

- The main Application document provides a summary overview of the Horus Kentucky 1 Project and the Applicant’s responses to applicable KRS.
- Appendices A through H includes, but is not limited to, the following:
 - Descriptions of the proposed site, including maps of the project area
 - Public involvement process documents
 - Interconnection System Impact Study
 - Economic Impact Analysis
 - Site Development Plan
 - Descriptions of legal boundaries
 - Site Assessment Report
- Appendix I (two documents) is the Property Value Impacts Study
- Appendix J (two documents) is the Phase 1 Environmental Site Assessment
- Appendix K (10 documents) is a detailed Geotechnical Report

Additional Information Provided by the Applicant

Once HE reviewed the contents of the SAR, HE and the Siting Board staff independently developed a first list of detailed questions, either requesting additional information or asking for clarification about items in the SAR. The Siting Board staff submitted the first request for information, including questions from HE, on August 19, 2021; Horus Kentucky 1 provided written responses on September 2, 2021.

After HE and the Siting Board staff reviewed Horus Kentucky 1's responses to the first request for information, HE and the Siting Board staff independently developed a second list of detailed questions. The Siting Board staff submitted the second request for information, including questions from HE, on September 16, 2021. Horus Kentucky 1 provided written responses to the second request for information on September 30, 2021.

HE and certain representatives from the Siting Board also met with the Applicant for an in-person meeting on September 14, 2021, to conduct a site visit and discuss remaining issues.

Report Format

This report is intended to support the Siting Board in its decision-making process pertaining to a construction certificate for Horus Kentucky 1, LLC. The report is structured to respond to the requirements for a SAR as outlined in KRS 278.708, the economic analysis described in KRS 278.706(j) and to our contract:

- This section of the report, Section 1, introduces the purpose and process of the SAR review and HE's work;
- Section 2 offers a summary and conclusions of HE's SAR evaluation;
- Section 3 describes the Horus Kentucky 1 Solar Project and proposed site development plan;
- Section 4 provides a brief profile of Simpson County's economic and demographic characteristics as context for the Project setting;
- Section 5 offers detailed findings and conclusions for each resource area; and
- Section 6 presents recommendations concerning mitigation measures and future Siting Board actions.

Caveats and Limitations

Review limited to resource areas/issues enumerated in the statutes. HE's evaluation of the Horus Kentucky 1 Solar Project is contractually limited to a review of the SAR and associated materials, as well as the economic impact analysis. Statutes dictate the issues to be covered in the SAR; HE focused on those specific topic areas, which are addressed in this report. The Siting Board might have additional interests or concerns related to the construction, siting, or operation of the Project; those may be addressed in other documents or by other parties.

Level of review detail determined by expert judgement. KRS 278.708 identifies the required components of an SAR; however, the level of scrutiny and detail of the evaluation depends upon expert judgement as to what information is relevant and what level of detail is appropriate. This level of review generally relates to the assessment methodologies, geographic extent of impacts and the degree of detailed information about the Project as requested by the consultant in follow-up inquiries. Given our experience related to project impact assessments

and evaluation of impacts on various socioeconomic and natural resource components, HE believes that we have performed a thorough and comprehensive review of the Horus Kentucky 1 SAR, which will meet the needs of the Siting Board.

Assumption of accurate Applicant data. HE reviewed all the data and information provided by the Applicant as part of the SAR and associated documents, including responses to two sets of inquiries. Although we evaluated Applicant data for consistency and clarity as part of our review, we did not perform any type of audit to confirm the accuracy of the provided information. We assume that the Applicant has provided an honest representation of the Project, based on the best data available at the time.

In instances where the Applicant was unsure about certain aspects of the Project, such as exactly where the solar panels would be placed, HE assumed a “worst case” for the purposes of the impact analysis. Should the actual Project development deviate in a manner that materially changes the Project magnitude or location of impacts, or affected parties, the Applicant can be required to notify the Siting Board for it to evaluate such a deviation and take appropriate action as deemed necessary. See mitigation recommendations in Section 6.

SECTION 2

Summary and Conclusions

On July 5, 2021, Horus Kentucky 1 applied to the Kentucky State Board on Electric Generation and Transmission Siting (Siting Board) for a construction certificate to construct a merchant electric generation facility. Horus Kentucky 1's application responded to the statutory requirements set forth by the State of Kentucky in KRS 278.706 and 278.708.

The Siting Board retained Harvey Economics (HE) to review and evaluate the Site Assessment Report (SAR) included in the Horus Kentucky 1 application, as well as other supporting information provided by the Applicant. In addition to the topic areas included in the SAR, HE also addressed the Applicant's economic impact analysis and the topic of decommissioning. The results and conclusions from HE's review and evaluation are provided below. Recommended mitigation measures are offered in Section 6 of this report.

Facility Description and Site Development Plan

Horus Kentucky 1, LLC (Horus Kentucky 1 or Applicant) proposes to construct a 69.3-megawatt (MW) alternating current (ac) solar electricity generation facility (Project or Solar Project) in south central Simpson County, KY, southeast of the City of Franklin. The Project site encompasses a total of about 550 acres of rural agricultural land. Solar infrastructure will include 163,632 solar panels, associated ground-mounted racking structures, 22 inverters and a Project substation transformer which will connect to the Tennessee Valley Authority's L5402 – 161-kilovolt (kV) transmission line.

- ***Surrounding land uses*** – The area around the Project site can be generally described as rural agricultural. Existing vegetation is sparse; the area includes many open fields. Acreage surrounding the Project site is largely residential agriculture or purely agricultural land. Small portions of the area are identified as residential or commercial properties. Commercial properties in the area include several hotels and restaurants and a large truck stop. One church is located south of the Project site.
- ***Proximity to homes and other structures*** – A total of 17 residential structures, one commercial structure and 45 “other” structures (including barns, warehouses, and similar ancillary structures) would be located within 1,200 feet of a Project solar panel. Four residential structures would be located within 300 feet of a solar panel.¹ One church is located within 1,500 feet of a solar panel.
- ***Locations of structures*** – Solar panels, inverters and the racking system will be located throughout the property. The substation transformer and a maintenance shed will be located on the eastern side of the Project site, at the entrance on Hendricks Road. The

¹ At least two of those structures are currently unoccupied and are in dilapidated condition. Additional residential structures are located within the “Excluded Zone”.

Tennessee Valley Authority's L5402 – 161-kilovolt (kV) transmission line runs in a north-south direction through the eastern portion of the Project site.

- **Locations of access ways** – Two proposed entrances will allow access to different areas of the property during construction and operations. Those access points include one entrance on Hendricks Road (east of its intersection with Tyree Chapel Road) and one entrance on Tyree Chapel Road (west of its intersection with Hendricks Road). A CSX rail line runs in a north-south direction on the west side of the Project site; the Project will not use the railway for any construction or operational activities.
- **Access control** – Security fencing (six-foot high chain link fencing, without razor wire at the top) will enclose the Project site; the substation will have its own additional security fencing. All fencing will meet National Electric Safety Code requirements. Both site entrances will be gated and locked when workers are not on-site and security cameras will be in place during construction and operations.
- **Utility service** – Water will be provided by tanker trucks as needed for dust control or other general Project uses. Portable toilets will be located on-site.
- **Project life**—The Applicant anticipates a 30-to-40-year Project life.

Project construction is expected to last approximately 12 months. An estimated average of approximately 120 workers will be on-site throughout the construction period, ranging from a minimum of 50 workers to a peak of 300 workers. The peak construction period is expected to last approximately four months. The Project construction schedule and description of construction activities is provided in Section 3.

Setback requirements. The Horus Kentucky 1 Project is subject to the requirements of applicable Simpson County zoning regulations, which, among other topics, includes specific setback distance requirements between Project equipment and residences (250 feet). As described in the Application materials, the Project does not meet the residential setback requirements in the case of four residential properties, two of which are currently abandoned and dilapidated. Three of those properties are located along Tyree Chapel Road and one is located on the east side of the Project site, south of Hendricks Road.

Conclusions and recommendations. HE believes that the Applicant has complied with almost all of the legislative requirements for describing the Horus Kentucky 1 facility and the site development plan, as required by KRS 278.708. However, the Project does not meet the Simpson County zoning regulations for setbacks from residential properties in multiple instances. HE recommends that Project infrastructure in proximity to those homes be moved in order to meet the County's setback requirements or a variance from the County be obtained.

Project Setting

Simpson County had a 2019 population of about 18,600 people. The County's population has grown steadily, but slowly since 2000, with an annual growth rate of less than one percent. Projections indicate that the County will continue to grow in the future, but at an even smaller

rate. The City of Franklin has an estimated 8,800 residents. The area immediately surrounding the Project site can be generally described as rural and agricultural, but Simpson County is also home to several manufacturing operations. Residents' income levels are low, and they experience higher than average rates of poverty as compared to other areas of Kentucky or the U.S. About 13 percent of County residents live in poverty.

Compatibility with Scenic Surroundings

The area surrounding the Project is largely agricultural, with scattered rural residential properties and some commercial structures. Existing vegetation in the area is sparse and numerous open spaces would allow the solar panels to be visible from many different viewpoints. However, the Project site is also located immediately south of I-65 and east of a small commercial area along US 31W (Nashville Road), indicating that less rural land uses also occur in the general area.

Scenic compatibility focuses on the solar panels and on the Project substation. Solar panels will be located very close to several homes along Tyree Chapel Road; panels will be in full view of those homes without any type of visual barrier. The substation is located 1,030 feet from the nearest residence. Portions of the Project will be visible from local roads, including Tyree Chapel Road, Hendricks Road. Few native visual buffers exist in those areas. The Applicant has stated that "vegetative buffers will be added to mitigate potential viewshed impacts", but the Applicant has not provided a specific plan for the location of those buffers. Vegetative buffers would at least partially shield the Project from local residences and drivers. The Applicant has stated they will work with neighboring homeowners and business owners to address concerns related to the Project.

The Project will use anti-glare solar panels. The Applicant's glare study concluded that no problematic glare is predicted from the Project; however, that study did recommend consideration of a screening plan and additional on-the-ground evaluation for certain areas around the Project site.

Given its rural location, sparse population and proximity to other commercial activity, HE believes the Horus Kentucky 1 facility can be considered compatible with the existing scenic surroundings, given the addition of vegetative buffers in certain, strategic areas.

Potential Changes in Property Values and Land Use

The Applicant's consultant, Kirkland Appraisals, LLC., provided an extensive database and analysis of property values, transactions and estimated impacts of solar facilities in diverse locations, concluding that the Project would have no effect on property values during construction or once in operation. To further assess potential property value impacts, HE: (1) reviewed existing literature related to solar facility impacts; (2) interviewed the Simpson County Property Valuation Administrator; (3) prepared further analysis of the data from Kirkland; and (4) examined the potential for impacts to residential and other properties closest to the Project.

The Simpson County Property Valuation Administrator stated that given the rural nature of the Project area, she does not believe that property values will be affected by the presence of the facility. She also indicated that given the current high demand for homes and properties in the County, she does not believe the solar facility would have an adverse effect on sales prices or sales activity.

HE's further evaluation of the data provided by Kirkland also suggests that property values are unlikely to be affected by solar facilities, although some uncertainty exists. Most recent studies also indicate no impacts to property values related to solar facilities. HE concludes that negative impacts to property values from this Project are unlikely as a general rule. This conclusion is predicated on the assumption that the mitigation strategies discussed in Section 6 are adopted by Horus Kentucky 1 and the Siting Board. Mitigation of visual and other effects, with close property owner coordination, can minimize uncertainties related to property values.

Anticipated Peak and Average Noise Levels

Neither the Commonwealth of Kentucky nor Simpson County have noise ordinances applicable to this Project. As such, HE adopted the noise recommendations generated by the Environmental Protection Agency and the World Health Organization to gauge acceptable levels of sound. Natural vegetation is relatively sparse in the Project area; vegetative buffers would help mitigate noise emissions that may be caused by construction or operational components of the Project.

Construction activities are expected to generate noise emissions greater than 55 decibels (dBA) throughout the 12-month construction period. This level is above standards for annoyance, but the noise will be sporadic and decrease with distance from nearby residences. The pile driving process is the loudest part of the construction process. Fencing installation, concrete pouring and ditch digging for electrical cables may also be loud activities. Those activities will only occur in any one location for a short period of time, moving around the Project site until construction is complete. Since these construction activities are not sustained, no hearing loss or long-term annoyance to residents is expected.

Noise from Project components during operations (inverters, motors, transformer) is anticipated to result in only a small increase, if any, to the local sound environment. Operational components would emit relatively low sounds during daylight hours and typically no sound at night. Few homes are located within 300 feet of the Project boundary; those homes may experience operational sound levels slightly greater than the 50 dBA noted by the World Health Organization as potentially causing moderate annoyance. Many residents living in the area are located along roadways with light to heavy levels of traffic or near agricultural fields where farming activities occur. Noise from the Project's operational components is not likely to annoy them.

Existing vegetation is sparse in some areas surrounding the Project site. Vegetative buffers developed by the Applicant would help mitigate noise for nearby homeowners. No specific buffering plan has been provided by Horus Kentucky 1 at this time.

Road and Rail Traffic, Fugitive Dust and Road Degradation

Roads providing access to the Project site include Geddes Road (from US 31W (Nashville Road), Tyree Chapel Road and Hendricks Road. Construction activities will cause noticeable increases in traffic volumes on each of those roads, given light existing traffic volumes in the area. Brief traffic stoppages on local roads will be necessary to allow for large truck and trailer access to the Project site during construction. These impacts will be temporary, occurring over the 12-month construction period, but may be annoying to local residents.

Delivery of the substation transformer will require several oversized trucks to travel on local roads. Other deliveries may also require the use of oversized trucks on local roads. Those vehicle trips will be permitted separately and may have the potential to cause road degradation. The Applicant has committed to restoring impacted roadway to pre-construction conditions, either paying for or fully fixing any damage.

Fugitive dust should not be an issue given the Applicant's proposed efforts to reduce dust with the application of water. However, the Applicant did not address other mitigation efforts such as ground cover or use of other vegetation to reduce dust.

Given the few employees and deliveries required for Project operations, traffic impacts during the operational phase will be minimal.

An existing CSX railroad line is located along the western edge of the Project site. The Applicant does not anticipate using the railway for any construction or operational purposes. No impacts to the railroad or railway service are anticipated as a result of the Project.

Economic Impact Analysis

The Applicant's economic impact was deficient and incomplete. However, information about Project construction and operation elsewhere in the SAR was sufficient to infer economic impacts. The Applicant had not yet provided tax-related information about Horus Kentucky 1.

Construction and operation of the Horus Kentucky 1 solar facility will provide some limited economic benefits to the region and the Commonwealth. Construction employment and income opportunities will be temporary, but local hires will increase employment and incomes in an area that needs it. The bulk of construction purchases will be made outside Kentucky, limiting opportunities for local business activity or generation of additional sales tax.

Operational economic benefits will be confined mostly to property taxes. Annual property tax payments will be made to multiple Simpson County taxing authorities; however, those payments will likely amount to a small percentage of total tax revenues. Operational employment will be minimal, and purchases of materials or supplies will be small on an annual basis.

Socioeconomic impacts of the Horus Kentucky 1 solar facility represent a positive, albeit small, contribution to the region.

Decommissioning

The Applicant assumes a 30- to 40-year useful life for the Horus Kentucky 1 solar facility. Horus Kentucky 1 has not yet prepared a formal decommissioning plan; however, the Applicant provided detailed information describing infrastructure removal and site restoration activities. Lease contracts with participating landowners require the Applicant to return the site to the condition in which it was received.

All above and below ground Project facilities will be removed from the Project site, unless the landowner requests to keep the fencing or the maintenance shed. After reclamation, the land would return to pre-Project productive uses and property values, thereby eliminating long term Project-related impacts, compared with simply shuttering the solar facility. This process will also add a modest, temporary positive economic stimulus to the region.

The Applicant will comply with the Franklin-Simpson County Zoning Regulations for solar facilities, which requires the development of a decommissioning plan, including “ensuring that the funds will be available for decommissioning and restoration.”

Public Outreach and Communication

The Applicant has engaged in public outreach in Simpson County and in the Project area since early 2021, including hosting a public meeting and mailing informational letters to adjacent landowners. However, the public meeting was not well attended, and public awareness of the Project is limited.

Complaint Resolution

The Applicant has stated that they will continue to work with local landowners and the public to resolve any potential issues during construction or operations, should such issues arise. HE encourages the development of a formal complaint resolution process, applicable to both the construction and operational periods.

Conclusions and Recommendations

Based on our findings related to the specific siting considerations in the statutes and as addressed in this report, HE recommends that the Siting Board approve Horus Kentucky 1, LLC’s application for a certificate to construct a merchant electric generating facility. This finding assumes that the Project is developed as described in the SAR and the supplemental information, and the mitigation measures set forth in Section 6 of this report are adopted.

SECTION 3

Project Overview and Proposed Site Development Plan

Project Overview

The Horus Kentucky 1, LLC SAR describes the Horus Kentucky 1 Project as follows:

“The Project will involve the construction of a 69.3-megawatt (MW) alternating current (AC) solar energy project in Franklin, Simpson County, Kentucky. The Project will be located within a project area of approximately 550-acres, situated off of Tyree Chapel Road in Franklin, Simpson County, Kentucky, with a latitude and longitude of 36° 40' 6.65" North and 86° 32' 37.86" West. The Project has historically been used for agriculture and farming.

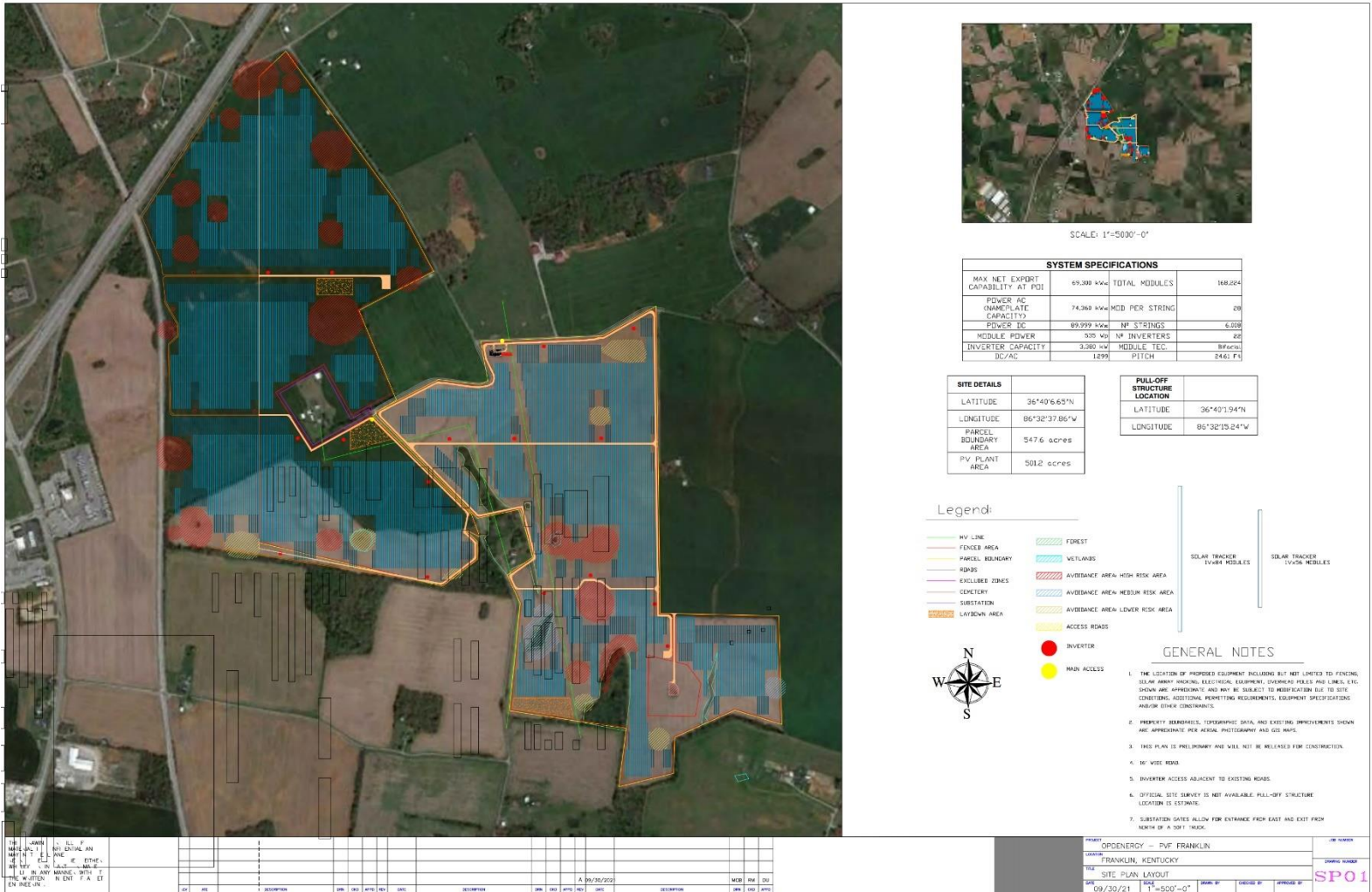
Project components will include solar PV panels, associated ground-mounted racking structure, access roads, 22 inverters, security fencing, laydown areas, and a project substation transformer which will connect to the Tennessee Valley Authority's L5402 - 161-kilovolt (kV) transmission line. Approximately 500 acres of the 550 acres would be occupied by PV panels, and the remaining approximate 50 acres would be occupied by ancillary equipment and infrastructure to support the Project or would remain undeveloped. The PV panels would be mounted on motor-operated axis tracker structures, which are commonly referred to as single-axis trackers. These single-axis trackers are designed to pivot the panels along their north-south axes to follow the path of the sun across the sky from the east to west direction. The tracker assemblies would be constructed in parallel north-south rows using steel piles installed at an average of 7.5 feet off ground to the top of the panel at 55-degree full tilt.

The perimeter of the Project would be enclosed with security fencing. An Operations & Maintenance (O&M) building is not proposed to be constructed for the Project.²

Exhibits 3-1 illustrates the Project boundaries and identifies locations of Project components.

² As part of supplemental materials, the Applicant stated that one permanent building will be constructed for use as a control and security room (maintenance shed).

**Exhibit 3-1.
Site Plan Layout Map for the Proposed Horus Kentucky 1 Project**



Source: Horus Kentucky 1, LLC, September 2021.

The Project site is located approximately 30 miles south of the City of Bowling Green, the largest community in the region, and less than five miles southeast of the City of Franklin.

Construction Activities

Construction of the Horus Kentucky 1 facility is expected to occur over a period of about 12 months. Peak construction activity is anticipated to last approximately four months.

Certain construction activities may occur sequentially across the entire Project site; however, the Applicant anticipates that most activities will overlap, with different trades anticipated to be assigned to different Project locations. For example, civil work may be occurring in one area of the Project, while panel installation would be occurring in another area of the Project where civil work has already been completed. According to the Applicant, mechanical activities are anticipated to occur sequentially, but not across the entire Project. Civil work and electrical installation are anticipated to take place at different times in different areas of the Project. General construction activities and anticipated timelines include the following:³

- Civil works: eight weeks
- Pile installation: unstated duration
- Tracker installation: 142.5 days (4 MW per week)
- Modules installation: 51.5 days (10 MW per week)
- Electrical installation (includes DC works, AC works, inverter station installation, monitoring and security system): 182.5 days
- Commissioning: four weeks

Approximately 120 construction workers are estimated to be on-site at any one time over the course of the 12-month construction period. However, depending on the specific tasks and activities occurring at any particular time, the number of workers on-site will range from a minimum of 50 workers to peak of 300 workers.

The Applicant is proposing that construction activity occur between the hours of 7:00 am and 8:00 pm, Monday through Saturday, with the exception of any holidays. According to the Applicant, construction activities would only occur after 6:00 pm during the peak period; those activities would only include module and cable installation. Saturday construction activity would also be limited to the four-month peak construction period. The Project will abide by the construction times established by Simpson County's building requirements.⁴

³ A preliminary construction schedule, provided by the Applicant, is included as Appendix A to this report.

⁴ According to Mr. Carter Munday, the Simpson County Planning & Zoning Administrator, any Project specific restrictions related to the timing of construction activities would be developed when the Applicant applies for a County building permit. Restrictions may apply if construction occurs close to residential neighborhoods or includes very loud activities, such as pile driving.

Life of the Project

The Horus Kentucky 1 facility is anticipated to operate for approximately 30 to 40 years. Project decommissioning (the process of closing the facility to retire it from service) is discussed in Section 5 of this report.

Proposed Site Development Plan

The following discussion addresses each of the SAR requirements for a proposed site development plan, as laid out in KRS 278.708(3)(a).

Surrounding land uses. Simpson County in general, and areas to the southeast of the City of Franklin specifically, are rural residential areas, with low population density and an agricultural emphasis. However, while the Project site and surrounding properties can be described as agricultural, the site also abuts I-65 near its intersection with US 31W (Nashville Road). That intersection is home to multiple restaurants, hotels and retail stores, as well as a large travel center/ truck stop. Section 4 of this report provides a general overview of the County's demographic and economic characteristics.

The SAR describes the land uses surrounding the Project site as “primarily agricultural farmland with scattered residential structures.” The Applicant’s consultant, Kirkland Appraisals, LLC (Kirkland), identifies the acreage surrounding the Project site as a mix of residential and agricultural uses.⁵ The Kirkland report provides the data shown in Exhibit 3-2, describing the land uses adjacent to the Project.

Exhibit 3-2.

Land Uses Adjacent to the Horus Kentucky 1 Project Site

<u>Land Use</u>	<u>Percent of Total Adjoining Acres</u>
Agricultural / Residential	47.01%
Agricultural	46.22%
Residential	4.13%
Commercial	2.63%
Total	100.00%

Source: Horus Kentucky 1, LLC, July 2021.

The Applicant also provided a table describing the distances between nearby residences or other structures and Project solar panels. That information is provided in Exhibit 3-3.

⁵ Appendix I, Property Value Impact Study.

Exhibit 3-3.
Distances between Nearby Structures and the Horus Kentucky 1 Project Solar Panels

Distance from Solar Panels (ft)	Residential Structures	Commercial Structures	Churches	Other Structures
0 - 300	4	0	0	16
301 - 600	6	0	0	11
601 - 900	2	0	0	7
901 - 1,200	6	1	0	11
1,201 - 1,500	12	0	1	16
1,501 - 1,800	12	5	0	7
1,801 - 2,100	5	4	0	13
2,100 - 2,400	<u>7</u>	<u>4</u>	<u>0</u>	<u>11</u>
Total Structures	54	14	1	92

Notes: (1) At least two of the residential structures located within 300 feet of a solar panel are currently unoccupied and in dilapidated condition.
(2) Several additional residential structures are located within the Excluded Zone; that acreage and those homes are owned by a participating landowner. Those residences are listed as 250 feet from a solar panel.
(3) Other structures include barns, sheds and similar ancillary structures.

Source: Horus Kentucky 1, LLC, September 2021.

There are 12 residences within 900 feet of a solar panel and 47 residences within 2,100 feet of a solar panel.⁶

Additionally, a small cemetery is located within the Project site, within an agricultural field east of Tyree Chapel Road. Kitchens Cemetery was created in the 1920s and includes approximately five headstones. The cemetery is discussed in more detail in Section 5 of this report, under Compatibility with Scenic Surroundings.

Legal boundaries. The SAR (Appendix G of the Application) provides legal descriptions of the boundaries of the proposed site. According to the Applicant, the Project will be constructed on privately-owned land comprised of four currently farmed tracts of land located less than five miles southeast of the City of Franklin. The northwest portion of the Project Site encompasses three parcels. The southeastern and southwestern portions of the Project site are split by Tyree Chapel Road; however, both portions are part of a single parcel.

As illustrated in Exhibit 3-1, the Project site includes one area identified as an “Excluded Zone”. That area is generally located in the center of the Project site, west of Tyree Chapel Road.⁷ The Excluded Zone covers an area of about eight acres, owned by a participating

⁶ Section 5 of this report provides additional information about distances between residential and non-residential structures and other Project facilities, including inverters and the substation.

⁷ An aerial photo of the structures located within the Excluded Zone is included as Exhibit D-21 in Appendix D of this report.

landowner, and includes several houses and barns.⁸ The houses within the Excluded Zone are not occupied by the landowner, but are rented to others.

Access control. The Site Plan Layout graphic included as Exhibit 3-1 identifies two proposed access points to the Project site, including (1) an entrance on Hendricks Road and (2) an entrance on Tyree Chapel Road. These entrances will be used during construction and for access to the site during operations. Both Hendricks Road and Tyree Chapel Road are small, local roads. According to the Applicant, Project vehicles will access these site entrances using Geddes Road to the south, with traffic flowing east on Geddes Road from US 31W (Nashville Road). Project traffic would not use Flat Rock-Peden Mill Road to access the site.

According to the Application, “the perimeter of the property will be enclosed by a security fence.” Chain-link fencing meeting National Electric Safety Code requirements will be located along the Project boundary line. The fence will be six feet in height, without razor wire at the top. The Substation will have its own additional fencing surrounding that facility.

All site entrances will be gated and locked when workers are not on-site and security cameras will be in place during construction and operations. The Applicant will hold meetings with local police to discuss security needs and concerns within the community.

Location of buildings, transmission lines and other structures. Exhibit 3-1 illustrates the locations of the solar panels, inverters and the substation within the Project boundary. The solar panels and inverters will be located throughout the property. The substation transformer will be located on the eastern side of the Project site, at the entrance on Hendricks Road. The Project’s substation transformer will connect to the Tennessee Valley Authority’s existing L5402 - 161-kilovolt (kV) transmission line. The Project will require the construction of one permanent building to be used for a control and security room (maintenance shed); that maintenance shed will be located to the north of the substation. No buildings or other structures currently on-site will be removed.

Two staging areas are anticipated to be developed within the Project site. The locations of those areas have not been finalized, but it is expected that one staging area will serve the northwest portion of the Project site and one will serve the southeast portion of the site. Each staging area will be approximately five acres in size and have a gravel base. Once construction is near completion, the staging areas will be used for module placement. A worker parking area will be developed outside of and adjacent to one the staging areas.

As illustrated in Exhibit 3-1, the Project site includes multiple areas identified as low, medium or high risk “avoidance areas”, due to specific geologic features or associated conditions at those locations.⁹ No construction activities would occur within those areas and no solar equipment, facilities or infrastructure would be located within any of the avoidance areas. Land within the avoidance areas would not be disturbed by construction or operational activities.

⁸ The Excluded Zone is not an individual parcel but is a portion of the property owned by a participating landowner.

⁹ Appendix K of the Application provides a geotechnical engineering report (Preliminary Karst Assessment) that fully describes the risk avoidance areas.

Location and use of access ways, internal roads, and railways. As noted previously and as shown in Exhibit 3-1, two entrances will allow access to different sections of the Project site during construction and operations – one on Hendricks Road and one on Tyree Chapel Road.

A network of internal roads (approximately six miles in length) will be constructed on the Project site. A main internal roadway will be gravel; other internal roadways will remain grassed.

A CSX rail line runs through Simpson County; that rail line runs in a north-south direction immediately west of the proposed Project site. Project vehicles (including worker commuter vehicles and delivery trucks) will need to drive over the railroad crossing on Geddes Road in order to access the site; impacts related to use of that railroad crossing are discussed in Chapter 5. The Project will not use the railway for any construction or operational activities.

Existing or proposed utilities to service facility. Portable toilets will be located strategically on-site. Water will be provided by tanker trucks as needed for dust control and / or general Project use. The Applicant did not specifically state the potential need for any electrical service nor who might provide that service, if necessary.

Compliance with applicable setback requirements. KRS 278.706(2)(d) states that a completed Application shall include “A statement certifying that the proposed plant will be in compliance with all local ordinances and regulations concerning noise control and with any local planning and zoning ordinances. The statement shall also disclose setback requirements established by the planning and zoning commission as provided under KRS 278.704(3).

KRS 278.704(3) reads:

“If the merchant electric generating facility is proposed to be located in a county or a municipality with planning and zoning, then setback requirements from a property boundary, residential neighborhood, school, hospital, or nursing home facility may be established by the planning and zoning commission. Any setback established by a planning and zoning commission for a facility in an area over which it has jurisdiction shall:

- (a) Have primacy over the setback requirement in subsections (2) and (5) of this section;¹⁰ and
- (b) Not be subject to modification or waiver by the board through a request for deviation by the applicant, as provided in subsection (4) of this section.”

In early 2020, the Franklin-Simpson County Planning & Zoning Board approved specific zoning regulations applicable to solar facilities greater than 10 acres in size.¹¹ Those regulations

¹⁰ In part, KRS 278.704(2) states all proposed structures or facilities used for generation of electricity must be 2,000 feet from any residential neighborhood, school, hospital, or nursing home facility. Section (5) is related to locating on the site of a former coal processing plant.

¹¹ Section 9.8 of the Zoning Regulations for City of Franklin and Simpson County Kentucky address solar farms. That section of the document is provided in Appendix E of this report.

include the following setback requirements, which refer to the minimum distance from Project equipment:

- 50 feet from any public right-of-way
- 100 feet from any abutting internal or external agricultural zoned properties
- 250 feet from any abutting residential zoned properties, rural village districts, churches, cemetery, school, or nursing home.

HE spoke at length with Mr. Carter Munday, the Simpson County Planning & Zoning Administrator, about these regulations and about the status of the Horus Kentucky 1 Project in relation to the County's permitting processes.¹² He confirmed that, in the case of adjacent residential properties, the setbacks apply to the distance between Project equipment and the property boundary, not the residence. Therefore, to comply with the setbacks, solar panels or other Project equipment must be located at least 250 feet from the boundary of a residential property.

Mr. Munday also explained the process that the Applicant must go through to have the Project approved by the Franklin-Simpson County Zoning Board (Zoning Board), which includes several steps. The Board must first approve a Conditional Use Permit (CUP) for the Project, which can be done based on the submittal of a general Project description and a site boundary map. The Zoning Board has approved two separate CUPs for the Horus Kentucky 1 Project, due to an inaccuracy in the Applicant's initial site description. The second part of the County's permitting process involves a comprehensive review of a submitted Development Plan, including an evaluation of the Project's compliance with the zoning regulations. The Applicant has not yet submitted a Project Development Plan to the Zoning Board.¹³ Additionally, the Zoning Board will not begin review of any Development Plan before a decommissioning plan has been submitted to and approved by the Simpson County Fiscal Court, which has not yet occurred.

The Zoning Board is also responsible for conducting an annual review of the Project to ensure that the Project remains in compliance with all applicable zoning regulations, including the setback requirements. Mr. Munday stated that an approved CUP can be pulled at any time if the Project is deemed to be out of compliance with any aspect of the zoning regulations.

Based on information provided by the Applicant, it appears that the Project does not meet the setback requirements in the case of several adjacent residential properties. Both the Property Value Impact Study (Appendix 1 of the Application) and the Revised Sound Level Assessment Report (Exhibit C of supplemental materials provided in response to the second request for information) identify residential structures that are less than 250 feet from solar panels.

The Property Value Impact Study identifies four homes less than 250 feet from panels: (1) a residential structure located along the eastern edge of the Project site, south of Hendricks Road – 140 feet from the closest solar panel. During the site visit, HE determined this structure to be

¹² HE staff spoke with Mr. Munday on September 23, 2021 via telephone.

¹³ The Applicant anticipates submitting a Development Plan to the Franklin-Simpson County Planning & Zoning Board in November 2021.

abandoned and dilapidated (Exhibit D-10, included in Appendix D of this report, provides a photo of that structure); (2) a residential structure at 1666 Tyree Chapel Road, south of the intersection with Hendricks Road – 210 feet from the closest solar panel. HE’s review of aerial photography found this residence to be abandoned and dilapidated; (3) an occupied residence at the north end of Tyree Chapel Road - 140 feet to the closest panel; and (4) a residence near the intersection of Tyree Chapel Road and Hendricks Road – 165 feet to the closest panel. The Revised Sound Level Assessment Report lists the distances between those structures and the solar panels as (1) 125 feet; (2) 95 feet; (3) 158 feet; and (4) 536 feet, respectively. Regardless of structural status and differences in measurement techniques, it is apparent that there are several residential structures located less than 250 feet from a solar panel.¹⁴

Mr. Munday indicated that solar developers can apply for a variance to the setback requirements, but that Applicants would have to prove a hardship for the need to construct facilities closer than the distances included in the zoning regulations. Section 12.4 of the Franklin-Simpson County Zoning Regulations describes the process and conditions associated with a Request for Variance.

As part of supplemental materials provided to the Siting Board, the Applicant stated that they “intend to either request a variance as allowable under the Franklin-Simpson Zoning Regulations or update its site plan layout to reflect compliance.” Those materials describe two residential properties whose boundary lines are located 32 feet from the Project and one residential property whose boundary line is located 37 feet from the property. Eight other residential properties are listed as having a distance of 330 feet or more between the Project and the property boundary line. The home located within the Excluded Zone was listed as exactly 250 feet from any Project facility.

There are no nursing homes or schools located within a two-mile radius of the Project site. The closest nursing home is the New Haven Assisted Living facility located approximately 2.1 miles northwest of the Project. The closest school is Simpson Elementary School, located approximately 3.5 miles northwest of the Project.

Results of SAR Review – Proposed Site Development Plan

Conclusions. Based on HE’s review of the Horus Kentucky 1 SAR, the subsequent information provided by the Applicant in response to two rounds of inquiries, direct discussions with the Applicant, and other secondary area research, HE offers the following conclusions regarding the proposed site development plan:

- We believe that the Applicant has generally complied with the legislative requirements for describing the facility and a site development plan, as required by KRS 278.708.
- Security and access control measures appear to be adequate, given the type of facility and its location in a rural area.

¹⁴ HE believes that, given their current conditions, the two abandoned and dilapidated residential structures are likely to remain abandoned; however, it is possible that those structures could be refurbished on their existing foundations and occupied in the future.

- The Horus Kentucky 1 Project is subject to the requirements of the Franklin-Simpson County Zoning Regulations, which, among other topics, includes specific setback distance requirements between Project equipment and the property boundaries of nearby residences and non-residential properties. The Project does not meet the setback requirements in the case of four existing residential structures, two of which are currently abandoned.
- The Applicant plans to either request a variance to the County's setback requirements or to revise the site plan layout to comply with the setback requirements. That request will be made directly to the Franklin-Simpson County Planning & Zoning Board.
- In order to be granted Project approval by the Franklin-Simpson County Planning & Zoning Board, the Applicant must submit to the County a detailed Development Plan for the Board's review. That plan has not yet been submitted.

Need for mitigation. Mitigation measures described in the SAR, or recommended by HE, which are related to the description of the facility and the proposed site development plan include:

1. A final site layout plan should be submitted to the Siting Board upon completion of the final site design. Deviations from the preliminary site layout plan, which formed the basis for HE's review, should be clearly indicated on the revised graphic. Those changes would include, but are not limited to, location of solar panels, inverters, transformer, substation, maintenance shed or other Project facilities or infrastructure.
2. Any change in Project boundaries from the information which formed this evaluation should be submitted to the Siting Board for review.
3. The Siting Board will determine if any deviation in the boundaries or site development plan is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required, but if yes, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.
4. A final Project-specific construction schedule, including revised estimates of on-site workers and commuter vehicle traffic, should be submitted to the Siting Board. Deviations from the preliminary construction schedule should be clearly indicated.
5. The Siting Board will determine if any deviation to the construction schedule or workforce estimates is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required. If so, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.
6. The Applicant or its contractor will control access to the site during construction and operation. All construction entrances will be gated and locked when not in use.
7. The Applicant's access control strategy should also include appropriate signage to warn potential trespassers. The Applicant must ensure that all site entrances and

boundaries have adequate signage, particularly in locations visible to the public, local residents and business owners.

8. According to National Electrical Safety Code regulations, the security fence must be installed prior to any electrical installation work. The substation will have its own separate security fences installed.
9. The Applicant will follow all applicable Franklin-Simpson County zoning regulations for solar facilities as described in Section 9.8 of the Zoning Regulations for City of Franklin and Simpson County Kentucky, including the minimum setback requirements for Project facilities and infrastructure. If a setback variance is requested from Simpson County, all materials developed by the Applicant as related to that request should also be provided to the Siting Board.
10. The Applicant will submit a detailed Development Plan to the Franklin-Simpson County Planning & Zoning Board for approval. A Certificate to Construct would not be granted by the Siting Board until the Development Plan is approved by the Franklin-Simpson County Planning & Zoning Board.

SECTION 4

Project Setting

Description of the Area

This section provides a description of the area surrounding the proposed Project site. The Project site is located to the southeast of the City of Franklin, in Simpson County, in southern Kentucky, close to the border with Tennessee. The topography of the area is mostly gently rolling plains and agricultural land; a prominent isolated hill called Pilot Knob, which rises 200 feet above the surrounding area, is also located in Simpson County.¹⁵

Population and housing density. As of mid-2019, approximately 18,600 people resided in Simpson County.¹⁶ The County has experienced a slightly increasing population base over the past 20 years; in 2000 the population was 16,400 and in 2010 the population was 17,300.^{17,18} Annual population growth has been steady since 2000, but amounts to less than one percent growth per year. About 87 percent of the population is white and the median age of residents is 39 years.¹⁹ Projections call for Simpson County's population to increase by a very small amount in future years; the Kentucky State Data Center estimates 19,200 people will reside in the County in 2040.²⁰ Currently, there are about 7,000 households in Simpson County, with an average of about 2.5 persons per household.²¹ There are 76 people per square mile, which makes Simpson County more sparsely populated than many other counties in Kentucky.²²

The City of Franklin, the county seat of Simpson County, is a small city with a population of about 8,800 people. Bowling Green, located about 25 miles north of Franklin, is the nearest

¹⁵ Kentucky Geological Survey. Groundwater Resources for Simpson County.
<http://www.uky.edu/KGS/water/library/gwatlas/Simpson/Topography.htm>

¹⁶ U.S. Census Bureau. Simpson County Quickfacts.
<https://www.census.gov/quickfacts/simpsoncountykentucky>

¹⁷ U.S. Census Bureau. Simpson County, Kentucky, Profile of General Demographic Characteristics.
<https://data.census.gov/cedsci/table?q=simpson%20county%20kentucky&y=2000&tid=DECENNIALDPSF42000.DP1&hidePreview=false>

¹⁸ U.S. Census Bureau. Simpson County, Kentucky, Annual Estimates of the Resident Population: April 2010 – July 1, 2019.
<https://data.census.gov/cedsci/table?q=simpson%20county%20kentucky&tid=PEPPPOP2019.PEPANNRES&hidePreview=true>

¹⁹ U.S. Census Bureau. Simpson County, Kentucky, Age and Sex.
<https://data.census.gov/cedsci/table?q=simpson%20county%20kentucky&tid=ACSST5Y2019.S0101&hidePreview=false>

²⁰ Kentucky State Data Center, Projections of Population and Households, State of Kentucky, Kentucky Counties, and Area Development Districts 2015 – 2040.
<http://www.ksdc.louisville.edu/wp-content/uploads/2016/10/projection-report-v16.pdf>

²¹ U.S. Census Bureau. Simpson County Quickfacts.
<https://www.census.gov/quickfacts/simpsoncountykentucky>

²² Statistical Atlas. Simpson County, Kentucky.
<https://statisticalatlas.com/county/Kentucky/Simpson-County/Population>

larger city in Kentucky with a population of about 70,500.²³ The Nashville-Davidson metropolitan area of Tennessee, with a population of about 517,000. is about 45 miles south of the City of Franklin.²⁴

Income. In 2019, per capita personal income in Simpson County was \$39,235. That was 10 percent less than the average per capital personal income in the Commonwealth of Kentucky, and 31 percent less than the average in the United States.²⁵ As of mid-2019, about 13 percent of the Simpson County population lived in poverty.²⁶

Business and industry. In 2019, there were about 12,100 jobs in Simpson County, with 79 percent classified as wage and salary jobs and 21 percent being proprietors' employment.²⁷

- Manufacturing is the largest employment sector in Simpson County, with 3,200 jobs.²⁸ Major industries in the area include Berry Plastics (makers of pipeline coatings as well as industrial and consumer adhesive tape), Greif (a global leader in industrial packaging products), M&M Manufacturing (custom metal, aluminum, and stainless steel fabricators for water and sewer industries), and Toyo Automotive Parts (automotive rubber parts, mountings, insulators).²⁹ Matalco, a producer of aluminum products for other manufacturing industries is investing in a new \$53 million operating facility in Simpson county, adding to the growing metals industry in Kentucky.³⁰
- Retail trade is the second largest sector in the County, with about 1,700 jobs. Government work is the next largest sector with roughly 940 jobs. Agriculture and farming jobs are minimal in Simpson County with approximately 500 jobs in 2019; however, 73 percent of Simpson county's land is designated farmland. Crop production includes grains, oilseeds, dry beans and peas. Additional agricultural operations focus on cattle and tobacco.³¹

²³ U.S. Census Reporter. Bowling Green, Total Population.

<https://censusreporter.org/profiles/16000US2108902-bowling-green-ky/>

²⁴ U.S. Census Reporter. Nashville-Davidson Profile.

<https://censusreporter.org/profiles/16000US4752006-nashville-davidson-metropolitan-government-balance-tn/>

²⁵ U.S. Bureau of Economic Analysis. United States and Kentucky, GDP and Personal Income.

<https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=2>

²⁶ U.S. Census Bureau. Simpson County Quickfacts.

<https://www.census.gov/quickfacts/fact/table/simpsoncountykentucky,US/PST045219>

²⁷ U.S. Bureau of Economic Analysis. Simpson County, Total Full-Time and Part-Time Employment.

<https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6>

²⁸ U.S. Bureau of Economic Analysis. Simpson County, Total Full-Time and Part-Time Employment.

<https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6>

²⁹ Kentucky Cabinet for Economic Development. Kentucky Directory of Business & Industry.

https://ced.ky.gov/kyedc/kpdf/all_facilities_by_location.pdf

³⁰ Kentucky Cabinet for Economic Development. Newsroom.

https://ced.ky.gov/Newsroom/NewsPage/20210319_matalco

³¹ U.S. Census of Agriculture. Simpson County, Kentucky Profile.

https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Kentucky/cp21213.pdf

Major and minor roads and railways. The Project site is mostly bounded on the north by I-65, on the west by US 31W (Nashville Rd), on the east by Tyree Chapel Road and Flat Rock - Peden Mill Road, and on the south by Geddes Road and Blue Door Church Road. I-65 runs in generally a north-south direction from the Gulf Coast in Alabama to the Great Lakes in Gary, Indiana. A CSX railway line runs through Simpson County, following US 31W; that rail line runs in a north-south direction immediately to the west of the Project site.

Overall area description. Based on HE's research, the area around the Project site can be generally described as rural and agricultural. The Project site is about five miles from Franklin, the closest city, which includes about 47 percent of the County's population. The County's population is expected to grow by a small amount over the next 30 years. Residents' income levels are low, and they experience higher than average rates of poverty as compared to other counties in Kentucky and the U.S. average poverty rate.³²

³² U.S. Census Bureau. Kentucky Quickfacts.
<https://www.census.gov/quickfacts/fact/table/KY/POP060210>

SECTION 5

Description of Impacts

This section of the report addresses impacts to the following resource topics, as enumerated in KRS 278.708 and KRS 278.706(j):

- Compatibility of the facility with scenic surroundings;
- Potential changes in property values and land use for adjacent property owners;
- Anticipated peak and average noise levels;
- Road and rail traffic, fugitive dust and anticipated degradation of roads and lands; and
- Economic impacts on the region and the state.

The statutes require that the SAR provides information about impacts to the above resources resulting from short-term construction activities and longer-term operational activities. The Siting Board also directed HE to address the potential effects of decommissioning activities, and that discussion is included in this section.

For each resource topic, HE describes generally accepted assessment criteria or methodology necessary to evaluate impacts of a project of this nature. We then summarize the relevant information included in the SAR, as well as supplemental information about the Horus Kentucky 1 Solar Project provided by the Applicant in response to data inquiries. HE also provides additional information gathered about the Project and its potential impacts on the region through secondary source research, including interviews. Finally, HE draws conclusions about Project impacts as well as recommended mitigation measures.

Facility Compatibility with Scenic Surroundings

This component of the statute relates to how well the proposed facility will “blend-in” or is compatible with its physical surroundings and associated land uses. For example, certain industrial facilities can be unsightly, visually unappealing, and generally incongruous with the surrounding area. Coal-fired electric generating plants often have large smokestacks that can be seen from far away. Wind turbines are tall, and their blades can be seen spinning from miles away, etc. Generally, solar farms are considered to be less visually intrusive, as they are relatively short in stature, and can be effectively visually blocked naturally with topographic variation or intervening vegetation, or through strategic means utilized by an applicant.

General methods of assessment. Visual impacts of solar facilities are highly dependent on the characteristics of the surrounding area, i.e., industrial, suburban residential, rural/agricultural. As a result, different methods may be used to assess the visual impacts of solar facilities, depending on location. The Argonne National Laboratory’s Environmental Science Division and the National Park Service jointly developed the *Guide to Evaluating*

Visual Impact Assessments for Renewable Energy Projects; that document is a guide designed to help planners evaluate the quality and completeness of visual impact assessments for solar and wind facilities.³³ Additional reports have been published from public agencies and private firms on visual impact assessments for solar facilities.

Most visual impact assessments focus on visualizations of the appearance of the project from key observation points (KOPs). Since it is impossible to visualize proposed projects from every observation point, it is common for planners to utilize a “worst-case” potential visual impact, i.e., locations where perceived change may be greatest. The overarching goal of visual impact assessments is to determine potential visual impacts that may result from construction, operations, and decommissioning of a project, in a manner that is logical, repeatable, and defensible.³⁴

A standard visual analysis generally proceeds in this sequence:³⁵

- Description of the Project’s visual setting;
- Identification of KOPs. KOPs are locations near the Project site where there is potential for solar facility components to be seen from ground-level vantage points, i.e., a nearby residence or a passing vehicle;
- Analysis of the visual characteristics of the Project, i.e., height of solar panels, descriptions of other facility components; and
- Evaluation of impacts from KOPs.

Glare from sun shining off of solar panels can also be a potential issue in certain locations (i.e., along roadways, near airports, or close to residential properties) or at specific times of the day (generally in the early morning or later in the afternoon as the panels rotate to capture the light). Glare analyses evaluate the potential for different types of glare (red, which is the most severe; yellow, which is less severe; and green, which has the lowest severity rating) at different locations around a Project site and the duration of potential glare, if applicable, at different times of the day. Measures can be implemented to reduce the potential for glare impacts, including the use of anti-glare panels, appropriate panel location and growth of vegetative buffers.

Summary of information provided by the Applicant. The existing scenic setting of the area, potential visual impacts associated with the Project and proposed mitigation are addressed in several portions of the SAR.

Scenic surroundings. The SAR describes the Project’s surrounding land as “primarily agricultural farmland with scattered residential structures.” As described in Section 3, current uses of the land surrounding the site are identified as largely agricultural and residential.

³³ National Park Service, U.S. Department of the Interior. *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects*. August 2014. <http://visualimpact.anl.gov/npsguidance/>.

³⁴ Dean Apostol, James Palmer, Martin Pasqualetti, Richard Smardon, Robert Sullivan. (2016). *The Renewable Energy Landscape: Preserving Scenic Values in our Sustainable Future*. September 2016.

³⁵ Environmental Design & Research. *Visual Impact Analysis*. May 2019.

Applicant provided maps (see Exhibit 3-1 of this report) also show a CSX railway line running in a north-south direction along the western edge of the Project site and I-65 running in a northeast-southwest direction along the northern portion of the Project site.

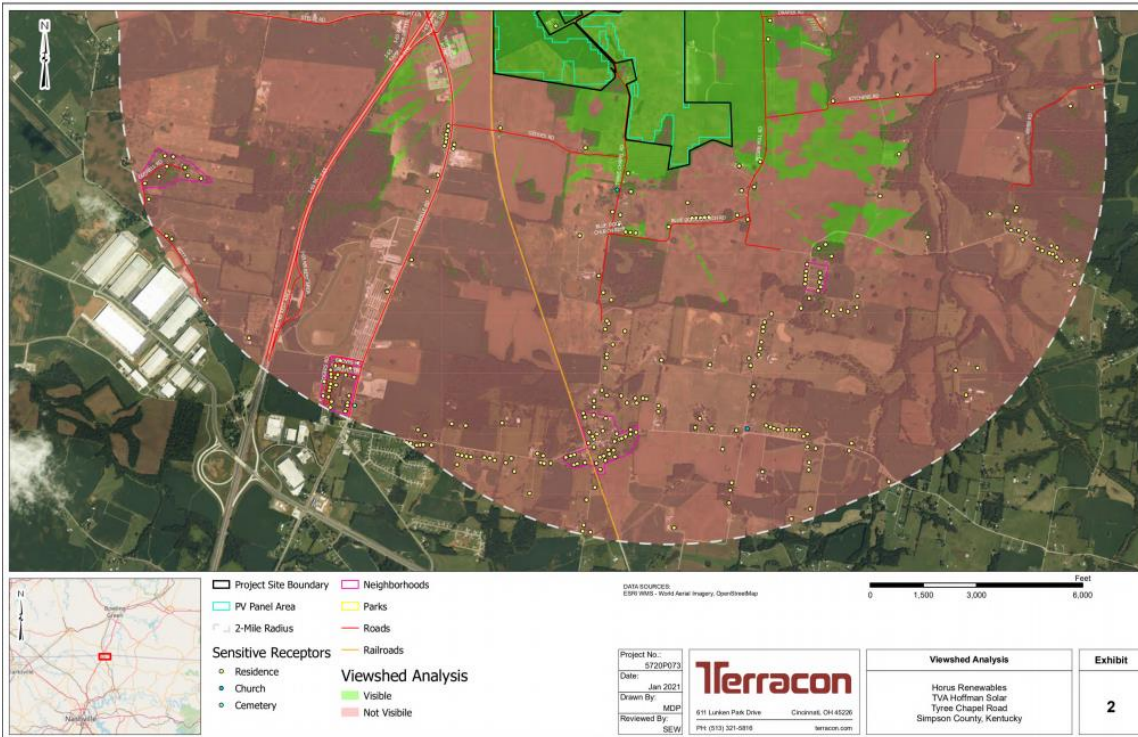
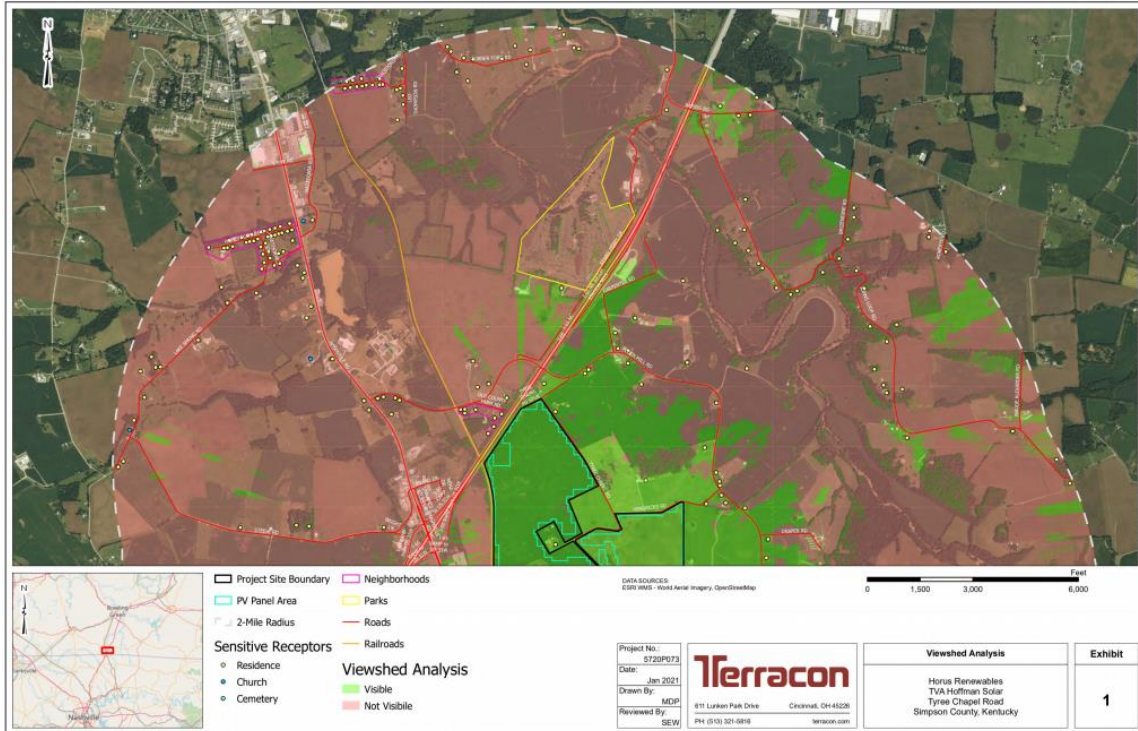
The Phase 1 Environmental Assessment (Appendix J of the Application) includes a series of photo images of the Project site and areas surrounding the Project site. Those photos show open fields, barns and associated structures, as well as a variety of trees, shrubs and grasses on and around the Project site. In some cases, the existing vegetation appears dense; other photographs show much less vegetation in specific areas. Photo images show winter foliage conditions, as deciduous trees are leafless.

Potential visual impacts from Project construction. The SAR does not address the potential for visual impacts to adjacent landowners, local visitors or drivers during the construction phase. The Applicant has noted that the majority of the site has already been cleared of trees, bushes or other vegetation for farming activities.

Potential visual impacts from Project operations and proposed vegetative buffers. The Project would include approximately 163,632 solar panels. At a maximum height of about eight feet, those panels would likely be the source main visual impact of the Project during operation. The Project substation, to be located on the eastern side of the Project site at the entrance on Hendricks Road, is another potential source of visual impacts. Twenty-two inverters will also be located throughout the site. Limited trimming or removal of existing vegetation will occur as needed for the installation of the security fence. Fence routing will be planned to minimize any impact to the existing vegetation.

The SAR states that the Project could be visible from a roadway or neighboring residence. Exhibit 5-1 presents the Viewshed Analysis performed by Terracon (Appendix A of the Application, which is also identified as “Map of Residential Neighborhoods Surrounding Proposed Facility”). According to the Applicant, the Viewshed Analysis takes into account existing elevation, topography and vegetation, as well as an assumed eight-foot panel height and a 5.5 foot tall sensor. Areas denoted in green are areas where the solar panels will be visible; areas denoted in red are areas where panels will not be visible. The majority of the areas where panels would be visible are located to the east of the Project site. Areas located to the west of the Project would not be visible due to elevation, topography and existing vegetation; areas to the southeast and southwest of the Project would be shielded by existing vegetation; and areas to the northwest (across from I-65) would also be shielded from view by elevation, topography and existing vegetation.

Exhibit 5-1.
Applicant's Viewshed Analysis for the Horus Kentucky 1 Solar Project



Note: This graphic was split by the Applicant into two pages, which limits its clarity.
 Source: Horus Kentucky 1, LLC, July 2021.

In cases where the Project could be visible from a roadway or neighboring residence, the Applicant has stated that “a vegetative buffer will be added in order to mitigate potential viewshed impacts”. Local native species, with an anticipated mature height of between 12 and 15 feet, would be used to create the vegetative buffer. A detailed vegetative buffering plan identifying specific areas along or within the Project boundary where vegetation would be planted has not been provided by the Applicant. The Applicant has stated that the location of any proposed vegetative buffer will be finalized with the submission of the Development Plan to the Franklin-Simpson County Planning & Zoning Board and that the Applicant intends to comply will all requirements or conditions required by local officials.

Exhibit 3-3 provides information regarding the proximity of residences, commercial buildings and other structures, in relation to the closest solar panels; that table is also shown below in Exhibit 5-2 for ease to the reader. Four residential structures are within 300 feet of the solar panels, 12 residences are within 900 feet, and 54 residences are within 2,400 feet of the Project panels.³⁶ One church is located within 1,500 feet of Project panels and 14 commercial buildings are located within 2,400 feet of Project panels. At least two of the residential structures located within 300 feet of solar panels are currently abandoned and are in dilapidated condition.

Exhibit 5-2.

Distance of Structures from the Horus Kentucky 1 Project Solar Panels

Distance from Solar Panels (ft)	Residential Structures	Commercial Structures	Churches	Other Structures
0 - 300	4	0	0	16
301 - 600	6	0	0	11
601 - 900	2	0	0	7
901 - 1,200	6	1	0	11
1,201 - 1,500	12	0	1	16
1,501 - 1,800	12	5	0	7
1,801 - 2,100	5	4	0	13
2,100 - 2,400	<u>7</u>	<u>4</u>	<u>0</u>	<u>11</u>
Total Structures	54	14	1	92

Notes: (1) Several additional residential structures are located within the Excluded Zone; that acreage and those homes are owned by a participating landowner. Residences within the Excluded Zone are listed as 250 feet from a solar panel.
 (2) Other structures include barns, sheds and similar ancillary structures.

Source: Horus Kentucky 1, LLC, September 2021.

- Nine residential structures would be located within 1,200 feet of an inverter and an additional 21 residences would be located between 1,200 feet and 2,400 feet from an inverter.

³⁶ Additionally, there are several residential structures located within the Excluded Zone; that acreage and those homes are owned by a participating landowner.

- One residential structure would be located between 900 and 1,200 feet of the substation and one residential structure would be located between 1,800 feet and 2,100 feet of the substation.

As described in Section 3 of this report, a small cemetery is located within the Project site. According to the Applicant, the Kitchens Cemetery is identified as Resource No. SI 536/ Archeological Site No. 15Si64; the cemetery is a previously recorded historic resource within the Kentucky Historical Commission’s database.³⁷ It is described as a small, rectangular, planned cemetery consisting of five identified burials with headstones, ca. 1920’s. The rural cemetery is located completely within the Project site, within an agricultural field east of Tyree Chapel Road. The cemetery is enclosed by a wire fence and several small, but overgrown, trees are located within the fenced area. Exhibit D-22 of Appendix D of this report provides two aerial photos of the cemetery. The cemetery is not open to the public; access must be granted by the landowner on who private property it is located. Pursuant to the applicable Franklin-Simpson County zoning regulations, Project infrastructure will be located at least 250 feet from the cemetery. According to the Applicant, it is unknown who is responsible for the preservation of the cemetery; the current landowner has been performing maintenance and upkeep activities. The Applicant has also stated that “although not considered to be a historic property, [the cemetery] should be avoided from ground disturbing activities as it is protected by Kentucky state law.” Supplemental materials provided by the Applicant state that “based on discussion with the current landowner, no vegetative buffers are currently considered surrounding the cemetery. The Applicant stated that they would be happy to install a small screening for the cemetery.

Potential for glare from Project panels. The Project’s solar panels will incorporate an anti-glaring treatment to minimize any potential for glare. The Applicant has also stated that any Project generated glare will be mitigated using “landscaping methods”, presumably vegetative buffers.

The Applicant provided a Glare Study prepared by a certified Glare Analyst with the firm Colliers Engineering & Design (Exhibit D of the Applicant’s response to the First Request for Information). The Study, which included 30 observation points and 13 route receptors, concluded that no problematic glare is predicted. However, the Study did recommend the following: (1) a screening plan should be considered for specific locations along the western edge of the Project near the railroad tracks, appropriate to the local environment and (2) an additional “boots on the ground” examination should be performed for some areas along Tyree Chapel Road and along portions of the eastern edge of the Project to confirm that glare will not be an issue in those areas.

The Applicant has indicated that it will “finalize a landscaping plan with the County to address potential glare issues along the western border of the Project near the CSX railroad track and along the stretch of Tyree Chapel Road near the residential structures within the Excluded Zone.” The Applicant also stated that they “performed additional boots on the ground

³⁷ According to the Architectural Survey commissioned by the Applicant, Kitchens Cemetery was not recommended for inclusion in the National Register of Historic Places.

examination along the areas that are denoted in green outline in the Glare Memo. The northern portion of the project along I-65 already provides a heavy vegetative cover along the highway, where glare would already be mitigated. In addition, based on the Viewshed Analysis conducted, the panels are not anticipated to be visible along I-65 due to existing elevation, topography, and vegetation. While vegetative screening already exists along I-65, Horus will work with the landowner and the County to ensure any glare impacts are mitigated along the northern boundary of the project.”

HE’s evaluation of impacts. HE reviewed maps and Google Earth satellite imagery of the site and used Google Maps to “drive” around the area to assess viewpoints of the Project from a vehicle commuter’s point of view. In addition, HE staff made a visit to the Project site on September 14, 2021. During this site visit, we visited all proposed access points, drove around the property to gain line-of-sight to various viewpoints, and compiled a photo log of the Property boundary at different areas. The photo log index map and site photos can be found in Appendices C and D of this report, respectively.

Visual setting. HE’s site visit confirmed information provided by the Applicant and gathered as part of the Project evaluation, with regards to the rural nature and “look” of the area. The area surrounding the Project is agricultural and residential, but there are several homes in close proximity to the Project boundary. Additionally, commercial businesses (hotels, restaurants, retail stores, a truck stop) are located along US 31W (Nashville Road) to the west of the Project site and both US 31W and I-65 experience heavier traffic volumes, including passenger cars, trucks and other vehicles.

Local roads immediately surrounding the Project site are paved but are relatively narrow. Existing vegetation includes some trees, bushes and grasses, but vegetation is relatively sparse in the area. Open agricultural fields and evidence of crop production occurs throughout the area. Newer residential construction exists further from the site along Peden Mill Road to the east and Blue Door Church Road to the south.

Interview with the County Planning and Zoning Administrator. As described previously in Section 3, HE staff spoke with Mr. Carter Munday about Simpson County’s zoning regulations for solar facilities in general and about the Horus Kentucky 1 Project specifically. The County’s zoning regulations (Article 14) address the need for landscaping and land use buffers around new development and between non-compatible zones or land uses. Mr. Munday specifically stated that he has made it clear to Horus Kentucky 1 staff that they must develop landscaping buffers surrounding the Project, such that if a person was driving by they would not know the Project was there, other than for the entrances. He does not want to be able to see the Project from any roads, homes or other buildings in the area. The Zoning Board will evaluate the Applicant’s Development Plan, when submitted to them, using that criterion when it comes to visual impacts.

Article 14 of the Franklin-Simpson County Zoning Regulations. As noted above, Article 14 of the County’s zoning regulations addresses landscaping and land use buffers.³⁸ Although the exact requirements applicable to the Horus Kentucky 1 facility will need to be developed

³⁸ Article 14, in its entirety, is included in Appendix E of this report.

through the County's Development Plan review process (described in Section 3 of this report), the following excerpts provide a general sense of the County's requirements:

- 14.3.2: Unless otherwise provided, landscape materials shall be installed to provide a minimum of fifty (50) percent winter opacity, between one (1) foot above finished grade level to the top of the required planting, hedge, fence, wall, or earth mound within four (4) years after installation.
- 14.4.1: Within the landscape easement, one tree per forty (40) feet of linear boundary, or fraction thereof shall be required.
- 14.4.2: Landscaped buffers required by specific district regulations shall be a continuous planting, hedge, fence, wall, or earth mound at least six (6) feet in height.
- 14.4.3: Grass or ground cover shall be planted on all portions of the landscape easement not occupied by other landscape material.
- 14.4.4: Alternative landscaping designs may be proposed or suggested by the local Planning & Zoning Board.
- 14.6.1: All landscaping buffers shall be installed in a sound, workmanship like manner and according to accepted good construction and planting procedures. The owner of the property shall be responsible for the continued proper maintenance of all landscaping buffer areas and shall keep them in a proper, neat, and orderly appearance, free from refuse and debris at all times. All unhealthy or dead plant materials shall be replaced within three (3) months. Deteriorating or missing materials from a fence shall be repaired, replaced, or refurbished within thirty (30) days.

Construction activities. Some adjacent landowners and commuters driving along surrounding roads, including Tyree Chapel Road, Hendricks Road, Geddes Road, other local roads, US 31W (Nashville Road) and I-65 and will likely be able to see construction equipment and activity as it occurs.

- There are very few homes surrounding the Project site, but several residences are very close to the site and would be able to see trucks and other equipment during construction. These include homes along Tyree Chapel Road (including those located within the Excluded Zone) and along Hendricks Road.
- Drivers on surrounding roadways, including local roads near the Project site, would be able to see construction activities occurring on the Project site since little vegetation exists in certain areas.
- The Kitchens Cemetery is located within an open agricultural field and will be surrounded by construction activity during the construction phase. The cemetery will have a full view of construction equipment and activity during that 12-month period.

- The Applicant has committed to working with local landowners and the public to resolve any potential issues during construction.

Because of the rural nature of the area, the small number of homes in close proximity to the Project site and the fact that construction will be temporary, occurring over about a 12-month period, with construction activities moving around the Project site, HE expects the visual impacts from construction activities to be minimal.

Project facilities. HE's focus of the scenic compatibility evaluation is upon the solar panels, as those structures will be above ground in close proximity to several residences and roads. Project inverters and the substation may also be visible from some locations.

- There is little existing vegetation in the area and the Project site has been largely cleared for agricultural purposes. Without the development of some type of visual barrier, the Project will be visible from most viewpoints (homes and roadways).
- Although the Applicant has stated that vegetative buffers will be added in order to mitigate potential viewshed impacts, no formal buffering plan for the Project has been provided to the Siting Board or to the County.
- The Simpson County Planning & Zoning Administrator has been clear with the Applicant and with HE about what is expected from the Project, with regard to vegetative buffers. The County zoning regulations support that stance. It is HE's understanding that County expects the Project to be fully buffered, such that it cannot be seen from any viewpoint.
- The Kitchens Cemetery is located within an open agricultural field and will be surrounded by solar panels during Project operations. Although solar panels would be a minimum of 250 feet from the boundary of the cemetery (per the Simpson County zoning regulations), panels or other infrastructure would be fully visible from the cemetery without a vegetative buffer surrounding that area.
- The Applicant has committed to working with local landowners and the public to resolve any potential issues related to operation of the Project. The Applicant will also be required to work through the County's Development Plan review process for local approval; that process will include a focus on visual impacts and vegetative buffers.

Without a vegetative buffer, the Project would be highly visible from surrounding homes and roadways. However, if buffers are planted according to the County's Planning & Zoning Administrator and zoning regulations, HE would expect the visual impacts associated with the presence of Project facilities to be minimal.

Conclusions and recommendations. Based on our review of the SAR, supplemental information provided by the Applicant, and additional research conducted by HE, we offer the following conclusions and recommendations regarding scenic compatibility:

- Construction vehicles and activity may be visible from local roadways and at multiple vantage points around the Project site, but these effects will be temporary as construction work moves around the site. Existing vegetation left in place along the Project boundary line may reduce visibility of construction activities occurring on-site in some areas, but natural vegetation surrounding the Project site is relatively sparse. However, the general area is relatively remote, with few residents or drivers along local roads, reducing the extent of visual impacts.
- Operational infrastructure, including the solar panels, inverters and substation will be largely visible to drivers along local roads, US 31W (Nashville Road) and I-65, as well as to local residents surrounding the Project site. If developed, vegetative buffers would shield Project infrastructure. The existence of relatively few homes in close proximity to the Project will reduce the extent of visual effects.
- The substation will be located on the south side of Hendricks Road and may be in full view of drivers and a small number of residences, especially if additional vegetative buffering is not developed.
- Vegetative buffers will be required by the Simpson County Planning & Zoning Board, potentially surrounding the entire Project site.
- The use of anti-glare panels will reduce, or eliminate, the potential for glare from solar panels for local residents and drivers. Glare is not expected to be an issue, but the Glare Study recommends further evaluation of several areas surrounding the Project site for potential screening needs.
- Based on our understanding of the Project area in Simpson County, HE believes that the Horus Kentucky 1 solar facility would not be incompatible with existing scenic conditions with appropriate buffering. Development of vegetative buffers would support scenic compatibility between the Project and adjacent properties and land uses.

Need for mitigation. The visual impacts are likely to be such that the Applicant should consider certain mitigation:

1. The Applicant will not remove any existing vegetation unless the existing vegetation needs to be removed for placement of Project infrastructure, including solar panels, or security fencing.
2. Existing vegetation between the solar arrays and the residences will be left in place, to the extent practicable, to help screen the Project and reduce visual impacts from the nearby homes and roadways.
3. The Applicant will work with homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors.

4. The Applicant will prepare a vegetative buffering plan and submit it to both the Franklin-Simpson County Planning & Zoning Board and the Siting Board. This plan should be in full compliance with the County regulations.
5. The Applicant will provide a visual buffer between Project infrastructure and residences or other occupied structures with a line of sight to the facility to the satisfaction of the Franklin-Simpson County Planning & Zoning Board. If vegetation is used, plantings should meet the height and density requirements of the Franklin-Simpson County zoning regulations.
6. To the extent that an affected property owner indicates to the Applicant that a visual barrier or vegetative buffer is not necessary, Horus Kentucky 1 will obtain that property owner's written consent and submit such consent in writing to the Siting Board and to the Simpson County Planning & Zoning Administrator. The Simpson County Planning & Zoning Administrator will determine whether the Applicant will be required to develop a buffer in that area.
7. The Applicant should plant vegetative buffers to surround the Kitchens Cemetery, to reduce or eliminate views of solar panels or other Project infrastructure from that location.
8. If the final site layout plan deviates from the preliminary plan with regard to the locations of solar panels, inverters, substation or other Project infrastructure, an additional evaluation of the need for vegetative buffers will be conducted and reviewed by the Siting Board.
9. Landscape screening will extend and connect to existing site vegetation, if any, to help create a more natural transition between existing vegetation and developed.
10. The Applicant will develop a vegetation management plan that describes the approach and procedures for maintaining or replacing vegetative buffers as needed. This plan will be developed pursuant to the applicable Franklin-Simpson County zoning regulations.
11. The Applicant should consider cultivating and maintaining multiple acres of native pollinator-friendly species on-site to help offset lost pollination opportunities from crops.
12. The Applicant should use anti-glare panels and operating the panels in such a way that glare from the panels is minimized or eliminated. The Applicant will develop a plan that addresses any potential glare issues along the Project boundaries. The Applicant will immediately adjust solar panel operations upon any complaint about glare from those living, working, or traveling in proximity to the Project. Failing this, the Applicant will cease operations until the glare is rectified.

Potential Changes in Property Values and Land Use

The construction and operation of industrial facilities has the potential to negatively affect property values and/or land uses of those properties adjacent to, or even in the general vicinity of, the facility in question. The magnitude, timing, and duration of increased traffic volume, noise, odor, visual impairments, or other emissions associated with the facility can influence the marketability and value of nearby properties. Each of those factors are addressed in this report and are considered here in examining property value impacts.

General methods of assessment. The value of a residential property is based on several factors, including characteristics of the home and the land on which it is situated, the uses and values of the surrounding property, among other attributes. The value of a residential property will take into account things such as lot size, age of home, size of home, number of bedrooms and bathrooms, etc. A residential property located near public lands or open spaces may be more highly valued, whereas the same property located near a heavy industry facility might have a lower value. Residential properties will be assessed differently than agricultural or industrial properties.

Several methods are available to assess the impacts of a new development on nearby property values. A technique known as hedonic pricing analysis can be used to determine the impacts of a specific characteristic on the price or value of a property. However, this method of valuation requires large amounts of data, statistical experience, and careful evaluation. Formal appraisal is a technique which uses the concept of specific property characteristics in comparing different properties. Matched pair analysis is another technique. A matched pair analysis makes a comparison between similarly situated properties that sold before and after a new industrial facility is constructed. This approach is described in more detail below.

Summary of information provided by the Applicant. The Property Value Impact Report (Appendix I of the Application) was completed by the Applicant's consultant, Richard Kirkland of Kirkland Appraisals, LLC. Referred to here as the Kirkland report, that document, along with additional follow-up information from Mr. Kirkland provides the following relevant information:

- *Land uses of adjacent properties* – Kirkland describes adjoining land as primarily a mix of residential and agricultural uses. About 47 percent of the acreage adjacent to the facility is mixed agricultural/residential; an additional 46 percent is agricultural, about four percent is identified as purely residential and a small amount of adjoining acreage is zoned as commercial (currently vacant).
- *Distances between solar panels and homes on adjacent properties* – the Kirkland report indicates that the closest homes will be at least 140 feet away from the Project footprint. In response to HE's inquiries, the Applicant provided additional information about the distance between various structures and Project solar panels; those data were provided in Exhibit 5-2. Altogether a total of 18 homes, one commercial building and 45 other structures (barns, sheds, etc.) are located within 1,200 feet of Project panels.

- **Discussion of a “matched pair” analysis** – The Kirkland report employs an analytical approach described as a matched pair analysis, which aims to determine the impact of a specific feature or attribute on property value. This form of “matched pair” analysis compares differences between the sales prices of properties adjacent to a solar facilities and sales prices of properties located further from that same facility.³⁹ Kirkland identifies and compares the sales prices of properties sold using data from 44 different solar farms across multiple states. In general, each of the solar farms included in the analysis are relatively similar in terms of rural, less densely populated locations. Nearby land uses are typically residential and agriculture in nature. The size of the solar facilities evaluated ranges from about 0.2 MW up to 80 MW and from an overall property size of 24 acres (4 MW facility) up to 2,034 acres (80 MW facility).⁴⁰ The results of this analysis and Kirkland’s overall conclusions are discussed below.
- **Regional home values compared to the matched pair data** – Mr. Kirkland also provided the following information regarding regional home values: the average home value within 1-mile of the Project site is \$201,786, the average home value within 3-miles is \$300,677, and the average home value within 5-miles is \$210,292. Those values are somewhat lower than, but roughly similar to, the average home value of properties in proximity to the solar projects analyzed in the matched-pair data set.
- **Narrative discussion of specific factors related to impacts on property values** – Mr. Kirkland briefly addresses the topics of hazardous materials, odor, noise, traffic, stigma and appearance as related to solar facilities in general and concludes that the “proposed solar farm [Horus Kentucky 1] will not negatively impact adjoining property values”. He does state that “the only category of impact of note is appearance, which is addressed through setbacks and landscaping buffers.”
- **Construction related impacts to property values** – Mr. Kirkland states that no impacts to property values are anticipated due to construction activity on the Project site. The report notes that “construction will be temporary and consistent with other development uses of the land and in fact dust from the construction will likely be less than most other construction projects given the minimal grading”.

Kirkland’s conclusions. Based on analysis of 96 residential dwelling matched-pairs associated with the 44 solar farms noted above, Kirkland concludes that:

“The range of differences (in sales prices) is from -10% to +10% with an average of +1% and median of +1%. This means that the average and median impact is for a slight positive impact due to adjacency to a solar farm. However, this 1% rate is within the typical variability I would expect from real estate. I therefore conclude that this data shows no negative or positive impact due to adjacency to a solar farm.”

³⁹ Kirkland adjusts for such factors as date of sale, age of home, square footage, number of bedrooms and bathrooms and garage spaces prior to comparing sales prices.

⁴⁰ Of the 44 solar facilities evaluated, 15 were larger than 20 MW and seven were larger than 70 MW.

Kirkland acknowledges that the -10% to +10% range is “seemingly wide” and notes that the “vast majority of the data falls between -5% and +5% and most of those are clearly in the 0 to +5% range.”

A separate analysis of 10 land sale matched-pairs shows property value impacts ranging from -12% to +17%, with a median impact of 0% due to adjacency to a solar facility.

- Kirkland concludes that the land sale matched-pair “data supports no negative or positive impact due to adjacency to a solar farm.”

HE’s evaluation of impacts. To assess the topic of impacts to property values, HE: (1) reviewed relevant existing literature related to solar facility impacts; (2) conducted interviews with several real estate professionals in Simpson County; and (3) prepared further analysis of the data provided in the Kirkland report.

Literature review. HE reviewed the existing literature related to the relationship between property values and utility – scale solar facilities. Overall, there are not many studies available that address the issue of changes in property values specifically related to solar facilities; the few that are available include the following:

- A 2020 study completed by economists at the University of Rhode Island found that in areas of high population density, houses within a one-mile radius depreciate by about 1.7 percent following construction of a solar array. The study found “substantially larger negative effects for properties within 0.1 miles and properties surrounding solar sites built on farm and forest lands in non-rural areas.” However, additional analysis focused on impacts in more rural areas found that the “effect in rural areas is effectively zero (a statistically insignificant 0.1%) and that the negative externalities of solar arrays are only occurring in non-rural areas.” The researchers note that this may be due to solar facilities being less visible in rural areas (due to land abundance for vegetative buffers).⁴¹
- A 2020 study focusing on the property value effects of wind turbines and solar facilities in the Netherlands states evidence suggesting that the negative effects of solar facilities (including noise (buzzing sounds), glare and visibility) results in decreased residential housing prices (2-3%). They found these effects to be localized (within 1km of the facility, or a little more than half a mile). However, the researchers also note that the relatively small number of solar facilities in the Netherlands makes the results less precise (as compared to the wind farm analysis).⁴²

⁴¹ Gaur, V., and C. Lang. *Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island*. University of Rhode Island, Department of Environmental and Natural Resource Economics, September 2020. <https://web.uri.edu/coopext/files/PropertyValueImpactsOfSolar.pdf>

⁴² Koster, H. and M. Drees. *Wind turbines and solar farms drive down house prices*. VoxEU, September 2020. <https://voxeu.org/article/wind-turbines-and-solar-farms-drive-down-house-prices>. Mr. Koster is Professor of Urban Economics and Real Estate at Vrije University in Amsterdam; Mr. Drees is Assistant Professor of real Estate Finance at the University of Amsterdam.

- A 2019 article produced by the American Planning Association (APA) indicates that the “impact of utility-scale solar facilities is typically negligible on neighboring property values.” The issue of property value impacts “can be a significant concern of adjacent residents, but negative impacts to property values are rarely demonstrated.”⁴³
- A 2018 University of Texas study included a geospatial analysis and a survey of residential property assessors to determine the potential for property value impacts. The results show “that while a majority of survey respondents estimated a value impact of zero, some estimated a negative impact associated with close distance between the home and the facility, and large facility size. Regardless of these perceptions, geospatial analysis shows that relatively few homes would be impacted.”⁴⁴
- Independent appraisers are often hired to conduct analyses related to property value impacts for solar companies, as is the case here for the Horus Kentucky 1 solar facility. Those analyses focus on property value trends of lands adjacent to existing solar farms across the country, using a paired sales or matching pair approach. HE reviewed several appraisal reports (not completed by Kirkland Associates); those appraisals indicate differences in property values ranging from about -3.2% to as much as +27%, although generally in cases with positive impacts, property values increased by about 5% or less. Overall, the conclusions were that solar facilities do not negatively impact property values.⁴⁵

It is interesting to note that although the few existing studies related to this issue generally indicate no impacts to property values, local residents often bring up concerns about property values during public hearings or open houses related to specific solar facilities. In many cases, as evidenced by newspaper articles or other media, residents believe that property values will be reduced by nearby solar farms. So, there may at least be a perception of negative effects on property values that permeates communities.

Interview with the Simpson County Property Valuation Administrator. HE spoke with Alison Cummings on September 23, 2021. She described the real estate market in Simpson

⁴³ Coffey, Darren. *Planning for Utility-Scale Soar Energy Facilities*. American Planning Association, PAS Memo, September – October 2019. <https://www.planning.org/pas/memo/2019/sep/>.

⁴⁴ Al-Hamoodah, Leila, et al. *An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations*. Policy Research Project, LBJ School of Public Affairs, The University of Texas at Austin, May 2018. https://emp.lbj.gov/sites/default/files/property-value_impacts_near_utility-scale_solar_installations.pdf.

⁴⁵ McGarr, P. and A. Lines, CohnReznick, Property Value Impact Study, Proposed Soar Farm, McLean County, IL, 2018; McGarr, P. and A. Lines, CohnReznick, Property Value Impact Study, Proposed Soar Farm, Kane County, IL, 2018; McGarr, P., CohnReznick, Property Value Impact Study, Adjacent Property Values Solar Impact Study: A Study of Nine Existing Solar Farms Located in Champaign, LaSalle, and Winnebago Counties, Illinois; and Lake, Porter, Madison, Marion, And Elkhart Counties, Indiana, 2018; McGarr, P., CohnReznick, Property Value Impact Study, Adjacent Property Values Solar Impact Study: A Study of Eight Existing Solar Farms Located in Lapeer County, Michigan; Chisago County, Minnesota; Marion County, Indiana; LaSalle County, Illinois; Bladen, Cumberland, Rutherford and Wilson Counties, North Carolina; and Isle of Wight County, Virginia, 2020.

County and especially within and around the City of Franklin as “hot”. She discussed an influx of new residents from out of state, likely at least in part because of relatively low housing prices, as compared to places like California, New York and surrounding states. As a result, housing prices have been rising in Simpson County and days on the market for any property has been decreasing.

Ms. Cummings was aware of the Horus Kentucky 1 Solar Project but has not attended any meetings about the Project or had any conversations with the Applicant regarding the Project. Given that this is the first solar project to propose development in Simpson County, Ms. Cummings has not been directly involved in evaluating any changes in property values from such a facility; however, given the rural nature of the Project area, she does not believe that property values will be affected by the presence of the facility. She also indicated that given the current high demand for homes and properties in the County, she does not believe the solar facility would have an adverse effect on sales prices or sales activity. She explained that in many rural areas, larger agricultural properties (similar to some of those surrounding the Project site) do not go up for sale very often and that families tend to want to keep those properties in the family. She has attended multiple conferences with other Kentucky PVAs in which the impacts of solar facilities have been discussed, without any definitive conclusion.

Ms. Cummings has not heard from any County residents with concerns regarding property values in relation to the Horus Kentucky 1 Project, or any type of feedback about the Project. She stated that it was likely that most people did not even know about it – there is very low public engagement about planning and development in the County, or about many other public activities.

Ms. Cummings also commented on industrial type developments in general in Simpson County. There have been several cases in which some opposition was registered in the planning or permitting phases, but once the project became operational, it was almost forgotten. Assuming the inclusion of some sort of visual buffer, Ms. Cummings believes that solar facilities might be a similar case.

Review of Kirkland data. Although Mr. Kirkland concludes that there would be no impacts on property values from the Horus Kentucky 1 facility, the matched pair analysis does indicate the potential for a range of positive or negative effects. Therefore, HE examined more closely the data provided in the matched pair sets to determine the likelihood of a positive impact, negative impact, or no impact. Exhibit 5-3 summarizes that effort, presenting a detailed picture of the distribution of price differences for matched pair sets.

About 28 percent of the matched pairs indicated a negative effect, although the majority of those showed a very small negative impact (less than a five percent decrease in sales price). About 58 percent of the matched pairs indicated a positive effect, with the majority showing a sales price increase of less than five percent). The remaining matched pair sets indicated no effect on sales price. Overall, these data appear to support Mr. Kirkland’s conclusion of no property value impacts due to proximity to solar facilities.

Exhibit 5-3.

Distribution of Sales Price Differences for Matched Pair Sets

# Facilities Included	44	
# Matched Pair Sets	96	
<u>Range of Impact</u>		
-10% to -15%	0	0.0%
-5% to -10%	3	3.1%
0% to -5%	24	25.0%
0%	13	13.5%
0% to +5%	45	46.9%
+5% to +10%	11	11.5%
+10% to +15%	<u>0</u>	<u>0.0%</u>
Total	96 Pairs	100.0%

Source: Kirkland report data set, 2021.

Residential and other properties in close proximity to the Project site. Information obtained in HE’s literature search and statements made by Mr. Kirkland indicate that impacts to the values of adjacent or surrounding properties may be related to the ability to see or hear the Project and that vegetation or other visual barriers may reduce the potential for adverse impacts to property values. Therefore, HE more closely examined the locations and situations of nearby residential and non-residential properties in terms of distance to the Project and potential viewshed impacts when considering potential impacts to property values.

- Several homes along Tyree Chapel Road would be located very close to the Project – within 300 feet of the panels. If vegetative buffers are developed to shield the Project from view, these residential property owners may not be able to see the solar panels from their homes. Additionally, as described later in this report, operational noise levels are expected to be low and Project generated noise level may not be noticeable to nearby residents. Other homes are located at further distances from the Project panels; those homeowners may also benefit from vegetative buffers, in terms of alleviating any concerns related to property value impacts.
- Commercial properties and land uses (including hotels, restaurants, retail stores and a truck stop) currently exist along I-65 and US 31W (Nashville Road). Although several commercial properties may be within sight of Project facilities, most are located at a far enough distance that the view of solar panels or other Project infrastructure would likely not seem intrusive. Operational noise would likely blend in with that of commercial operations and may not be noticeable to those property owners or customers.

Conclusions and recommendations. Based upon review of the Kirkland report and our additional research efforts and interviews, HE offers the following conclusions related to potential impacts to property values or land uses for adjacent property owners:

- Certain literature and our interviews suggest that concerns surrounding impacts to property values from solar facilities stems from visibility of panels and other infrastructure. If that is the case, the creation of vegetative or other buffers may go a long way to reducing concerns or mitigating potential reductions in property values.⁴⁶
- Current research suggests that the existence of solar facilities does not, in general, measurably result in negative influences on property values for adjacent landowners in rural areas. HE's data analyses also generally point to a conclusion of no discernible impacts to property values, although there is a small risk of negative impacts.
- Construction activities will be temporary, occurring over a period of about 12 months. Those activities will result in increased traffic and noise in the vicinity of the project; however, homebuyers and those interested in buying other types of properties often have a longer-term mindset when deliberating a purchase. Additionally, the high level of current market activity in Simpson County, coupled with current low interest rates, will likely have a larger influence on desirability and prices than the solar facility construction. Even so, some sales might be delayed because of uncertainty.
- Little existing vegetation surrounds the Project site; the Project will be in full view from many nearby locations, including homes and roads. The Applicant should develop a detailed buffering plan, pursuant to the regulations and requirements of the Franklin-Simpson County Planning & Zoning Board, to reduce impacts related to the change in viewshed.
- Operational noise levels are estimated to be below the World Health Organization's estimates of moderate or annoying noise levels for all nearby residences.
- The Simpson County Property Valuation Administrator believes that property values will be unaffected by the presence of the solar facility. She also indicated that given the current high demand for homes and properties in the County, it is unlikely that the solar facility would have an adverse effect on sales prices or sales activity.
- HE concludes that property values in the Project area and in Simpson County are unlikely to be affected by the siting of the Horus Kentucky 1 facility. This conclusion assumes that the mitigation strategies discussed in Section 6 are adopted by Horus Kentucky 1, LLC.

Need for mitigation. No unique mitigation measures are recommended related to potential impacts to property values or adjacent land uses because other mitigation can accomplish this. However, close coordination by the Applicant with impacted and concerned homeowners regarding these mitigation measures should be initiated.

⁴⁶ Community & Environmental Defense Services, located in Maryland supports coordination between solar companies and landowners related to screening measures to protect the view. Community & Environmental Defense Services, Solar Farms: Protecting Homes, Property Value, Views & the Environment While Reaping Solar Energy Benefits. <https://ceds.org/solar/>

Anticipated Peak and Average Noise Levels

Noise issues stem from construction activities and operational components of the solar facility. During construction, noise will include graders, bulldozers, excavators, dozers, dump trucks, pile drivers, and other equipment. During operations, noise will be emitted from transformers, inverters, and the tracking motors that tilt the panels to track the sun throughout the day. Distance from noise emitters to noise receptors is important since noise levels decrease the further a noise receptor from a noise emitter. Simpson County does not have a noise ordinance.

General methods of assessment. Sound levels are measured in decibel units (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity. Sound levels are typically described as dBA, which is the measure of the overall noise level of sound across the audible spectrum to compensate for the varying sensitivity of the human ear to sound at different frequencies. The impacts of noise are not strictly related to loudness – the time of day when noise occurs, the duration of the noise, and baseline or background noise levels are also important factors in determining the “loudness” of a noise.

Generally speaking, an increase in 10 dBA is perceived as a doubling of loudness, that is to say, 70 dBA is perceived as twice as loud as is a level of 60 dBA.⁴⁷ A change of three decibels is barely noticeable, but a change of five decibels is typically noticeable. Once sounds reach 90 dBA humans can experience pain from the noise and sounds above 150 dBA can cause permanent hearing damage.⁴⁸ For additional context, 30 dBA is the sound emitted by a whisper, 55 dBA are emitted from a percolating coffee-maker, and 90 dBA would be the sound emitted by an individual’s yell.

A standard noise impact assessment focuses on several key factors:⁴⁹

- Measurement of existing ambient noise levels;
- Identification of noise-sensitive receptor sites;
- Calculation of distances between noise sources and sensitive receptors;
- Estimation of Project-related (construction or operational) noise production and exposure, including cumulative noise effects.

Summary of information provided by the Applicant. The SAR included as Appendix H of the Application briefly addressed construction and operational noise impacts. In response to HE requests, the Applicant provided a more detailed Sound Level Assessment Report (Appendix A of the response to the first request for information) and a Revised Sound Level

⁴⁷ RECON Environmental, Inc. *Noise Analysis for the Drew Solar Project, Imperial County, California*. July 24, 2018. <http://www.icpds.com/CMS/Media/Drew-Solar---Appendix-G.pdf>

⁴⁸ Alpine Hearing Protection website, <https://www.alpinehearingprotection.co.uk/5-sound-levels-in-decibels/#:~:text=0%20decibel%20is%20the%20so,permanent%20damage%20to%20your%20hearing.>

⁴⁹ Department of Energy. Noise and Vibration Impact Assessment Methodology. https://www.energy.gov/sites/prod/files/edg/media/EIS0250F-S2_0369_Volume_V_Part_3.pdf;

Assessment Report (Exhibit C of the response to the second request for information).⁵⁰ Both Sound Level Assessment reports were completed by Skelly and Loy, a Terracon Company (Terracon).

Baseline (ambient) noise levels. About 1,900 feet of the northernmost portion of the Project site are adjacent to the northbound lanes of I-65; a CSX railway line runs along the Project boundary line on the western side of the Project site (those features are illustrated on the Site Plan Overview Map provided in Exhibit 3-1 of this report). Other areas surrounding the Project site are primarily agricultural. Therefore, ambient noise is expected to vary across the Project area.

Terracon employed data from the Acoustical Society of America (ASA) to establish baseline noise levels for the Project area; an in-person, site specific analysis was not performed for the Sound Level reports. The average noise level over a 24-hour period (L_{dn}), daytime noise levels (L_d) and nighttime noise levels (L_n) for six different land use categories are provided in Exhibit 5-4.

Exhibit 5-4.

Representative Existing Sound Conditions Based on Land Use

<u>Land Use Category</u>	<u>Typical L_{dn}</u> <u>(dBA)</u>	<u>Day Level L_d</u> <u>(dBA)</u>	<u>Night Level L_n</u> <u>(dBA)</u>
1. Very noisy urban residential	67	66	58
2. Noisy urban residential	62	61	54
3. Urban and noisy suburban residential	57	55	49
4. Quiet urban and normal suburban residential	52	50	44
5. Quiet suburban residential	47	45	39
6. Very quiet suburban and rural residential	42	40	34

Source: Horus Kentucky 1, LLC, September 2021.

Although the Project area is primarily rural, areas adjacent to I-65 are expected to experience ambient noise levels similar to Category 1, due to traffic noise. Traffic noise levels in that area may range from 60 to 70 dBA, depending on proximity to the highway. Moving eastward across the Project site, away from I-65, noise levels should be typical for rural agricultural land, reflective of Categories 5 and 6. When large farm equipment is being operated, noise levels can be high, ranging from 72 – 107 dBA at the operator’s ear.⁵¹ The Sound Study estimates that absent farm equipment noises, ambient background noise levels near the southeastern portion of the Project site (furthest away from I-65) would range from 35 to 45 dBA, in keeping with the sound levels reflected in Category 6.

⁵⁰ The Revised Sound Level Assessment Report includes three additional noise sensitive receptors not included in the first report.

⁵¹ Horus Kentucky 1 LLC, data from Depczynski, J., Franklin, R. C., Challinor, K., Williams, W., & Fragar, L. J., Farm Noise Emissions During Common Agricultural Activities (Tech.). National Center for Biotechnology Information. 2005.

Noise sensitive receptors. Noise sensitive receptors are generally defined as locations where people reside or where the presence of unwanted sound may adversely affect the existing land use. Typically, sound sensitive land uses include residences, places of worship, hotels, auditoriums, athletic fields, day care centers, hospitals, offices, schools, parks and recreational areas. Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Local conditions such as traffic, topography, and wind characteristics of the region can alter background sound conditions.

The Applicant provided information about the 65 noise sensitive receptors within 2,400 feet of the Project boundary.⁵² Fifteen receptors are separated from the Project site by I-65; those receptors are located on the north / west side of the interstate, while the Project site is located to the south / east of the interstate. Due to traffic noise from I-65, sensitive noise receptors located to the north / west of the interstate will likely experience Project generated noise to a lesser extent than those on the south / east side of the interstate. Noise sensitive receptors by type and relation to I-65 are shown in Exhibit 5-5. A map of all noise sensitive receptors included in the Revised Sound Assessment Report is included as Appendix B to this report.

Exhibit 5-5.

Sensitive Noise Receptors within 2,400 Feet of the Project Boundary Line

Sensitive Receptors	<u>South / East of I-65</u>	<u>North / West of I-65</u>
Residential Property	49	10
Hotels with Outdoor Usage Areas	—	5
Churches	1	—

Source: Horus Kentucky 1, LLC, September 2021.

The Sound Level reports also provided the expected L_{dn} (average noise level over a 24-hour period) under current conditions for each noise receptor. The number of noise sensitive receptors by applicable land use category (based on Exhibit 5-4, above) and ambient noise levels associated with each of those categories is shown in Exhibit 5-6.

⁵² A map showing the locations of each receptor is included as Appendix B of this report.

Exhibit 5-6.

Number of Noise Sensitive Receptors by Land Use Category and Distance from I-65

<u>Land Use Category</u>	<u>Distance from I-65</u>	<u>Noise Receptors</u>	<u>Ambient Sound (L_{dn})</u>
1. Very noisy urban residential	Adjacent or very close	10	67 dBA
2. Noisy urban residential	Very close	7	62 dBA
3. Urban and noisy suburban residential	775 - 1,000 feet	5	57 dBA
4. Quiet urban and normal suburban residential	1,000 - 3,000 feet	7	52 dBA
5. Quiet suburban residential	3,000 - 7,000 feet	11	47 dBA
6. Very quiet suburban and rural residential	> 7,000 feet	25	42 dBA

Source: Horus Kentucky 1, LLC, September 2021.

The Sound Level reports determined that all noise sensitive receptors would experience at least a minor amount of traffic noise from I-65 and occasional railroad noise. This is in addition to the normal sounds associated with farming and other typical rural noise from animals, insects and wind.

Construction noise emitters. During the construction phase, a variety of heavy equipment will be utilized. Peak construction noise will be created by pile drivers, concrete trucks, backhoes, bulldozers and additional road traffic. At a distance of 50 feet, noise levels for that equipment may range from about 75 dBA for a pick-up truck up to 101 dBA for a pile driver.

The Sound Level reports utilized data from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) to predict a worst-case scenario for noise impacts on sensitive receptors. The model incorporated noise data for solar panel array installation at each receptor location, including backhoe, crane, dozer, pickup truck, tractor and vibratory pile driver activity. Pile drivers are used to place the support posts for the solar panels and will create the loudest construction equipment noise. The pile driving procedure produces a repetitive, metallic impact sound, but individual posts take only a few minutes to be driven into the ground.

The noise model provided noise levels for each receptor within 2,400 feet of the Project boundary. Model results included average construction noise levels (L_{eq}) and maximum construction noise levels (L_{max}). Of the 65 noise sensitive receptors, 12 are located within 600 feet of the Project boundary. Average and maximum construction noise levels for those locations are shown in Exhibit 5-7.

Exhibit 5-7.

Average and Maximum Construction Noise Levels for Sensitive Receptors within 600 Feet of the Project Boundary

Sensitive Noise Receptor Address	Distance from Boundary (ft)	Distance from Nearest Solar Panel (ft)	Average Construction Noise Level L_{eq} (dBA)	Maximum Construction Noise Level L_{max} (dBA)
292 Tyree Chapel Rd.	140	158	84	91
141 Tyree Chapel Rd.	440	901	69	76
727 Peden Mill Rd.	370	703	71	78
155 Old County Farm Rd.	290	394	76	83
111 Old County Farm Rd.	350	377	77	83
139 Old County Farm Rd.	270	304	79	85
123 Old County Farm Rd.	520	559	73	80
3835 Peden Mill Rd.	570	836	70	76
1271 Tyree Chapel Rd.	170	312	78	85
172 Hendricks Rd.	370	536	74	80
XX Hendricks Rd.	73	125	86	93
1666 Tyree Chapel Rd.	60	95	89	95

Source: Horus Kentucky 1, LLC, September 2021.

As the distance from the source of noise increases, the sound level attenuates, or decreases. A doubling of distance results in a decreased noise level of approximately six dBA.⁵³ Therefore, the noise receptor located 2,360 feet from the Project boundary (the receptor located furthest from the Project boundary, but still within the 2,400-foot radius of the Project site) would be expected to experience average construction noise of 60 dBA and maximum noise of 67 dBA. These data include the cumulative effects of the multiple construction activities that would occur to construct a single solar panel array.

The analysis also considers a scenario in which two sets of panel arrays were constructed at the same time in the vicinity of a single noise receptor. Those activities would result in a doubling of construction noise, resulting in an additional three dBA to the total if both activities occurred at the same distance from the receptor. Construction of a single array will take one to two days.

The Sound Level reports state that construction noise can best be minimized through maintenance of equipment, proper scheduling and duration limits for the noisiest activities. The Applicant proposes that construction activities will take place between the hours of 7:00 am and 8:00 pm, Monday through Saturday. In addition, the nature of the Project is such that construction will move across the site resulting in noise levels for the various receptors that are temporary and intermittent. The Applicant did not propose any additional sound dampening measures for the construction phase of the Project.

Operational noise emitters. The primary sources for noise during the operational phase will be from (1) the tracking devices for the solar panels; (2) the inverters, which convert direct current electricity to alternating current; and (3) the main transformer at the substation. The

⁵³ <http://hyperphysics.phy-astr.gsu.edu/hbase/Acoustic/isprob2.html#c1>

locations of these devices are shown in the Noise Receptor Location map provided in Appendix B of this report.

Tracking systems involve the panels being driven by small, brushless DC motors to track the arc of the sun to maximize each panel's potential for solar absorption. The solar facility would employ 22 inverters across the project site. Noise created by the inverters is described in the analysis as a low hum that produces the same acoustical output as a home air conditioning unit. The nearest noise sensitive receptor is located 269 feet from an inverter.

The main transformer at the substation is anticipated to be a 55 MVA ONAF2 transformer and will cover about ½ acre. The nearest noise sensitive receptor is located 1,030 feet from the substation location.

Sounds emitted from operational equipment are shown in Exhibit 5-8.

Exhibit 5-8.
Operational Sound Levels, by Equipment Type and Distance

<u>Equipment</u>	<u>Sound Pressure Level (dBA)</u>	<u>Distance (Feet)</u>
Inverters	79	3
Transformer	76	9
Tracking Motors	50	30

Source: Horus Kentucky 1, LLC, September 2021.

Terracon utilized a SoundPLAN model, developed using 3-dimensional topography, to estimate operational noise levels generated by the Project. The sound modeling indicated that operational sound levels at each of the noise sensitive receptors will range from 32 dBA to 52 dBA. Receptors predicted to experience operational noise of between 43 and 45 dBA are generally located north of I-65; background traffic noise emitted from the highway will dominate the acoustical environment in that area. The single receptor predicted at 52 dBA is located within the Excluded Zone and is owned by a participating landowner. The remainder of the receptors analyzed would experience operational noise below 40 dBA; according to the Sound Level studies, Project facilities will not be audible at those locations. For the majority of receptors, the projected operational noise levels are lower than the estimated ambient L_{dn} for the same location.

In addition to the project operational noises, other maintenance and repair activities will occur. Mowing is expected to occur three to four times a year and should not be an issue in this agricultural sound environment.

HE's evaluation of impacts. Neither the Commonwealth of Kentucky nor Simpson County have a noise ordinance that is applicable to the Project. As such, HE utilized the noise limit recommendations generated by the Environmental Protection Agency (EPA) and the World Health Organization (WHO) to gauge acceptable levels of sound.

- The EPA determined that a constant sound of 70 dBA over a 24-hour period is enough to start causing permanent hearing loss for individuals, and a sound of 55 dBA outdoors is enough to cause activity interference and annoyance.⁵⁴
- The WHO determined that daytime noise emissions greater than 55 dBA over a 16-hour period can cause serious annoyance, and noise emissions greater than 50 dBA over a 16-hour period can cause moderate annoyance. The WHO recommends limits of 45 dBA over an 8-hour period during the night.⁵⁵

Construction noise. Construction activities will produce sporadic noise that will exceed 55 dBA during daytime hours. Of the 65 noise sensitive receptors, the Sound Level reports demonstrate that 22 receptors already experience an L_{dn} (average noise levels over a 24-hour period) of greater than 55 dBA under existing conditions. Several homes in close proximity to the Project site would experience maximum construction noise levels greater than 90 dBA and several more would experience maximum noise greater than 80 dBA at some point during the construction phase. However, the nature of the Project, which requires that construction activities move around the site as each task is completed, will minimize some of the annoyance created by loud, though sporadic, noise.

The Project has the potential for a number of loud activities to occur simultaneously, but the timing of activities is such that it is not realistic to predict which sources of noise will contribute to these periods of cumulative sounds. To better consider this question, HE looked at methods for calculating cumulative sound levels.

As a reference, one decibel is the “just noticeable difference” (JND) in sound intensity for the human ear.⁵⁶ However, the frequencies of different sounds will affect the perceived loudness of cumulative noise. “Compared with dB, A-weighted measurements underestimate the perceived loudness, annoyance factor, and stress-inducing capability of noises with low frequency components, especially at moderate and high volumes of noise.”⁵⁷ This means that very different types of noises could have a greater cumulative impact than expected. Cumulative impacts from two noise sources can be calculated based on the difference in the sound levels as shown in Exhibit 5-9.

⁵⁴ United States Environmental Protection Agency. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March 1974. <https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF>

⁵⁵ World Health Organization. *Guidelines for Community Noise*. April 1999. <https://www.who.int/docstore/peh/noise/Comnoise-1.pdf>

⁵⁶ <http://hyperphysics.phy-astr.gsu.edu/hbase/Sound/db.html#c3>

⁵⁷ <https://www.softdb.com/difference-between-db-dba/>

Exhibit 5-9.

Calculation of Additional Sound Power, in Decibels

<u>Signal Level Difference between Two Sources (dB)</u>	<u>Decibels to Add to the Highest Signal Level (dB)</u>
0	3
1	2.5
2	2
3	2
4	1.5
5	1
6	1
7	1
8	0.5
9	0.5
10	0.5
> 10	0

Source: https://www.engineeringtoolbox.com/adding-decibel-d_63.html.

This suggests that even multiple sources of loud noise will produce only modest increases to overall sound levels, providing the sources of noise are not of very different frequencies.

Although the residents near the Project site will experience noise at levels expected to cause annoyance, the sporadic nature of the noise will not be sufficient to cause damage to residents' hearing.

Operational noise. The nature of solar projects dictates that noise from operations will occur during daylight hours. The closest residential receptor will experience predicted noise levels during operation of about 52 dBA (this is the residential area located within the Excluded Zone). The majority of other sensitive receptors daytime noise levels were modeled to be less than 40 dBA, well within the WHO's recommended maximum noise level of 50.0 dBA. HE concludes that, overall, noise impacts from Project operations will be minimal.

Conclusions and recommendations. Based on our review of the SAR, supplemental information provided by the Applicant, and additional research conducted by HE, we offer the following conclusions and recommendations regarding noise emissions:

- Construction phase noise may be annoying for residents surrounding the Project area for short periods of time. The intermittent nature of the noise might ameliorate the impacts, but residents close to the Project site might find construction noise to be troublesome even if it does not present actual damages to hearing.
- The current trend of employees working from home could make daytime noise more of an issue than it would have been previously. However, there are few residences located close to the Project site.

- Some residents and hotel guests may find the construction noise in concert with the highway noise to be objectional.
- Noise from Project components during operations (inverters, motors, transformer) is anticipated to result in small, if any, increases to the local sound environment, depending on location. In many locations, those increases would be unnoticeable to residents or drivers in the area.
- The topography and existing vegetation in some areas might help mitigate noise emissions that may be caused by construction or operational components of the Project. Additional vegetative buffering would also help to reduce noise impacts. The extent of vegetative buffers required for the Project will be determined by the Franklin-Simpson County Planning & Zoning Board during their review of the Applicant's Development Plan.

Need for mitigation. The Applicant should consider certain mitigation to reduce noise impacts:

1. The Applicant should notify residents and businesses within 2,400 feet of the Project boundary about the construction plan, the noise potential, and the mitigation plans at least one month prior to the start of construction.
2. The Applicant should remain in contact with nearby residents to confirm that noise levels are not unduly high or annoying during construction. If the noise levels are unduly high or annoying, the Applicant should mitigate those effects as needed.
3. If pile driving activity occurs within 1,500 feet of a noise sensitive receptor, the Applicant should implement a construction method that will suppress the noise generated during the pile driving process (i.e., semi-tractor and canvas method; sound blankets on fencing surrounding the Project site; or any other comparably effective method).
4. Pile driving activities should cease by 6:00 pm each day, except for pile driving locations within 1,500 of a noise receptor, in which case, pile driving should cease at 5:00 pm. Since the area is largely rural, a constant pounding during evening hours has the potential to upset the natural tranquility of the area and severely annoy residents.
5. The Applicant should limit the construction activity, process and deliveries to the hours of 8:00 am to 6:00 pm, Monday through Saturday. No construction work should be conducted on Sundays. These hours represent a reasonable timeframe to ensure that nearby property owners are not unduly impacted by construction activities.
6. When possible, construction crews should avoid simultaneous use of multiple sources of loud equipment in the same area.

7. If repairs or maintenance activities occur at night, times that are normally quiet during the operational phase, crews should be aware of nearby homes and reduce loud noise when possible.

Road and Rail Traffic, Fugitive Dust and Road Degradation

Traffic concerns related to the development of the Horus Kentucky 1 solar facility during the construction or operational phases are addressed in this section. The 12-month long construction phase would include commuting construction workers, vehicles, and equipment on-site, plus the delivery of heavy loads of solar components, infrastructure, and other equipment. Increased traffic during operations will occur as employees travel to and from the property to monitor and maintain the site.

General methods of assessment. A typical evaluation of traffic-related impacts include:

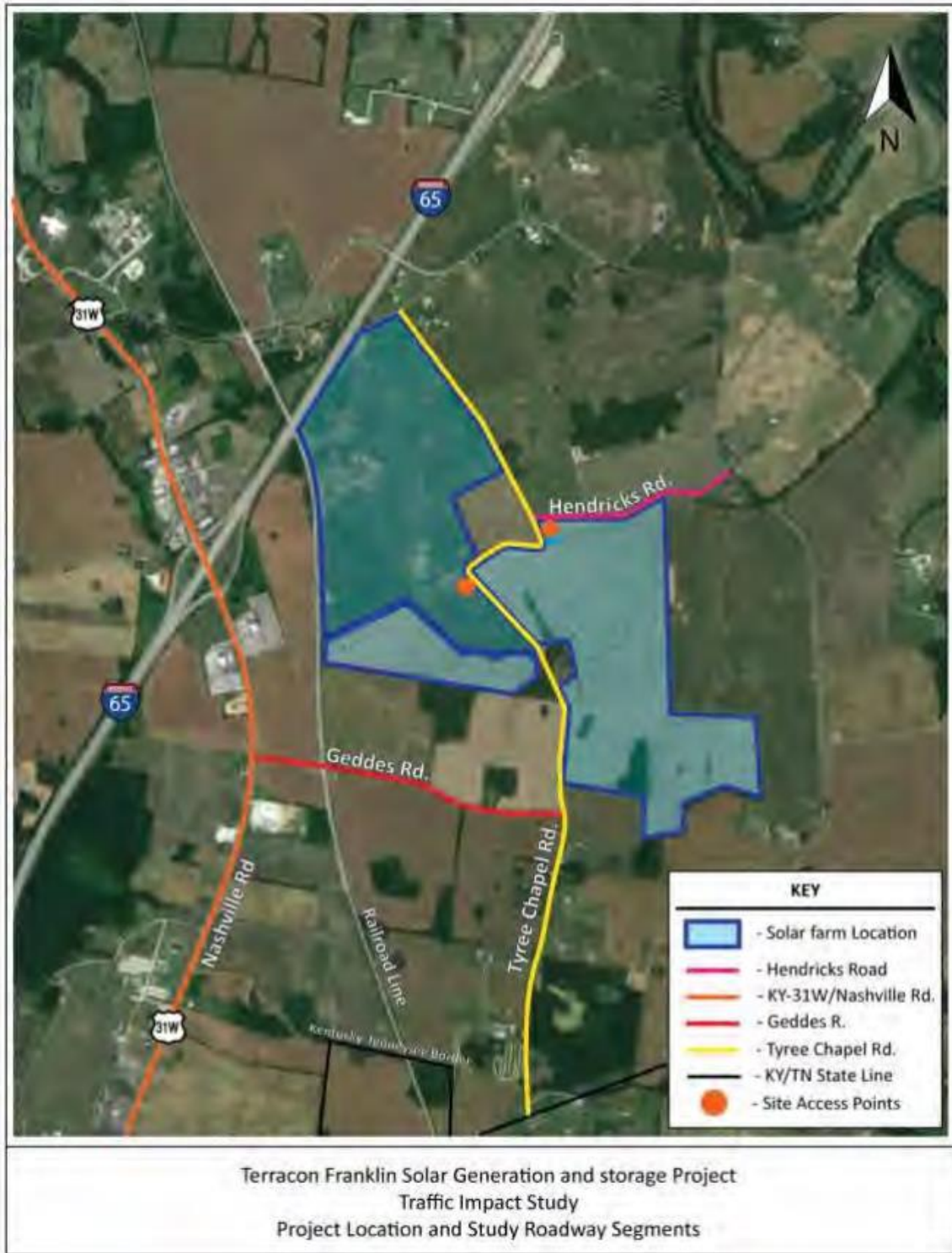
- Establishing existing traffic conditions in the area;
- Identifying primary access points that will be used by the Project;
- Estimating changes in traffic due to construction and operations; and
- Assessing the impacts of Project-related traffic on local areas. This includes determining whether additional traffic will lead to congestion, changes in service levels of existing road networks and identifying any potential degradation to existing roadways.

Summary of information provided by the Applicant. A brief Traffic Assessment was provided in the SAR included with the Application. Under contract to Terracon, the company Fisher then completed the Transportation Effect and Route Evaluation Study (Traffic Study) for the Project (Exhibit B of the response to the first request for information). Subsequently, additional information and clarification regarding various traffic issues was provided in the Applicant's responses to the second request for information. HE's analysis assumes that responses to the second request for information are the most recent and updated; that information was used if it conflicted with earlier responses. The Fisher report provided data on existing traffic volumes and road conditions for local roadways expected to be used to access the site. Traffic projections, level of service (LOS) analysis and operational phase impacts were also provided.

Site access, vehicle parking and internal roadways. Vehicles traveling to the Project site will utilize US 31W (Nashville Road), Geddes Road and portions of Tyree Chapel Road to reach the two Project access points. The Applicant expects that Flat Rock-Peden Mill Road will also experience some Project traffic. Exhibit 5-10 illustrated the affected roadways and Project access points.

Exhibit 5-10.

Project Location, Project Entrances and Traffic Study Roadway Segments



Source: Horus Kentucky 1, LLC, September 2021.

Limited on-site parking will be provided in the three separate laydown areas shown on the Site Plan Layout map, provided in Exhibit 3-1 of this report. The acreage of each of the three laydown areas was not provided. On average, 25 vehicles will park at the Project site, with a maximum of 75 vehicles during the peak construction period. The Applicant anticipates that construction workers will stay at any of the six hotels located to the west of I-65. These workers will be picked up at a specific common location and driven to the Project site via Project carpool. Four workers are anticipated to ride in a single vehicle. This method of shuttling workers will be revised as worker numbers fluctuate.

About six miles of internal roads will be constructed on the Project site. A main internal roadway will be gravel; other internal roadways will remain grassed.

Baseline traffic volumes and road conditions. US 31W (Nashville Road) is the only access road to the Project site for which traffic data were available. Traffic data for that roadway, as provided by Fisher, are shown in Exhibit 5-11.

**Exhibit 5-11.
Existing Roadway Traffic Volume Data**

<u>Roadway Segment</u>	<u>Existing AADT</u>	<u>Morning Peak Hour</u>		<u>Evening Peak Hour</u>	
		<u>NB</u>	<u>SB</u>	<u>NB</u>	<u>SB</u>
US 31W (Nashville Road)	10,841	468	399	399	468

Note: NB indicates Northbound; SB indicated Southbound

Source: Horus Kentucky 1, LLC, September 2021.

Other roadways in the Project area, including Geddes Road, Tyree Chapel Road and Hendricks Road, are described in the Traffic Study as “very low volume local roads that primarily provide access to farmland and a small number of private residences.” With no existing traffic data available, Fisher assumed the standard capacity of a two-lane roadway-1,700 passenger cars per hour in a single direction and 3,200 passenger cars per hour total. Descriptions of local roads surrounding the Project are provided in Exhibit 5-12.

**Exhibit 5-12.
Local Roadway Descriptions**

<u>Local Road</u>	<u>Primary Direction</u>	<u>Speed Limit MPH</u>	<u>Approximate Width (Feet)</u>	<u>Lanes</u>	<u>Markings</u>	<u>Shoulder in Project Vicinity</u>
Geddes Road	East/West	30	18	2	Unstriped	No
Tyree Chapel Road	North/South	30	14	2	Unstriped	No
Hendricks Road	East/West	30	12	2	Unstriped	No

Source: Horus Kentucky 1, LLC, September 2021.

The Applicant provided photos representative of road conditions for Tyree Chapel Road (north of Geddes Road and Hendricks Road), Geddes Road, and Hendricks Road. Each of these roads are paved, narrow with little or no shoulder area, and are unmarked. Photos of US 31W (Nashville Road) were not provided. In each of the provided photos, the pavement

appears to be in generally good condition, although it is difficult to judge based on these limited snapshots.

Construction related traffic volumes and routes utilized. Construction related traffic will include (1) passenger vehicles; (2) heavy-duty trucks; and (3) water trucks.

- Between 50 and 300 workers would be on-site on any individual day, but traffic from worker vehicles will be mitigated by the worker carpooling system described above.
- The average number of delivery trucks per day is anticipated to be 20, but the Applicant does not expect to exceed that number even during peak periods.
- One water truck is expected to access the site each day and is included in the total number of trucks.
- The weight and class of delivery trucks is unknown but will be available 3 months prior to the start of construction.

The delivery of the transformer will involve three trucks to transport the transformer and accessories. The total gross weight for the truck transporting the frame of the transformer will be approximately 90 tons. This will be an overweight load and oversized load and will require an escort. The Applicant will contract with a transport firm for this delivery and that firm will comply with all state and local roadway regulations. Upon delivery, it is possible that lane closures or traffic stoppages of up to 15 minutes will be required.

Project traffic is expected to travel on I-65, then south on US 31W (Nashville Road) and then to Geddes and Tyree Chapel Road to the Project access points. The Traffic Study projected that 90 percent of both worker and delivery truck traffic would come from the north; the remaining 10 percent would come from the south.

The traffic analysis determined that only a slight degradation in operations would occur under the projected traffic levels for US 31W (Nashville Road) and that the LOS would remain at Level A. The LOS analysis assumed 300 worker round trips per day, which is contrary to the data provided by the Applicant regarding worker carpooling but reflects a worst-case scenario. Utilizing the standard capacity limits for a two-lane roadway, the Traffic Study concluded that the additional Project traffic would be within the threshold of acceptable operations for the local roads described above.

Construction traffic management. The Applicant addresses traffic management for certain roads or for specific construction activities as follows:

- Although some parking will be accommodated on site, workers in nearby hotels will be shuttled to the Project site which will minimize traffic on narrow, local roads.
- Ridesharing during the construction phase will be encouraged.
- Safety precautions will be taken, including signage and flagmen, to prevent traffic collisions.

Operations related traffic volumes. The Traffic Study did not consider traffic volumes during the operational phase but noted that “the expected traffic to be contributed to the area will be similar to that of a typical single-family home.”

Road degradation. The Traffic Study indicated that the Project would not permanently alter any roadways or damage existing road infrastructure. The Applicant confirmed that Horus Kentucky 1 will repair or pay for repairs for any damage to local roads due to Project activity.

Railways. CSX operates a railway line located directly west of the Project boundary. The location of that railway line can be seen in Exhibit 3-1 of this report. No information was provided about railway operations or activity levels. The Applicant stated that they will “work with the County and CSX or KYTC (if necessary) to assess impacts and damage to the railroad crossings due to Project generated traffic or other activities.” No information was provided by the Applicant about expected Project traffic volumes crossing the railroad or about the specific type and weight of Project vehicles expected to cross the rail line.

Fugitive dust. The Applicant expects that if conditions are dry, water trucks will be used to apply water and minimize dust on the Project site. Compacted gravel internal roads may also contribute airborne dust particles and water will be applied as needed.

HE’s evaluation of impacts. HE conducted the following additional research and analyses related to traffic, road degradation and fugitive dust.

Baseline traffic volumes. The Applicant provided traffic counts for US 31W (Nashville Road), stating that that is the only road with available data near the Project site. HE confirmed that no data for other roads are available.

Photographs of local roads taken by HE on the in-person site visit generally indicate light levels of existing traffic. However, HE’s visit in mid-September coincided with harvesting season and large farm trucks were traveling through the area; HE, Applicant and Siting Board vehicles were required to maneuver around those trucks in several instances. HE observed that these roads are generally narrow, unmarked and lacking shoulders. Due to the narrowness of the local roads, trucks need to pull over to allow cars to pass. Photos from HE’s site visit are provided in Appendix D, including Exhibit D-6, which shows vehicles passing on Tyree Chapel Road.

According to the Kentucky Transportation Cabinet’s (KTC) Truck Weight Classification Map, US 31W (Nashville Road) near the Project site is rated for 80,000lb (40-ton) gross vehicle weights.⁵⁸ Gross vehicle weight is the total weight of the vehicle, including passengers and cargo. No weight limit information is available for local roads surrounding the Project site, including Geddes Road, Tyree Chapel Road or Hendricks Road.

Construction related traffic impacts. The Traffic Study assumes 300 round trips per day, reflecting the maximum number of construction workers on-site during the peak period. Given that level of activity (plus the 20 daily delivery truck trips), portions of US 31W (Nashville

⁵⁸ <https://transportation.ky.gov/Planning/Documents/Weight%20Class.pdf>

Road) would experience traffic increases as high as 72 percent during the morning and evening peak “rush-hours”, as shown in Exhibit 5-13. However, if workers travel to the Project site in groups of four (carpooling) from the nearby hotels, the number of daily vehicle round trips would decrease to 75 round trips per day for workers and 20 round trip truck trips per day. With carpooling, the increase in US 31W traffic volumes would be much less, but the increase would still be considerable at 21 percent during the morning and evening peak “rush-hours” (Exhibit 5-13).

Exhibit 5-13.

Change in Traffic Volumes on US 31W, Peak Construction Period, with and without Carpooling

	<u>Morning Peak Hour</u>		<u>Evening Peak Hour</u>	
	<u>NB</u>	<u>SB</u>	<u>NB</u>	<u>SB</u>
Trips Assuming No Carpooling				
Existing Trips	468	399	399	468
New Trips	32	288	288	32
Increase	7%	72%	72%	7%
Trips Assuming Carpooling	10	85	85	10
Increase	2%	21%	21%	2%

Note: NB indicates Northbound; SB indicates Southbound.

Source: Horus Kentucky 1, LLC, September 2021.

The traffic impacts described in Exhibit 5-13 reflect peak period activity (with and without carpooling); the peak construction period is expected to last approximately four months. At other times during the 12-month construction period, traffic impacts would be considerably less.

- Assuming no carpooling, as many as 320 vehicles (including workers and trucks) would use Geddes Road, Tyree Chapel Road and Hendricks Road on a daily basis. Although the percentage increase in traffic cannot be calculated without knowledge of existing traffic levels on those roads, HE assumes that the increases will be noticeable, but affect few other drivers. Given the assumed light levels of traffic on those local roads, Project traffic is likely to be noticeable to local drivers even with carpooling.
- The types and weights of Project truck traffic has not been provided, but an increase of 20 truck roundtrips per day will likely be noticeable to residents.
- The narrow roads in the Project area will cause drivers to pull over to pass each other and will increase the inconvenience to local residents during the construction period.

This information suggests that carpooling will be important to minimizing traffic impacts for local residents.

Impacts to railways. The extent to which Project traffic will impact the local CSX railway is unknown. The Applicant should work with CSX to determine if railway crossings by Project delivery trucks will be an issue.

Operations related traffic impacts. With fewer than ten staff members working regular business hours and the occasional off hours maintenance and repair, traffic impacts during operations should be minimal. HE does not expect significant traffic effects related to operation of the facility.

Road degradation. The lack of information about the weight limits, types of existing traffic (especially large trucks) and baseline traffic levels on some roads make it difficult to predict if road degradation will occur. However, the Kentucky Transportation Cabinet (KTC) offers information about the conditions and limitations associated with some roads.

The KTC's Pavement Conditions interactive map provides data regarding road conditions for individual segments of state and county roads; pavement conditions data are not available for local or city roads.⁵⁹ Pavement conditions are measured by several factors, including an International Roughness Index (IRI) and a Pavement Distress Index (PDI); higher values of these indices indicate rougher pavement or poorer pavement conditions. The portion of US 31W (Nashville Road) near the Project site has an IRI of 73.92 and a PDI of 0.15; that route is color coded green (on a scale of green, yellow and red) and treatments are recommended to occur by 2026. HE interprets these data to mean that US 31W near the Project site is currently in good condition. No pavement conditions data is available for Geddes Road, Tyree Chapel Road or Hendricks Road.

According to the Kentucky Transportation Cabinet's Bridge Data Miner interactive map, no bridges are located on the roads identified for Project access.⁶⁰

Given the estimates of Project generated traffic during construction and the available information about road and bridge conditions, the Applicant should be prepared to repair any damage due to commuting workers or heavy trucks traveling on the local roadways.

Fugitive dust. Fugitive dust should not be an issue given the Applicant's proposed efforts to reduce dust with the application of water. However, the Applicant did not address other mitigation efforts such as ground cover and other vegetation.

Conclusions and recommendations. Based on our review of the SAR and subsequent information provided by the Applicant, as well as other secondary research conducted regarding roads and dust, HE offers the following conclusions regarding traffic, fugitive dust, and road degradation:

⁵⁹ <https://maps.kytc.ky.gov/pavementconditions/>

⁶⁰ <https://maps.kytc.ky.gov/bridgedataminer/>

- The nature of the local access roads will require that drivers pull over for large vehicles. While residents may be accustomed to this, especially considering farm equipment in the area, this might be a point of dissatisfaction.
- Construction traffic will likely be noticeable on local roads surrounding the Project site, including Geddes Road, Tyree Chapel Road and Hendricks Road. However, few homes are located in that area and few vehicle trips may occur on those roads, reducing the potential impacts to residents and drivers.
- Construction worker carpooling will minimize traffic-related effects, including the potential for congestion, accidents, noise or dust issues.
- Delivery of the transformer will require three heavy trucks, at least one of which is anticipated to have a total gross weight of approximately 90 tons. To access the substation location, those trucks will drive on Geddes Road, Tyree Chapel Road and Hendricks Road. It is likely that those roads are not rated for such heavy weights.
- During construction, commuting worker and Project-related truck traffic will constrict existing road travel, affecting a relatively small number of motorists.
- Given the small number of employees on-site during operations, HE does not anticipate any noticeable traffic impacts during the operational period.
- Fugitive dust should not be an issue given the Applicant's proposed efforts to reduce dust with the application of water.

Need for mitigation. The Applicant should consider certain mitigation to reduce impacts associated with traffic and dust:

1. The Applicant should work with the Commonwealth road authorities and the Simpson County Road Department to perform road surveys, before and after construction activities, on all roads to be used by construction vehicles.
2. The Applicant should develop information about the exact truck types and weights for daily truck traffic and use that data in consultations with the KTC and Simpson County Road Department. That data should also be submitted to the Siting Board as soon as it is available
3. The Applicant will consult with the Kentucky Transportation Cabinet (KTC) regarding truck and other construction traffic and obtain necessary permits from the KTC.
4. The Applicant will consult with the Simpson County Road Department regarding truck and other construction traffic and obtain necessary permits from the Simpson County Road Department.

5. The Applicant will comply with any road use agreement executed with the Simpson County Road Department. Such an agreement might include special considerations for overweight loads, routes utilized by heavy trucks, road weight limits and bridge weight limits.
6. The Applicant will fix or fully compensate the appropriate transportation authorities for any damage or degradation to roads that it causes or to which it materially contributes to, regardless of its status as a KY Route or local road.
7. The Applicant should develop and follow a traffic management plan to minimize the impacts of any traffic increases and keep traffic and people safe. This should include a carpooling or shuttling system from nearby hotels to the Project site.
8. The Applicant will comply with all laws and regulations regarding the use of roadways.
9. The Applicant should consult with CSX and the KTC, if necessary, to evaluate impacts to the railroad crossing on Geddes Road from Project traffic. If necessary, the Applicant will develop additional, specific mitigation measures applicable to impacts on that CXS railroad crossing.
10. The Applicant will develop a fugitive dust control plan and follow best practices to suppress fugitive dust emissions. The Applicant will monitor dust emissions occurring during construction or operations and adjust activities, if necessary, to minimize dust emissions.

Economic Impacts

Evaluation of the potential economic effects of the Horus Kentucky 1 Solar Project is based on knowledge of the Project's construction timeline and activities and the solar facility's long-term operational activities. Project employment needs, local expenditures (labor, materials/supplies, equipment) and payment of applicable taxes and other fees are considered over the short- and long-term and placed within the context of existing demographic and economic conditions.

General methods of assessment. Both the construction and operational phases should be evaluated to include:

- Detailed understanding of the project: Specific activities to occur, the timeline of those activities, geographic extent of project effects;
- Quantification of direct effects: Number of employees and range of wage levels, materials purchases, supplies and equipment and associated sales tax payments, other tax payments including property taxes. Determining the portion of purchases to occur in the local area or within the Commonwealth is key;

- Estimation of total effects: Use of region and industry specific multipliers to estimate indirect and induced effects to calculate total effects such as employment, income and overall economic activity;
- Other social or economic benefits, including potential non-monetary benefits, to the local community or surrounding area; and
- Potential curtailments or impacts to other industries.

Summary of information provided by the Applicant. The Horus Kentucky 1 Application included an Economic Impact Analysis (Appendix E of the Application) prepared by Terracon Consultants, Inc. That report includes a discussion and explanation of the Project's economic benefits, including estimates of employment, labor income, total economic output and tax revenues generated by Project construction and operations for Simpson County. In response to HE inquiries, the Applicant provided additional information regarding construction and operational expenditures and tax payments.

Excerpts from the Applicant's economic impact analysis and supplemental materials included the following:

Capital investment: Capital investment for the Horus Kentucky 1 Project is estimated at approximately \$80 million. Much of the total expenditures for this project are expected to be spent outside of Simpson County or Kentucky, including the solar panels, trackers and other major equipment. The Applicant has requested that this information remain confidential. Because this equipment is typically manufactured outside of Kentucky, spending on the equipment is not expected to directly affect the economies of Simpson County or Kentucky. However, the Project contractor will arrange for local purchase of certain materials and services as construction commences, as available.

Construction employment and earnings: Construction of the facility is anticipated to require approximately 100 full-time equivalent (FTE) workers over the 12-month construction period.⁶¹ Approximately 30 FTEs are expected to be hired from within Simpson County. Given the circulation of construction-related monies throughout the local area, the Project would also generate some additional new jobs, or FTEs, in Simpson County, in other economic sectors.⁶² The Applicant has requested that estimates of construction-related labor income and associated payroll taxes be kept confidential; however, those dollars will provide economic benefits to the local area.

Operational employment, earnings and expenditures: Horus Kentucky 1 anticipates hiring three to four local technicians and maintenance employees to perform the Project's regular operation and maintenance work, including periodic motor replacement, inverter air filter replacement, fence repair, vegetation control, and array inspection, repairs and maintenance. Salaries for those employees are estimated to be approximately \$50,000 per FTE

⁶¹ 1 job = 1 FTE = 2,080 hours worked in one year. A part-time or temporary position would constitute a fraction of one job or FTE. Therefore, the number of individual people hired for construction will likely be greater than the estimated number of FTEs.

⁶² These are referred to as indirect and induced jobs.

per year. An estimated \$50,000 would be spent in Simpson County on materials and equipment annually. Local purchases would relate mainly to repair and replacement of existing equipment. Supplies such as wire, consumables, landscaping equipment, fencing and gravel would be among the most common purchases.

Property taxes: The Applicant is “currently in the process of determining what the tax treatment by the State and County will be and are still working to determine if they will be using an assessment and depreciation schedule, replacement value or income method to determine our annual tax bill.” According to supplemental materials submitted to the Siting Board, “the Applicant is currently compiling the information necessary to prepare the full tax analysis and will supplement its Application with that information once it is available.”

HE’s evaluation of impacts. An economic impact analysis can be an opportunity to identify the monetary and other benefits provided by Project construction and operational activities. Little information was offered by the Applicant, limiting a meaningful quantification and discussion of the monetary and other benefits and context to determine the magnitude of those benefits:

- For most solar facilities, the purchase of materials, supplies and equipment makes up a large portion of total project construction costs. In response to HE inquiries, the Applicant notes that a portion of the materials and supplies required for construction would be sourced from within Simpson County. The majority of the Project’s capital expenditures are anticipated to occur out-of-state, limiting the economic benefits to the Commonwealth. Therefore, the economic benefits of construction will come mainly from labor activities.
- It is also important to note that direct construction jobs, as well as indirect and induced, will be temporary, resulting from the 18-month construction period. Additionally, the portion of construction period jobs realized for Simpson County residents will depend on the number of available and qualified workers in the area.
- Annual operations and maintenance expenditures for the Project would be small. The majority of economic benefits generated during operations would result from employee earnings and property tax payments; however, a detailed tax analysis has not been completed by the Applicant.
- Property taxes distributed to local entities within Simpson County will provide additional revenue for these agencies; however, those payments will generally amount to a small percentage of total tax revenues for any individual entity.
- Landowner leases are not mentioned in the economic analysis. Those landowners will realize direct benefits from the Project via lease payments.

Conclusions and recommendations. Estimates of construction worker employment, labor income, economic outputs and indirect and induced effects were revised throughout this review process, and the resulting economic impact study is unclear and unsupportable. The information provided was markedly different across subsequent submittals and inconsistent.

The Applicant also requested that specific information be kept confidential. Additionally, some information is missing altogether, i.e. the operational period tax analysis. Therefore, HE's conclusions are largely qualitative and high-level in nature.

Construction and operation of the Horus Kentucky 1 facility will provide some limited economic benefits to the region and to the Commonwealth. Overall, the Project will result in measurable, but temporary, positive economic effects to the region during the construction phase. Construction activity will generate regional employment and income opportunities; those effects will be temporary, but local hires will increase employment and incomes to an area that needs it. Most construction purchases will be made outside of Kentucky.

Operational economic benefits will be confined mostly to property tax revenues, although these are assumed to be relatively minor. Those payments will generally amount to a small percentage of total tax revenues for any individual public entity. Operational employment will be minimal, and purchases of materials or supplies will be very small on an annual basis.

Need for mitigation. Socioeconomic impacts of the Horus Kentucky 1 facility represent a positive, albeit small, contribution to the region. The following mitigation measures could be implemented to increase economic benefits within Simpson County and provide more detailed information about the Project's local economic benefits:

1. The Applicant should attempt to hire local workers and contractors to the extent they are qualified to perform the construction and operations work.
2. The Applicant should consider all opportunities to optimize local benefits; for example, by purchasing as many materials as possible in the local area during construction and operation.
3. The Applicant should prepare and submit to the Siting Board a complete and detailed property tax analysis, providing, at a minimum, the total amount of property tax revenues generated by Project operations; the annual amount of property tax revenues generated by Project operations for each year of the Project; the annual distribution of property tax revenues to each applicable taxing entity within Simpson County; and the methodologies on which those estimates are based.

Decommissioning Activities

Decommissioning is the process of safely closing the solar facility to retire it from service at the end of its useful life, and subsequently returning the land to its original condition. This might include removal of solar panels and all associated facilities, and restoration of the property to pre-Project conditions. Although not specifically addressed in the statutes, the Siting Board requested that HE discuss the potential impacts associated with decommissioning activities.

General methods of assessment. The types of impacts likely to result from decommissioning might be similar in nature to those experienced during construction. For example, workers would need to commute to the site daily, trucks would be required to haul

equipment away using local roads and noise may be generated by all of the activity. Therefore, the methods of assessing decommissioning impacts would be similar to those employed to evaluate the construction phase effects. Removal and disposal of the project components should also be addressed in this assessment.

Summary of information provided by the Applicant. According to the Applicant, the Horus Kentucky 1 solar facility would have an expected useful life of 30 to 40 years.

Franklin-Simpson County Zoning Regulations. The Franklin-Simpson County Zoning Regulations applicable to solar farms are brief regarding decommissioning requirements. They require the Applicant to develop a “decommissioning plan that describes the anticipated life of the solar farm, the estimated costs in current dollars, the method for ensuring that the funds will be available for decommissioning and restoration and the manner in which the farm will be decommissioned and the site restored.” The regulations go on to state that “following a six-month period in which no electricity is generated, the permit holder will have six months to complete decommissioning of the solar farm. Decommissioning includes removing of solar panels, buildings, cabling, electrical components, and any other associated materials.”

Decommissioning plan and activities. The SAR notes that the Phase 1 Environmental Site Assessment “provides a baseline for returning the property to its current condition after Project decommissioning.” The Applicant provided the following information about decommissioning activities:

- **Panel Disposal:** Solar panels will be removed from the racking and removed from site. It is expected that the panels will be recycled at the time, but if that is not possible, they would be landfilled according to the then current State disposal regulations.
- **Concrete Disposal:** The project is expected to have approximately 3,500 tons of concrete between the inverter pads and post grouting. The inverter pads will be broken up and removed from site along with the post grouting, which will be pulled from the ground. This concrete is expected to be recycled at the time.
- **Metals disposal:** (1) Copper - there will be 539 tons of copper which will be recycled. All wire will be removed from site, including any wire that was buried. (2) Aluminum -there will be 1,463 tons of aluminum which will be recycled. Most of this material is part of the racking system which will be removed from the steel posts. (3) Steel - there will be 4,312 tons of steel which will be recycled. Most of this material is part of the post support system which will be pulled from the ground along with the concrete grout. The grout will be separated and recycled as detailed above.
- **Inverter Disposal:** Inverters will be removed in one piece and expectedly sent to a recycling center to remove the different types of metals
- **Site Restoration:** The maintenance shed, and fence may or may not be removed based on the wishes of the landowner at the time. Once all the materials have been removed

from the site, the post holes will be filled with local clean fill and the site will be disked and a local fescue will be planted unless the landowner has other planting requirements.

All Project facilities (above and below ground) will be removed from the Project site, assuming the landowner does not wish to keep the fence and / or maintenance shed.

Additionally, Application materials state that lease contracts with the landowners require the Applicant to return the site in the condition in which it was received.

Anticipated decommissioning costs. The Applicant provided an estimated decommissioning cost of approximately \$2,329,000. According to the Applicant, the current scrap value of the metals, including copper (539 tons), steel (4,312 tons) and aluminum (1,463 tons), is estimated to be approximately \$5,863,000. The Applicant fully expects to receive funding from the eventual decommissioning contractor following the completion of the work.

Decommissioning bond and securities. The Applicant will secure a decommissioning bond naming the two individual participating landowners and Simpson County as beneficiaries. Each landowner could draw on that bond, if necessary. If Simpson County is not satisfied with the final site remediation, the County could also draw on the bond to remediate any items in the original Conditions of the Conditional Use Permit that were not completed. Negotiations as to the amount of that bond are currently on-going with Simpson County and are expected to be completed by early November 2021.

Lease agreements with each landowner require that the Applicant post a decommissioning bond. Each lease agreement includes a \$50,000 surety bond or Letter of Credit with a credit worthy financial institution for the entire length of the lease period of the agreement. Those amounts were based on good faith negotiations with each landowner following a discussion on the expected decommissioning costs. Simpson County has yet to settle on the appropriate amount for the decommissioning bond, but the Applicant anticipates the total security to be well over \$100,000. Any funds available would be utilized to return the site to its original condition if Horus Kentucky 1, LLC is unwilling or unable to perform the remediation at the end of the lease term

HE's evaluation of impacts. The impacts of decommissioning activities are likely to be somewhat smaller than those of construction. Fewer workers may be able to complete facility removal activities in a shorter time period, as compared to construction activities. Additionally, decommissioning work may not require the same level of experience or skill sets as project construction, resulting in the employment of more general laborers at lower wages. Therefore, the benefits to local employment and income during decommissioning would be somewhat less than those described for the construction phase.

Conclusions and recommendations. HE believes that decommissioning the facility and returning the site to its original condition can be accomplished once all the components will be removed. After reclamation, the Applicant would return the land to its pre-Project productive use and property value, and eliminate long term Project-related negative impacts, compared with simply shutting the solar facility. This process will also have a modest and temporary positive economic stimulus to the region.

The Applicant has suggested that economic incentives exist for decommissioning, but HE believes that is highly uncertain due to costs for decommissioning and metal prices 30 years in the future. Negotiations with Simpson County regarding the amount of the decommissioning bond are currently underway; all cost data and assumptions should be clearly identified and thoroughly explained to County officials prior to the conclusion of the negotiations.

Need for mitigation. The Applicant's approach to decommissioning and restoration includes removal of above ground and underground structures associated with the Project, as well as site restoration activities. Commitments regarding land restoration are included in individual lease agreements with participating landowners. To ensure that all decommissioning commitments are met, we recommend the following:

1. The Applicant will abide by all applicable requirements regarding decommissioning, pursuant to the Franklin-Simpson County Zoning Regulations for solar facilities.
2. The Applicant should develop an explicit decommissioning plan. This plan shall be filed with the Siting Board or its successors as well as Simpson County. This plan should commit the Applicant to removing all facility components from the Project site and Simpson County at the cessation of operations. Fencing and the maintenance shed shall also be removed unless the landowner states in writing that they prefer those to remain in place.
3. The Applicant, its successors, or assigns shall decommission the entire site if the Project ceases producing electricity for a period of six (6) months as per County regulations. Decommissioning shall involve the removal of all solar panels, racking, and equipment including concrete pads and trenched electrical wiring.
4. As applicable to individual lease agreements, the Applicant, its successors, or assigns will abide by the specific land restoration commitments agreed to by individual property owners, as described in each signed lease agreement and according to County requirements.
5. The Applicant will file a decommissioning bond equal to the amount necessary to complete site decommissioning and restoration activities, naming Simpson County as a third-party beneficiary of that bond, so that Simpson County will have the authority to draw upon the bond to effectuate the decommissioning plan. The bond amount will be set by Simpson County and shall be in place by the commencement of operations.
6. The amount of the decommissioning bond should be reviewed and updated every five years at the expense of the Applicant to determine and update the cost of facility removal.
7. If the Applicant proposes to retrofit the current proposed facility, it shall demonstrate to the Siting Board that the retrofit facility will not result in a material change in the pattern or magnitude of impacts compared to the original project. Otherwise, a new Site Assessment Report will be submitted for Siting Board review. The term retrofit is

defined as the facility being re-designed such that the facility has a different type of operations or function, i.e., no longer operates as a solar electric generation facility.

8. The Applicant shall also prepare a new Site Assessment Report for Siting Board review if the Applicant intends to retire the currently proposed facility and employ a different technology.

Public Outreach and Communication

The Application details the public involvement activities undertaken by Horus Kentucky 1, LLC staff. Those activities included the following events and actions taken to notify and inform Simpson County officials and residents about the Project:

- Public meetings and events:
 - A public meeting for the Project was held on March 25, 2021, at the Simpson County Historical Center in Franklin, Kentucky. A Notice of Public Meeting was published in the Franklin Favorite, a newspaper of general circulation within Simpson County, on March 13, 2021. An additional notice was published in the Franklin Favorite on March 18, 2021. Fliers were posted at the location of the public meeting as of March 12, 2021.
 - The meeting allowed for in-person attendance and was also made available through a digital “virtual” meeting platform, which could be accessed through a web browser as well as through a call-in number.
 - According to the Application, only two community members attended the public meeting, both of whom are adjacent landowners.
- Outreach to surrounding landowners and others:
 - Letters were mailed to 24 landowners whose properties border the Project on March 10, 2021. Those packages included a letter, project flier and notice of public meeting.
 - Notice of the Application was sent to the 24 adjacent landowners by certified mail on June 8, 2021 and published in the Franklin Favorite on June 10, 2021.

As part of HE’s site visit to the Project area, HE met with the Simpson County Judge Executive, Mr. Mason Barnes. Mr. Barnes indicated that every landowner that owns property adjacent to the Project site was notified of the Project. He has heard very little feedback regarding the Project and no negative feedback. He has not received any complaints about the Project. Mr. Barnes also said that Simpson County is a big county and that very few people show up to public meetings.

The lack of public awareness of the Project and lack of public engagement in general were sentiments that were re-iterated in HE’s interviews with the Simpson County Planning & Zoning Administrator, Mr. Carter Munday, and the Simpson County Property Valuation

Administrator, Ms. Alison Cummings. Both individuals indicated that local residents do not tend to follow the local newspaper or radio stations and generally hear about these types of projects through word of mouth, if at all.

Need for mitigation. Because of the limited attendance at the local public meeting and the general sense of local unawareness of the Project, it is suggested that the Applicant pursue additional public outreach and engagement activities within Simpson County.

Complaint Resolution

The Applicant has stated that they will continue to work with local landowners and the public to resolve any potential issues during construction or operations, should such issues arise.

According to the Applicant, “there will be a procedure for complaints resolution that will be both hierarchical and based on where the complaint was received. Any formal or informal complaints from the County building inspector (Ron Tabor) will be directed to the on-site construction manager, with a copy sent to the Applicant. If the complaint cannot be solved by the construction manager, it will be resolved by the Project manager assigned by the Applicant. If the complaint is received directly from a neighbor or outside interested party, the on-site construction manager will again notify the Applicant and try to resolve the complaint. If there is a failure at that level, the Applicant will then resolve the dispute with the complainant.”

Need for mitigation. The Applicant’s described approach to resolving complaints is vague and generally undefined. A formal process for addressing complaints should be developed and followed during the construction and operational periods to address any issues associated with visual, noise or other Project-related impacts. The following measures should be undertaken to implement a complaint resolution process:

1. The Applicant should develop a complaint resolution plan that describes the process for filing complaints during construction and during operations, and this plan should be provided to Simpson County and the Siting Board. The complaint resolution plan should explain how the complaint will be addressed; the timeframe in which a complainant can expect a response; and an explanation of how resolution will be determined if the complainant is not satisfied with the response from the Applicant.
2. The Applicant should submit to the Siting Board, annually, a status report associated with the complaint resolution plan, recounting the individual complaints, how the Applicant addressed those complaints and the ultimate resolution of those complaints, and whether or not the resolution was to the complainant’s satisfaction.

SECTION 6

Recommended Mitigation

This section identifies actions the Applicant can take to mitigate potential negative impacts on certain regional resources. Other regulatory processes will determine the need for particular actions; these are only noted here, and Harvey Economics makes no recommendation as to their merit. Beyond those actions, HE recommends a list of mitigation actions for Siting Board and Applicant consideration.

Regulatory Actions and Mitigation Outside Siting Board Jurisdiction

The Siting Board should be aware of the following permitting and regulatory actions that will require Applicant compliance and possible mitigation efforts. No action on these actions is required by the Siting Board since these are outside the Siting Board's jurisdiction. The Mitigation Measures & Conditions section of the SAR includes the following:

- A Wetland Delineation was conducted for the Project. Identified wetlands and jurisdictional waters will be avoided during construction and operation of the Project. It is not anticipated that the Project will utilize U.S. Army Corps of Engineers (USACE) Nationwide Permits.
- A Threatened & Endangered Species Survey was prepared for the Project. The presence of potential habitat for the Indiana and Northern Long-Eared Bats requires that any tree clearing would need to be performed during the off-season or additional investigations and consultation with regulatory agencies may be necessary. However, as denoted on the site development plan, the forested areas are denoted as "avoidance areas" and tree clearing is not proposed for the construction or operation of the Project.
- Based on the scope of the proposed construction activities, the Project would likely require a Kentucky Pollutant Discharge Elimination System (KPDES) construction general permit issued by the Kentucky Energy and Environment Cabinet. A general KPDES permit would require the development of a Stormwater Pollution Prevention Plan (SWPPP) and implementation of approved pollution prevention measures. The SWPPP would address the design, inspection, and maintenance of Best Management Practices (BMPs) utilized during construction activities.
- A Conditional Use Permit (CUP) issued by the Franklin-Simpson County Zoning Board of Kentucky would be required for the Project.
 - Supplemental information provided by the Applicant, along with an interview with the Simpson County Planning & Zoning Administrator, show that two CUPs have been approved, covering the entire Project site. In addition to the approved CUPs, the Applicant must also submit a detailed Development Plan

for the Project to the Simpson County Planning a& Zoning Board for approval. That process was described in Section 3 of this report.

Mitigation for Siting Board and Applicant Consideration

The following mitigation measures are based upon: (1) Applicant commitments set forth in the SAR; (2) measures discussed with the Applicant in subsequent information exchanges or discussions; and (3) additional mitigation steps HE believes will reduce or eliminate negative Project impacts and are reasonable for the Applicant to undertake.

In performing this comprehensive review of the Horus Kentucky 1 Application and supplemental materials, HE has gained an understanding of the Project, the location, the construction and operational activities, the Applicant's intentions, and the Project's impacts. Our recommended mitigation actions are intended to reduce or eliminate potential adverse impacts.

A. Site development plan:

1. A final site layout plan should be submitted to the Siting Board upon completion of the final site design. Deviations from the preliminary site layout plan, which formed the basis for HE's review, should be clearly indicated on the revised graphic. Those changes would include, but are not limited to, location of solar panels, inverters, transformer, substation, maintenance shed or other Project facilities or infrastructure.
2. Any change in Project boundaries from the information which formed this evaluation should be submitted to the Siting Board for review.
3. The Siting Board will determine if any deviation in the boundaries or site development plan is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required, but if yes, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.
4. A final Project-specific construction schedule, including revised estimates of on-site workers and commuter vehicle traffic, should be submitted to the Siting Board. Deviations from the preliminary construction schedule should be clearly indicated.
5. The Siting Board will determine if any deviation to the construction schedule or workforce estimates is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required. If so, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.
6. The Applicant or its contractor will control access to the site during construction and operation. All construction entrances will be gated and locked when not in use.
7. The Applicant's access control strategy should also include appropriate signage to warn potential trespassers. The Applicant must ensure that all site entrances and

boundaries have adequate signage, particularly in locations visible to the public, local residents and business owners.

8. According to National Electrical Safety Code regulations, the security fence must be installed prior to any electrical installation work. The substation will have its own separate security fences installed.
9. The Applicant will follow all applicable Franklin-Simpson County zoning regulations for solar facilities as described in Section 9.8 of the Zoning Regulations for City of Franklin and Simpson County Kentucky, including the minimum setback requirements for Project facilities and infrastructure. If a setback variance is requested from Simpson County, all materials developed by the Applicant as related to that request should also be provided to the Siting Board.
10. The Applicant will submit a detailed Development Plan to the Franklin-Simpson County Planning & Zoning Board for approval. A Certificate to Construct would not be granted by the Siting Board until the Development Plan is approved by the Franklin-Simpson County Planning & Zoning Board.

B. Compatibility with scenic surroundings:

1. The Applicant will not remove any existing vegetation unless the existing vegetation needs to be removed for placement of Project infrastructure, including solar panels, or security fencing.
2. Existing vegetation between the solar arrays and the residences will be left in place, to the extent practicable, to help screen the Project and reduce visual impacts from the nearby homes and roadways.
3. The Applicant will work with homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors.
4. The Applicant will prepare a vegetative buffering plan and submit it to both the Franklin-Simpson County Planning & Zoning Board and the Siting Board. This plan should be in full compliance with the County regulations.
5. The Applicant will provide a visual buffer between Project infrastructure and residences or other occupied structures with a line of sight to the facility to the satisfaction of the Franklin-Simpson County Planning & Zoning Board. If vegetation is used, plantings should meet the height and density requirements of the Franklin-Simpson County zoning regulations.
6. To the extent that an affected property owner indicates to the Applicant that a visual barrier or vegetative buffer is not necessary, Horus Kentucky 1 will obtain that property owner's written consent and submit such consent in writing to the Siting Board and to the Simpson County Planning & Zoning Administrator. The Simpson County Planning

& Zoning Administrator will determine whether the Applicant will be required to develop a buffer in that area.

7. The Applicant should plant vegetative buffers to surround the Kitchens Cemetery, to reduce or eliminate views of solar panels or other Project infrastructure from that location.
8. If the final site layout plan deviates from the preliminary plan with regard to the locations of solar panels, inverters, substation or other Project infrastructure, an additional evaluation of the need for vegetative buffers will be conducted and reviewed by the Siting Board.
9. Landscape screening will extend and connect to existing site vegetation, if any, to help create a more natural transition between existing vegetation and developed.
10. The Applicant will develop a vegetation management plan that describes the approach and procedures for maintaining or replacing vegetative buffers as needed. This plan will be developed pursuant to the applicable Franklin-Simpson County zoning regulations.
11. The Applicant should consider cultivating and maintaining multiple acres of native pollinator-friendly species on-site to help offset lost pollination opportunities from crops.
12. The Applicant should use anti-glare panels and operating the panels in such a way that glare from the panels is minimized or eliminated. The Applicant will develop a plan that addresses any potential glare issues along the Project boundaries. The Applicant will immediately adjust solar panel operations upon any complaint about glare from those living, working, or traveling in proximity to the Project. Failing this, the Applicant will cease operations until the glare is rectified.

C. Potential changes in property values and land use:

1. No unique mitigation measures are recommended related to potential impacts to property values or adjacent land uses because other mitigation can accomplish this. However, close coordination by the Applicant with impacted and concerned homeowners regarding these mitigation measures should be initiated.

D. Anticipated peak and average noise levels:

1. The Applicant should notify residents and businesses within 2,400 feet of the Project boundary about the construction plan, the noise potential, and the mitigation plans at least one month prior to the start of construction.
2. The Applicant should remain in contact with nearby residents to confirm that noise levels are not unduly high or annoying during construction. If the noise levels are unduly high or annoying, the Applicant should mitigate those effects as needed.

3. If pile driving activity occurs within 1,500 feet of a noise sensitive receptor, the Applicant should implement a construction method that will suppress the noise generated during the pile driving process (i.e., semi-tractor and canvas method; sound blankets on fencing surrounding the Project site; or any other comparably effective method).
4. Pile driving activities should cease by 6:00 pm each day, except for pile driving locations within 1,500 of a noise receptor, in which case, pile driving should cease at 5:00 pm. Since the area is largely rural, a constant pounding during evening hours has the potential to upset the natural tranquility of the area and severely annoy residents.
5. The Applicant should limit the construction activity, process and deliveries to the hours of 8:00 am to 6:00 pm, Monday through Saturday. No construction work should be conducted on Sundays. These hours represent a reasonable timeframe to ensure that nearby property owners are not unduly impacted by construction activities.
6. When possible, construction crews should avoid simultaneous use of multiple sources of loud equipment in the same area.
7. If repairs or maintenance activities occur at night, times that are normally quiet during the operational phase, crews should be aware of nearby homes and reduce loud noise when possible.

E. Road and rail traffic, fugitive dust, and road degradation:

1. The Applicant should work with the Commonwealth road authorities and the Simpson County Road Department to perform road surveys, before and after construction activities, on all roads to be used by construction vehicles.
2. The Applicant should develop information about the exact truck types and weights for daily truck traffic and use that data in consultations with the KTC and Simpson County Road Department. That data should also be submitted to the Siting Board as soon as it is available
3. The Applicant will consult with the Kentucky Transportation Cabinet (KTC) regarding truck and other construction traffic and obtain necessary permits from the KTC.
4. The Applicant will consult with the Simpson County Road Department regarding truck and other construction traffic and obtain necessary permits from the Simpson County Road Department.
5. The Applicant will comply with any road use agreement executed with the Simpson County Road Department. Such an agreement might include special considerations for overweight loads, routes utilized by heavy trucks, road weight limits and bridge weight limits.

6. The Applicant will fix or fully compensate the appropriate transportation authorities for any damage or degradation to roads that it causes or to which it materially contributes to, regardless of its status as a KY Route or local road.
7. The Applicant should develop and follow a traffic management plan to minimize the impacts of any traffic increases and keep traffic and people safe. This should include a carpooling or shuttling system from nearby hotels to the Project site.
8. The Applicant will comply with all laws and regulations regarding the use of roadways.
9. The Applicant should consult with CSX and the KTC, is necessary, to evaluate impacts to the railroad crossing on Geddes Road from Project traffic. If necessary, the Applicant will develop additional, specific mitigation measures applicable to impacts on that CXS railroad crossing.
10. The Applicant will develop a fugitive dust control plan and follow best practices to suppress fugitive dust emissions. The Applicant will monitor dust emissions occurring during construction or operations and adjust activities, if necessary, to minimize dust emissions.

F. Economic impacts:

4. The Applicant should attempt to hire local workers and contractors to the extent they are qualified to perform the construction and operations work.
5. The Applicant should consider all opportunities to optimize local benefits; for example, by purchasing as many materials as possible in the local area during construction and operation.
6. The Applicant should prepare and submit to the Siting Board a complete and detailed property tax analysis, providing, at a minimum, the total amount of property tax revenues generated by Project operations; the annual amount of property tax revenues generated by Project operations for each year of the Project; the annual distribution of property tax revenues to each applicable taxing entity within Simpson County; and the methodologies on which those estimates are based.

G. Decommissioning:

1. The Applicant will abide by all applicable requirements regarding decommissioning, pursuant to the Franklin-Simpson County Zoning Regulations for solar facilities.
2. The Applicant should develop an explicit decommissioning plan. This plan shall be filed with the Siting Board or its successors as well as Simpson County. This plan should commit the Applicant to removing all facility components from the Project site and Simpson County at the cessation of operations. Fencing and the maintenance shed shall also be removed unless the landowner states in writing that they prefer those to remain in place.

3. The Applicant, its successors, or assigns shall decommission the entire site if the Project ceases producing electricity for a period of six (6) months as per County regulations. Decommissioning shall involve the removal of all solar panels, racking, and equipment including concrete pads and trenched electrical wiring.
4. As applicable to individual lease agreements, the Applicant, its successors, or assigns will abide by the specific land restoration commitments agreed to by individual property owners, as described in each signed lease agreement and according to County requirements.
5. The Applicant will file a decommissioning bond equal to the amount necessary to complete site decommissioning and restoration activities, naming Simpson County as a third-party beneficiary of that bond, so that Simpson County will have the authority to draw upon the bond to effectuate the decommissioning plan. The bond amount will be set by Simpson County and shall be in place by the commencement of operations.
6. The amount of the decommissioning bond should be reviewed and updated every five years at the expense of the Applicant to determine and update the cost of facility removal.
7. If the Applicant proposes to retrofit the current proposed facility, it shall demonstrate to the Siting Board that the retrofit facility will not result in a material change in the pattern or magnitude of impacts compared to the original project. Otherwise, a new Site Assessment Report will be submitted for Siting Board review. The term retrofit is defined as the facility being re-designed such that the facility has a different type of operations or function, i.e., no longer operates as a solar electric generation facility.
8. The Applicant shall also prepare a new Site Assessment Report for Siting Board review if the Applicant intends to retire the currently proposed facility and employ a different technology.

H. Public outreach and communication:

1. Because of the limited attendance at the local public meeting and the general sense of local unawareness of the Project, it is suggested that the Applicant pursue additional public outreach and engagement activities within Simpson County

I. Complaint resolution program:

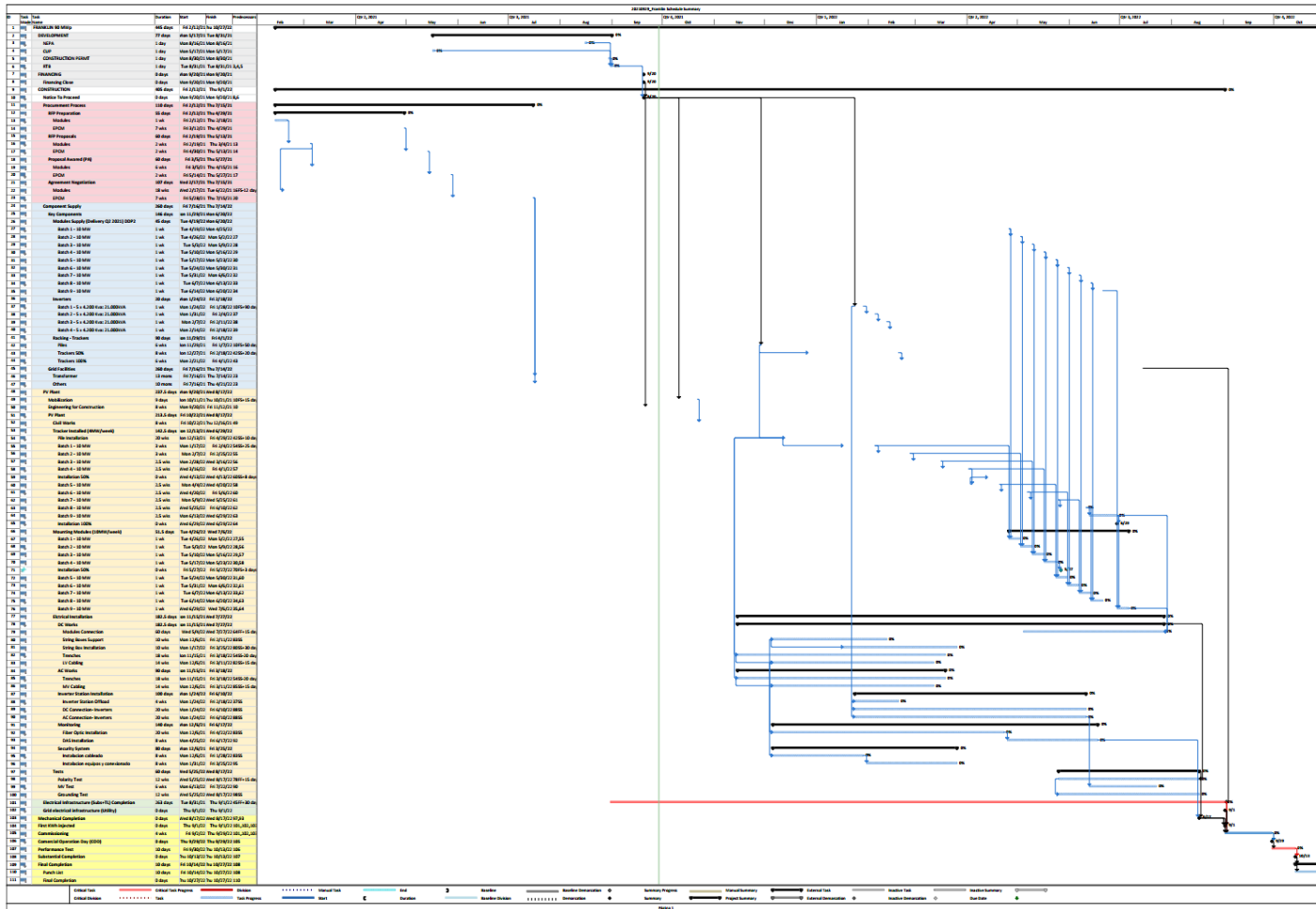
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2. The Applicant should submit to the Siting Board, annually, a status report associated with the complaint resolution plan, recounting the individual complaints, how the Applicant addressed those complaints and the ultimate resolution of those complaints, and whether or not the resolution was to the complainant's satisfaction.

APPENDICES

Appendix A

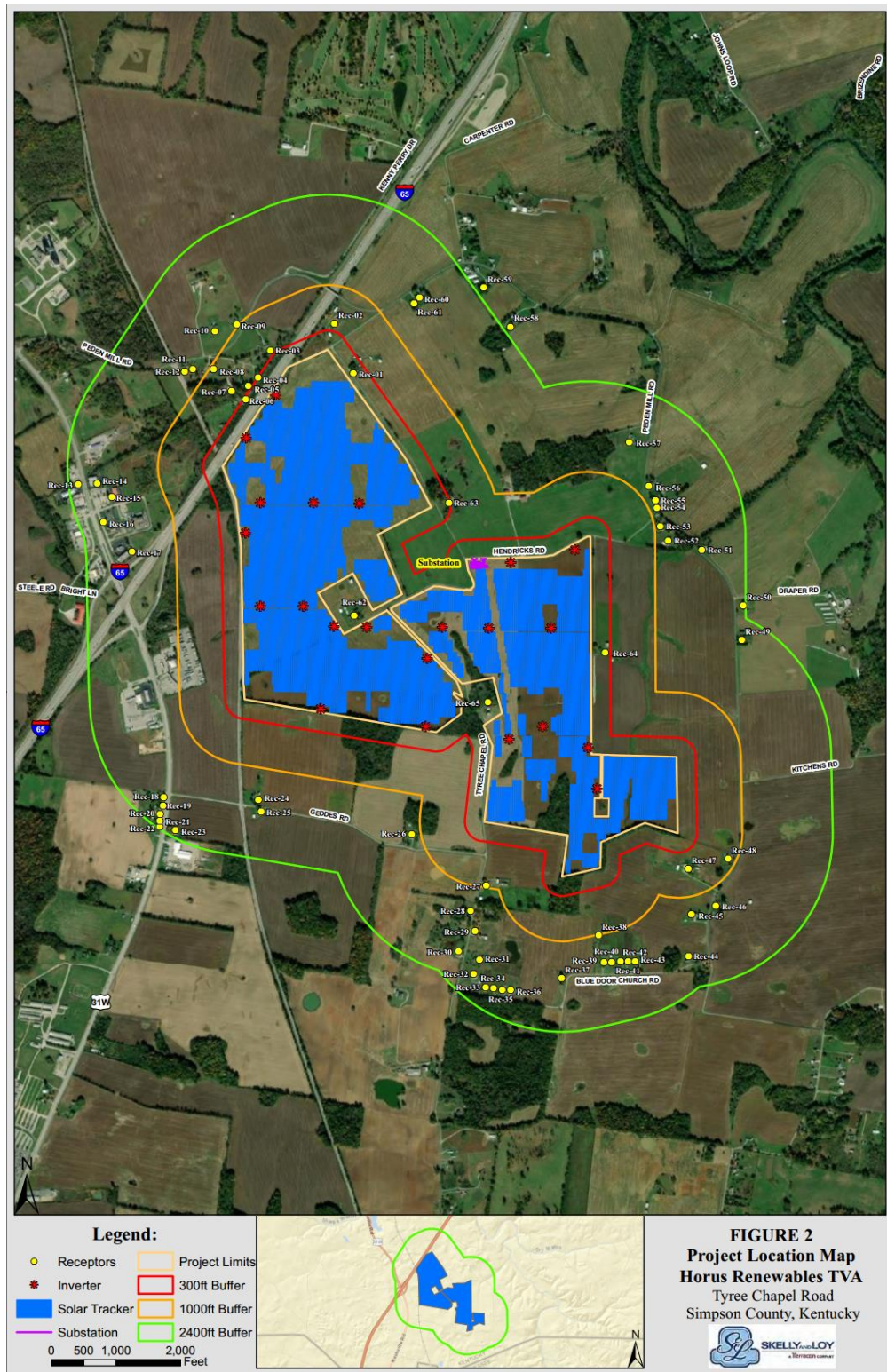
Preliminary Construction Schedule



Source: Horus Kentucky 1, LLC, September 2021.

Appendix B

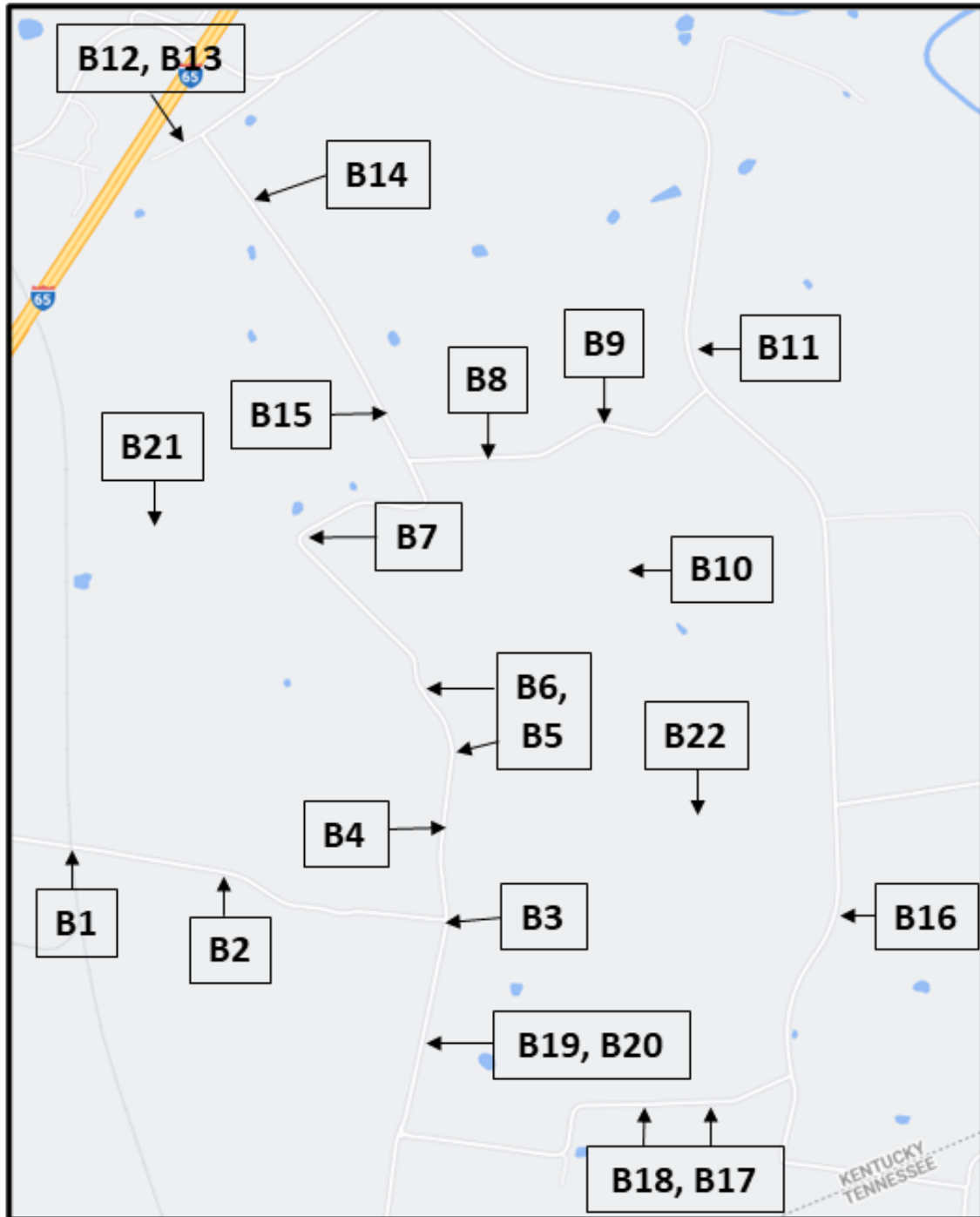
Noise Receptor Location Map



Source: Horus Kentucky 1, LLC, September 2021.

Appendix C

Photo Log Index Map



Appendix D

Site Photos

Exhibit D-1.

CSX Railroad Crossing on Geddes Road, Facing East (first photo) and Facing North (second photo)



**Exhibit D-2.
Geddes Road, Facing West**



**Exhibit D-3.
Intersection of Geddes Road and Tyree Chapel Road**

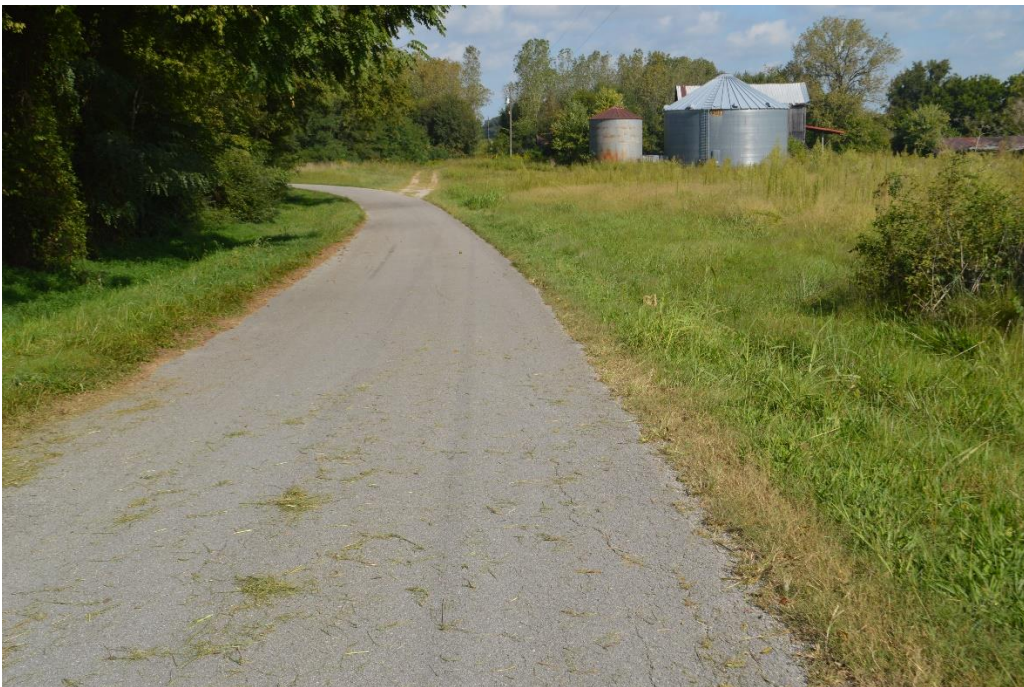


Exhibit D-4.

Tyree Chapel Road, North of the Intersection with Geddes Road, Facing North (first photo) and Facing South (second photo)



Exhibit D-5.
Views from Tyree Chapel Road, North of the Intersection with Geddes Road



**Exhibit D-6.
Vehicles Passing on Tyree Chapel Road**



**Exhibit D-7.
Location of Proposed Entrance on Tyree Chapel Road (near the Excluded Zone), Facing West from Tyree Chapel Road**





Exhibit D-8.
Location of the Proposed Entrance on Hendricks Road



Exhibit D-9.

View from the Eastern Edge of the Project Site, Facing West, from Hendricks Road (first photo) and from a Private Road South of Hendricks Road (second photo)



Exhibit D-10.

Abandoned Home Located along the Eastern Edge of the Project Site, South of Hendricks Road



Exhibit D-11.

Home on Peden Mill Road, East of the Project Site



Exhibit D-12.
Northern Edge of the Project Site, near I-65, Facing North



Exhibit D-13.
Home Located on the Northern Edge of the Project Site, Near I-65



Exhibit D-14.

View of the Project Site from the Northeastern Edge of the Property



Exhibit D-15.

View of the Project Site from Tyree Chapel Road, North of the Intersection with Hendricks Road, Facing West



Exhibit D-16.

View of the Southeastern Portion of the Project Site from an Adjoining Residential Property



Exhibit D-17.

View of the Southeastern Portion of the Project Site, from Blue Door Church Road, Facing North



Exhibit D-18.
Homes along Blue Door Church Road, South of the Project Site



Exhibit D-19.

Tyree Chapel Church, Located on Tyree Chapel Road, South of the Project Site



Exhibit D-20.

Tyree Chapel Road, South of the Project Site



Exhibit D-21.

Applicant Provided Drone Photo of Structures Located within the Excluded Zone, from the Air, Facing West



Exhibit D-22.

Applicant Provided Drone Photos of Kitchens Cemetery, from the Air, Facing South





Appendix E

Selected Zoning Regulations for Franklin-Simpson County, Kentucky

Franklin-Simpson County Zoning Regulations

9.8 Solar Farms 10 ACRES OR MORE (amended addition 1/7/2020)

Zone district allowed: AG, I-1, & I-2

Use permit type: Conditional Use Permitted

Purpose: To allow large scale ground mounted solar power generation projects of 10 acres or more to be permitted under CUP Application in an AG, I-1, & I-2 Zone District only.

Setbacks: 50 feet from any public road right-of-way
250 feet from any abutting residential zoned properties, rural village districts, churches, cemetery, school, or nursing home.
100 feet from any abutting internal or external AG zoned properties.

Height requirements: No structure may exceed the maximum height of 15 feet. However, under special circumstances in the developmental plan phase the planning commission may approve a wavier for up to a maximum 25 feet.

Required parking: 1 Space for every 2 employees on shift of greatest employment plus 1 space for every vehicle used in conduct of such use.

Development plan required: Yes

Development plan requirements: Must display the following:

1. The location and dimensions of all proposed areas for placement of solar panels, screening and fencing and related structures.
2. Any preexisting structures on the same property and principle structures on other properties that would affect placement of solar panels.
3. Parking and access areas.
4. Location of any proposed solar access easements.
5. Locations for wiring interconnections to system components.
6. Site access must be secured by a fence of at least 6 foot in height. A vegetative landscape buffer may be provided between the fence and the property line under the Planning Commission's recommendation for location and type so as long as it does not impair the system efficiency.
7. Site must adhere to the applicable sections of the international building code and national electric code.
8. Any glare generated by the system must be mitigated or directed away from adjoining property or adjacent roadway when it creates a nuisance or safety hazard for passing motorist.
9. Decommissioning plan that describes the anticipated life of the solar farm, the estimated costs in current dollars, the method for ensuring that the funds will be available for decommissioning and restoration and the manner in which the farm will be decommissioned and the site restored. Following a six-month period in which no electricity is generated, the permit holder will have six months to complete de commissioning of the solar farm. Decommissioning includes removing of solar panels, buildings, cabling, electrical components, and any other associated materials.
10. Property must be maintained to standards maintained within international property maintenance codes and local ordinances. (added 1/7/2020)

Franklin-Simpson County Zoning Regulations

Article 14 Landscape and Land Use Buffers

14.1 Intent

The intent of this Article is to improve the appearance of vehicular use areas and property abutting public rights-of-way; to require buffering between non-compatible land uses; and to protect, preserve, and promote the aesthetic appeal, character, and value of the surrounding neighborhoods; to promote public health and safety through the reduction of noise, pollution and light glare.

14.2 Sites Affected

14.2.1 New Development

Any new development, building, structure or vehicular use area (VUA) hereafter created and used in a district requiring landscaping to be provided as required by the provisions of this Article.

14.2.2 Existing Sites

No building, structure, or vehicular use area may be enlarged or expanded unless the minimum landscaping required by the provision of this Article is provided when the expanded area is for a multi-family, commercial or industrial land use. The provisions of this Article will apply only to the area altered or expansion and not for the entire property.

14.3 Where Landscape Materials Required

14.3.1 The minimum requirements that shall be met in regard to interior and perimeter landscaping for non-compatible land use areas.

14.3.2 Unless otherwise provided, landscape materials shall be installed to provide a minimum of fifty (50) percent winter opacity, between one (1) foot above finished grade level to the top of the required planting, hedge, fence, wall, or earth mound within four (4) years after installation.

14.3.3 A landscape easement shall be required as a buffer between non-compatible zones and between particular non-compatible land uses. Such easement shall be located adjacent to all common boundaries except street frontage, unless otherwise specified. The following situations shall require landscape easements:

- a. When any other residential zone district adjoins any R-5 zoning district.
- b. When a residential zoning district abuts any business or industrial zoning district.
- c. When a residential zoning district abuts any railroad or interstate highway rights-of-way.
- d. When any residential zone district adjoins a utility substation, salvage yard, land fill, sewage treatment plan, or similar use.

Franklin-Simpson County Zoning Regulations

- e. Where landscaping may be requested as a visual buffer to improve the aesthetics of an area as recommended by the Planning & Zoning Board.

14.3.4 The minimum landscape easement shall be as specified in the zoning district regulations.

14.4 Trees, Planting, Hedge, Fence, Wall, or Earth Mound

14.4.1 Within the landscape easement, one tree per forty (40) feet of linear boundary, or fraction thereof shall be required.

14.4.2 Landscaped buffers required by specific district regulations shall be a continuous planting, hedge, fence, wall, or earth mound at least six (6) feet in height.

14.4.3 Grass or ground cover shall be planted on all portions of the landscape easement not occupied by other landscape material.

14.4.4 Alternative landscaping designs may be proposed or suggested by the local Planning & Zoning Board

14.5 Landscaping At Driveways and Street Intersections

To ensure that landscape materials do not constitute a driving hazard, a site visibility triangle. Reference 7.8.2 and 7.8.3, shall be observed at all street intersections or intersections of driveways or alleys with streets. No landscaped buffer is required in these areas.

14.6 Maintenance and Installation

14.6.1 All landscaping buffers shall be installed in a sound, workmanship like manner and according to accepted good construction and planting procedures. The owner of the property shall be responsible for the continued proper maintenance of all landscaping buffer areas and shall keep them in a proper, neat, and orderly appearance, free from refuse and debris at all times. All unhealthy or dead plant material shall be replaced within three (3) months. Deteriorating or missing materials from a fence shall be repaired, replaced, or refurbished within thirty (30) days.

14.7 Violations

Violation of these installation and maintenance provision shall be grounds for citation by the administrative official as set forth in Article 11.