Appendix D

Prime Farmland Alternatives Assessment

MEMO

Date:

March 25, 2025

To:

Lake Charlotte Solar, LLC

From:

Merjent, Inc.

Subject:

Prime Farmland Assessment
Lake Charlotte Solar Facility and BESS Project, Martin County, MN

1.0 INTRODUCTION

On behalf of and in coordination with Lake Charlotte Solar, LLC (Lake Charlotte), Merjent, Inc. (Merjent) prepared this memorandum to address siting a utility-scale photovoltaic (PV) solar energy conversion facility (Solar Facility) and associated Battery Energy Storage System (BESS), collectively the Project, in Minnesota on soils designated as prime farmland. Specifically, the purpose of this assessment is to determine whether there is a feasible and prudent alternative to locating the Solar Facility on designated prime farmland. The Lake Charlotte Solar Facility will generate up to 150 megawatts (MW) alternating current (AC) and the BESS will store up to 150 MW (MW). The Project is located in Rutland Township, Martin County, Minnesota (see Figures 1-3).

The Project requires an area of approximately 1,276.7 acres (Land Control Area) within proximity of an existing electric substation with sufficient capacity to serve as the Point of Interconnection (POI) for bringing power generated by the Solar Facility into the existing electrical grid. Lake Charlotte evaluated alternative sites within 5 miles of the proposed POI for the Project, the Southern Minnesota Municipal Power Agency (SMMPA) Rutland Substation, and for comparison, a previously considered alternate project site that was not constructed, known as the Royal Solar Project (see Figure 2).

The proposed POI for the Royal Solar Project was a hydropower dam. The total amount of prime farmland within a five-mile radius of the Royal Solar Project POI was less than that in the five-mile radius of the Lake Charlotte Project; however, the Royal Solar Project was not developed because the proposed POI was ultimately determined to be inadequate because it could not meet the megawattage capacity required for a utility-scale solar project of this size. Although no prime farmland was present within the Royal Solar Project, the location and available POI could not meet the needs of a utility-scale solar project.

This prime farmland assessment is required to demonstrate compliance with Minnesota Rules 7850.4400, subpart 4 (Prime Farmland Rule). The Prime Farmland Rule prohibits large energy power generating plants, such as the Solar Facility, from being sited on more than 0.5-acre of prime farmland per MW of net generating capacity unless there is no feasible and prudent alternative or unless the project meets one of the Rule's exemptions. The BESS is not subject to

the Prime Farmland Rule[1]. The entire Lake Charlotte Project (i.e., Solar Facility and BESS) is expected to occupy approximately 1,004 acres (Preliminary Development Area) within a 1,276.7-acre Land Control Area. The Land Control Area and Preliminary Development Area are sited on prime farmland (see Figures 4 and 4a). Given the 150 MW net generating capacity of the Project, the Rule would allow use of up to 75 acres of prime farmland; however, the Lake Charlotte Preliminary Development Area would occupy approximately 318.0 acres of "prime farmland" and approximately 658.8 acres of "prime farmland if drained".[2] Current land use within the Preliminary Development Area is predominately agricultural row crop production (99.4 percent). The Project would result in the temporary removal of these acreages from row crop production for the life of the Project.

Please note that the total acres of the Preliminary Development Area are overstated by approximately 58.0 acres, which includes soils of primarily prime farmland and prime farmland if drained. The additional acreage allows flexibility in the design to potentially adjust the solar array layout in an area of drainage tile. The drainage tile is in the northeastern portion of the Preliminary Development Area. Lake Charlotte is in the process of coordinating with Martin County to petition for abandonment of the drainage tile. If the county approves the drainage tile abandonment, Lake Charlotte proposes to adjust the layout of the solar arrays to place solar arrays and associated infrastructure in the northeastern portion of the Preliminary Development Area. Figure 3 shows both the current layout for the solar arrays and the potential alternate layout for the solar arrays (labeled as Solar Array – Alternate and shown as tannish - olive shading in Figure 3). If solar arrays are added in the northeast portion of the Preliminary Development Area, some of the arrays shown in green on Figure 3 would not be necessary, resulting in less development area.

In May 2020, the Minnesota Department of Commerce (DOC) Energy Environmental Review Analysis (EERA) issued the *Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternative* (Prime Farmland Guidance) (DOC, 2020). The Prime Farmland Guidance recognizes that, "the State of Minnesota has dual mandates to advance solar energy production and protect prime farmland" and is "meant to assist developers in defining feasible and prudent in relation to siting alternatives." An analysis of factors identified in the Prime Farmland Guidance with respect to site selection and alternative sites is provided in the following sections below.

2.0 PROJECT DESCRIPTION

The Project is located in Rutland Township, Martin County, Minnesota (see Figure 1). The POI is the SMMPA Rutland Substation, which is adjacent to the Land Control Area. The Preliminary Development Area and proposed equipment layout shown in the figures attached to this prime farmland assessment are preliminary and subject to change as the design advances.

The Preliminary Development Area (i.e., the area to be used for construction and operation of the Project) is approximately 1,004 acres (see Figure 4a), which is approximately 78.6 percent of the 1,276.7- acre Land Control Area (see Figure 4). Under the Rule (as applied to this proposed 150 MW Project), no more than 75 acres of prime farmland could be impacted by the Project (i.e., 0.5 acres of prime farmland per MW of net generating capacity) unless there is no feasible and

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[1] Minnesota Session Law 2023, chapter 60, article 12, section 67(b) provides that "Minnesota Rules, Part 7850.4400, subpart 4, does not apply to energy storage systems." Accordingly, the BESS is not subject to the Rule.

[2] The BESS portion of the Project would occupy approximately 15.9 acres of land. Accordingly, if the land to be used for the BESS is removed from this analysis, the remaining Solar Facility land still exceeds the 0.5 acre / MW threshold required by the Rule.

prudent alternative or unless the Project meets one of the Rule exemptions. The Solar Facility does not meet an exemption to the Rule, but the BESS is not subject to the Rule. Of the 1,004 acres of Preliminary Development Area, 976.8 acres (97.3 percent) are considered prime farmland, which includes 318.0 acres (31.7 percent) of "prime farmland" and 658.8 acres (65.6 percent) of "prime farmland if drained". About 23.9 acres (2.4 percent) of the Preliminary Development Area are classified as "farmland of statewide importance", which is not considered prime farmland (see Figure 4a)[3]. However, as demonstrated in this memorandum, there is no feasible or prudent alternative to the proposed Project location; therefore, the Project satisfies the Prime Farmland Rule.

Lake Charlotte attempted to minimize use of prime farmland to the maximum extent practicable when siting the Project. Lake Charlotte also identified and reviewed prime and non-prime farmland designated areas within the Land Control Area (see Figures 4 and 4a), within five miles of the POI (Figures 5), and within Martin County (see Figures 6) for potential sites suitable for development of the Project. Lake Charlotte was unable to identify any locations within five miles of the POI or within Martin County that would fall below the prime farmland thresholds stipulated by the Prime Farmland Rule. Large tracts of non-prime farmland in Martin County are generally associated with floodplains, streams, lakes, and wetlands (see Figure 6). There is no feasible or prudent alternative for the Project Land Control Area within five miles of the POI or within Martin County.

Lake Charlotte has secured land rights with the landowners for the entire Land Control Area via lease option agreements or purchase options. Each landowner was given the option to either sell or lease their land to Lake Charlotte. The collector substation will be located on purchased land. The use of agricultural land for the Project is only temporary during the life of the Project and is reversible.

A Vegetation Management Plan and an Agricultural Impact Mitigation Plan will be implemented during construction and operation of the Project. The anticipated life of the Project is 30 years (with the possibility to extend the life of the Project upon securing the necessary approvals). At the end of operation, Lake Charotte will restore the land to its original condition and the land will likely return to agricultural use or any other use chosen by the landowners. A Decommissioning Plan will be in place to restore the land after the useful life of the Project and, together with the AIMP, will preserve the ability to farm the land after the Project ceases operation.

The Preliminary Development Area incorporates buffers and setbacks from the arrays and allows for flexibility in overall design. Lake Charlotte is coordinating with the Martin County and will work with the county to address any concerns it may have about the Project design and setbacks.

Lake Charlotte will coordinate with Martin County to petition abandonment of the drainage tile in the northeastern portion of the Preliminary Development Area. If approved, Lake Charlotte will incorporate measures to abandon the drainage tile while maintaining flow patterns, any setback requirements, and Project integrity.

The electrical collection lines between the solar arrays/inverters and collector substation (discussed below) will be 34.5 kilovolt (kV) feeders and will be direct buried in a trench at a depth

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[3] Note that soils designated as 'prime farmland if drained' and 'prime farmland if protected from flooding or not frequently flooded during the growing season' were considered prime farmland and were included in prime farmland acreages provided in this memorandum; 'farmland of statewide importance' is, by definition, not considered prime farmland and was not included in prime farmland acreages provided in this memorandum.

approximately four feet below ground. Directional boring may be used to install collectors across some portions of the Project, as applicable.

The Lake Charlotte Project will connect to the grid by tapping into the existing SMMPA Rutland Substation (POI). All electricity generated by the Solar Facility will be routed to a new collector substation with a step-up transformer. The BESS is located adjacent to and connects directly to the west side of the collector substation. A new 161 kV generation-tie line (gen-tie line) that will be less than 1,500 feet, will connect the collector substation to the SMMPA Rutland Substation (see Figure 3). The collector substation and gen-tie line will be constructed, owned, and operated by Lake Charlotte.

The Land Control Area is comprised of open land primarily utilized for row crop agriculture. Topography within the Land Control Area is generally flat ranging from 1,134 to 1,169 feet above mean sea level (amsl). The Preliminary Development Area is mostly devoid of permanent landcover and environmental constraints. Lake Charlotte was able to secure sufficient lease agreements to largely avoid existing water and other natural resource features. No other significant environmental constraints were identified in or near the Land Control Area (see Figures 3, 4, 4a, 11, and 13).

3.0 PROJECT NEED, PERMITTING, AND SCHEDULE

The Project is being developed, designed, and permitted to meet or exceed applicable state, county, and local requirements, including the Prime Farmland Rule. The Project will specifically address Minnesota's mandate and goals found in the Renewable Energy Standard, Governor Walz's "One Minnesota Path to Clean Energy" to require 100 percent carbon-free energy by 2040, and applicable energy planning requirements.[4] It will serve consumers' growing demand for renewable energy under various utility-sponsored programs and for utilities, independent power purchasers and corporations seeking to use renewable energy for business growth.

The Project will also benefit the local community through investment in construction spending, operation, property and business taxes, and landowner lease and easement payments. The Project will generate up to 150 MW of power and produce enough energy to provide energy for approximately 32,067 households based on the average annual energy consumption (U.S. Environmental Protection Agency [USEPA], 2025a) and prevent emissions of approximately 258,490 metric tons of carbon dioxide equivalent (CO_2e) annually (USEPA, 2025b).[5] Reduced emissions associated with the Project as compared to traditional carbon-based energy generation will further benefit the environment and overall health of the regional community (i.e., reduced potential mortality due to harmful air pollutants, associated health care costs, reduction in water consumption) which are summarized in the Joint Site Permit Application for the Solar Facility and BESS.

Lake Charlotte Solar has an executed Generator Interconnection Agreement with SMMPA and Midcontinent Independent System Operator, Inc (MISO), enabling the Project to interconnect at the SMMPA Rutland Substation (the Project Point of Interconnection). The Applicant is pursuing an additional Generator Interconnection Agreement for the BESS to operate independently and receive and store energy directly from the electric grid. The Project Substation would provide the

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[4] See Minn. Stat. §216B.1691; Minn. Stat. § 216C.05.

[5] This is based upon https://www.epa.gov/avert/avert-web-edition.

BESS with an independent connection to the electrical grid. Lake Charlotte plans to construct the Project on a schedule that facilitates an in-service date in the first quarter 2029.

4.0 FACTORS DRIVING CHOICE OF REGION

4.1 GUIDANCE

The Prime Farmland Guidance first directs an applicant to discuss why a project has been proposed in a particular region, including an assessment of: (1) the solar resource in the region; (2) available interconnection points; (3) and efforts to investigate developable sites (i.e., those with appropriate topography and willing participants). Lake Charlotte explored southern Minnesota to identify a suitable area for a solar project based on these factors. When Lake Charlotte began searching for locations, Minnesota was identified as a state supportive of solar deployment based on utility and regulatory interest, as well as previous development activity in the state. Lake Charlotte initially reviewed the entire state of Minnesota during the site selection process.

4.2 SOLAR RESOURCES IN THE REGION

Lake Charlotte's key goals in siting the proposed Project was to (1) identify the most productive solar resource in Minnesota which will allow economic operation of a large utility-scale solar energy generation facility, (2) allow for efficient use of installed facilities located in reasonable proximity to the transmission system, and (3) minimize impacts to human settlement and natural resources.

Lake Charlotte assessed publicly available solar generation data in Minnesota to determine solar potential in Minnesota. According to data compiled by the Minnesota Solar Suitability Analysis (MSSA) program, southern Minnesota has some of the best locations for exposure to the sun's solar radiation (insolation) and, thus, highest net capacity factors in the state (refer to Figure 7).[6] Figures 8 and 9 provide MSAA Insolation for the Lake Charlotte Project and the Royal Solar Project, a previous project site that was evaluated and rejected due to lack of capacity for interconnection. In Minnesota, there is a strong correlation between high solar resource and the prevalence of prime farmland (see Image 1). As displayed in Image 1, southwestern and southcentral Minnesota are characterized by the prevalence of prime farmland and the highest solar resource. Conversely, areas without prime farmland generally have a lower solar resource.

Lake Charlotte focused its efforts on locating a Project site in areas with high solar potential near an existing point of interconnection that had available capacity to meet the output generated by the Project and be economically delivered to the electrical grid. Site locations were not evaluated in the northeastern portion of the state where low solar potential is mapped. Focus was directed to the south and west portions of Minnesota (see Figure 7).

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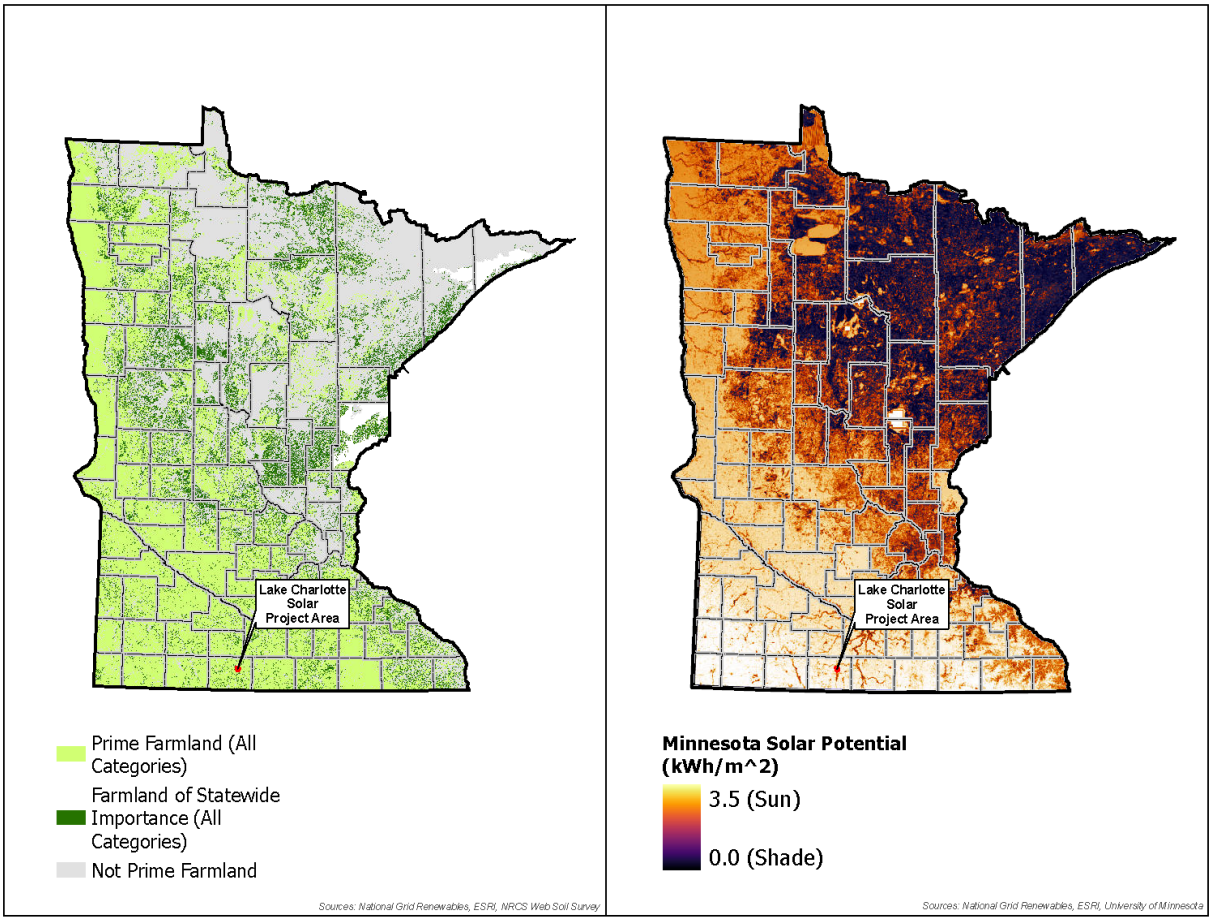
[6] The MSSA is an ongoing project led by graduate students in the Masters of Geographic Information Science program at the University of Minnesota. The project aims to map solar potential on a large scale across Minnesota using LiDAR data and GIS technology with the goal of providing free and open-source tools and data to the GIS community. See https://solar.maps.umn.edu/app/.

Image 1: Prime Farmland and Solar Resources in Minnesota



The south and west portions of the state are the highest solar potential regions in Minnesota and also have the most existing land cover conducive to solar development. Landcover most conducive to solar development is made up of large, flat, open agricultural lands.

The previously evaluated Royal Solar Project site was located on the edge of the region in Minnesota with high solar potential, and in an area with a reduced presence of prime farmland and proximity to existing transmission infrastructure with potentially available capacity. The Guidance indicates that “otherwise compliant areas” refers to areas not specifically prohibited (subpart 1) or generally excluded (subpart 3) for energy development as enumerated in Minnesota Rules 7850.4400, subpart 1. When beginning a search for a site, Lake Charlotte assumed it would be able to identify an adequately sized site near available transmission capacity that did not exceed the 0.5 acre/MW threshold due to the general scarcity of prime farmland in the east central part of the State but was ultimately unable to do so as described below.

4.3 AVAILABLE INTERCONNECTION POINTS

Identifying existing electrical infrastructure with available capacity was the largest driving factor in selecting a suitable site. Lake Charlotte searched within the south and west portions of Minnesota for existing points of interconnection and transmission lines that had potential capacity to support

the Project. As a result of this search, Lake Charlotte identified the SMMPA Rutland Substation. The SMMPA Rutland Substation had capacity for this Project to interconnect via a 161 kV gen-tie line.

Lake Charlotte reviewed the site assessment conducted for the Royal Solar Project to determine potential feasibility of locating the Project in an area with less prime farmland (see Figure 10). A study was conducted of the Royal Solar Project POI. Lake Charlotte determined that the POI did not have sufficient capacity available to support a utility-scale solar project, such as the Project. Therefore, the Royal Solar Project site would not be prudent or feasible alternative to the Project.

Lake Charlotte proposes to interconnect the Project to the existing SMMPA Rutland Substation (see Figure 2). Lake Charlotte submitted an interconnection request with MISO in June 20, 2020. Lake Charlotte has executed a Generator Interconnection Agreement (GIA) on August 15, 2024, with MISO and SMMPA, the owner and operator of the SMMPA Rutland Substation. This interconnection will provide sufficient outlet to accommodate the solar energy generation from the Solar Facility.

5.0 EFFORTS TO INVESTIGATE DEVELOPABLE SITES

The State of Minnesota policy requires the siting of transmission lines in a manner that "minimize[s] adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion" (Minnesota Statutes section 216E.02, Subdivision 1), and requiring the efficient use of resources, especially if a viable, feasible and prudent alternative exists.

Lake Charlotte evaluated potential project locations within 5-miles of the POI using the following criteria:

- significant tracts of cleared contiguous land;
- distance to a potential POI;
- specific areas of the region that were determined suitably flat to allow for economical construction of solar energy generation equipment;
- community support and acceptance of the Project;
- local landowners willing to enter voluntary leases or easements; and
- avoidance of sensitive environmental resources and minimization of potential adverse environmental impacts.

The analysis and results of the area within a 5-mile radius of the potential POI is presented below. All factors were used in the evaluation and selection of the proposed Land Control Area.

5.1 SOILS

In consideration of Minnesota Rules 7850.4400, subp. 4, Lake Charlotte examined the soils within the south and west Minnesota regions. The prevalence of prime farmland is consistently high regardless of location in the region. Prime farmland, and its sub-categories, are mapped throughout the region (see Figure 6). For context, Martin County encompasses about 455,896

acres of land, of which 390,267.8 acres (86 percent) are classified as prime farmland and prime farmland if drained or protected from flooding (Soil Survey Staff, NRCS USDA, 2025). Areas in the region most conducive to solar development, consisting of approximately 976.8 acres of land, are also primarily comprised of soils defined as prime farmland.

To find an area suitable for construction, Lake Charlotte evaluated the area within five miles of the POI (see Figure 5) and for comparison reviewed the area within five miles of the Royal Solar Project POI (see Figure 10). The area within 5 miles of the Royal Solar Project POI contained less overall acres of prime farmland; however, the Royal Solar POI did not have available capacity that would allow the interconnection of a 150MW generation facility. Transmission interconnection was the most significant factor in Project siting. If there is not sufficient capacity to interconnect a project, then the lack or presence of prime farmland is meaningless. The Lake Charlotte collector substation will be located approximately 50 feet from the SMMPA Rutland Substation, which has available capacity to allow the interconnection of the 150 MW Project.

5.2 FACTORS DRIVING CHOICE OF REGION

The Prime Farmland Guidance further identifies factors to assess when prime farmland is present within a proposed project site, including: (1) alternative sites in nonprime farmland in proximity to an interconnection site; (2) avoidance of other prohibited areas; and (3) alternative configurations or technologies. As displayed on Image 1, southwestern and southcentral Minnesota, including Martin County, contains the best solar resource in the state.

With respect to avoidance of prohibited areas, Lake Charlotte evaluated potential constraints during site selection to determine whether the Project has avoided constraints to the maximum degree practicable. These include transmission interconnection, willing landowners to sell or lease land for Project facilities, and environmental constraints that may prohibit or make development more challenging. Within five miles of the POI, Lake Charlotte avoided parcels:

- owned or managed by a state or federal agency (i.e., state park, WMA, or Waterfowl Production Area);
- within a municipality;
- within two miles of a public airport;
- with U.S. Fish and Wildlife Service (USFWS) designated critical habitat;
- with Minnesota Department of Natural Resources (MDNR) Sites of Biodiversity Significance;
- with MDNR mapped native plant communities or native prairie;
- with MDNR Public Waters Inventory watercourses or basins; and
- with MDNR rare species records.

These constraints, and the areas most suitable for solar development without these features, are displayed on Figure 11. As shown on the constraints map, Lake Charlotte has sited the facility to avoid the sensitive resources identified above.

During development of the Project, Lake Charlotte also reviewed the Royal Solar Project assessment. A 5-mile radius around the hydropower plant, proposed as the POI, was the search area used to identify potential project locations. A constraints analysis was completed for the area within the 5-mile radius as shown on Figure 12.

By comparing Figures 11 and 12, it is easily discernable that areas within five miles of the Lake Charlotte Project contain fewer natural resources such as wetlands, floodplains, public waters, public lands managed for wildlife, sites of biodiversity significance and potential threatened and endangered species habitat than the Royal Solar Project. On the contrary, there is a less buildable area within five miles of the Royal Solar Project POI that is not encumbered by natural resources and where the available buildable area is not designated as prime farmland.

Lake Charlotte further evaluated and generated buildable area maps within five miles of the Lake Charlotte POI and Royal Solar POI (see Figures 14a and 14b). Lake Charlotte used the constraint layers identified in Figures 11 and 12 to determine which areas are not buildable. Additionally, other constraints that would limit constructability were also evaluated, regardless of prime farmland status. Constraints included National Land Cover Data (NLCD) and aerial imagery to identify forested areas, National Wetlands Inventory (NWI) and National Hydrography Datasets (NHD) to map streams and wetlands, FEMA data to identify floodplains, and slope information to identify slopes in excess of 12 percent (considered too steep for solar development). Moreover, public infrastructure corridors and features such as roads (60-foot-right-of-way), railroads (with 60-foot-right of-way), pipelines (with 75-foot right-of-way), transmission lines (with 75-foot right-of-way), substations, and existing homes were also excluded from buildable areas.

Figure 14a shows the estimated buildable area within five miles of the POI for the Lake Charlotte Project. Overall, the Lake Charlotte buildable area is approximately 43,648 acres within five miles of the POI. Figure 14b shows the estimated buildable area within five miles of the POI for the Royal Solar Project. Overall, the Royal Solar Project buildable area is approximately 26,193 acres within five miles of the POI. The available buildable area for Lake Charlotte is approximately 40 percent greater than the size of the Royal Solar Project buildable area. The difference between the two buildable areas highlights the presence of significantly more constraints that would preclude solar development within five miles of the Royal POI.

The Royal Solar Project was not pursued further due to the existing environmental and development constraints in conjunction with the lack of available capacity at the Royal POI for a 150 MW Project.

Based on the analysis above, there are no feasible or prudent alternatives to the proposed Project Area (as herein defined) for the Project.

5.3 AVOIDANCE & MINIMIZATION CONSIDERATIONS

As discussed above, the Land Control Area is an optimal site for development of the proposed 150 MW AC Solar Facility and BESS. The selected location better meets the needs of the Project and avoids prohibited areas to the maximum extent practicable. In addition, there is relatively little opportunity to avoid impacts to prime farmland in the state of Minnesota where high solar potential exists. Areas where non-prime farmland is more prevalent are generally associated with steep slopes, forested areas, wetlands and floodplains, and other areas not suitable for solar development. In addition, areas of non-prime farmland that are not constrained by natural resources do not have adequate capacity to support a 150 MW interconnection necessary for the Project.

Lake Charlotte Solar has considered several design options to minimize impacts on soils and prime farmland including minimizing the overall Preliminary Development Area, minimizing solar facility placement in areas with slopes that would require excess grading. Similarly, access road construction requires grading and soil segregation. Lake Charlotte has minimized access roads, except to the extent required for safety and maintenance activities, and grading and soil disturbance is minimized to the extent practicable. The installation of the electrical collection system involves trenching a portion of the electrical collection cables to a depth of four feet. The design will also include DC electrical collection cabling that will be installed either below-ground, underhung beneath the photovoltaic panels and racking and/or suspended above ground via the solar cable management system. Implementing the cable management system greatly reduces soil disturbance because trenching is not required along every row of panels. Together, these design considerations minimize the Project's impact on prime farmland and other sensitive resources.

5.4 MITIGATION AND OFFSETTING BENEFITS

In addition to the minimization measures described above, the Project includes an Agricultural Impact Mitigation Plan and Vegetation Management Plan as mitigation measures, as well as offsetting benefits such as reducing nitrogen pollution. Each of these is described further below.

5.5 AGRICULTURAL IMPACT MITIGATION PLAN

Lake Charlotte has developed an Agricultural Impact Mitigation Plan detailing methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation that will help to ensure the Project is designed, constructed, operated, and ultimately decommissioned and restored in a manner allowing the land to be returned to its original agricultural use in the future. Moreover, conversion of the Project footprint to non-row-crop uses for the life of the Project may also have beneficial environmental impacts such as soil building, erosion control, habitat for wildlife, and protection of groundwater and surface water resources from nitrogen pollution (see Sections 3.0 and 5.3 of the Agricultural Impact Mitigation Plan, Appendix E, Joint Site Permit Application).

5.6 VEGETATION MANAGEMENT PLAN

Lake Charlotte has developed a Vegetation Management Plan (see Appendix C, Joint Site Permit Application) that provides a guide to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. As discussed further below, shifting the land cover in the Preliminary Development Area to perennial vegetation instead of row crops for the life of the Project, could prove to be beneficial for limiting nitrogen infiltration into groundwater supply and nitrogen runoff, thereby improving groundwater and surface water quality. Additionally, perennial plants improve the soil with organic matter over the 30-year life the Project, allowing soil animals (i.e. soil fauna) to recover after years of intensive compaction and pesticide and fertilizer application.

5.7 THE PROJECT MAY REDUCE NITROGEN POLLUTION AND AVOID IMPACTS TO SENSITIVE GROUNDWATER RESOURCES

Nitrogen, in the form of fertilizer, is a critical component to agricultural productivity. However, nitrogen is a potent water pollutant that is exceedingly difficult to contain once it has been introduced into the environment. Elevated nitrate levels can be harmful to fish and aquatic life and pollute drinking water wells as it moves both in surface water and in groundwater. In Minnesota,

concern about nitrates, from nitrogen fertilizer, in groundwater has been well documented (Minnesota Department of Agriculture, 2019).

A study by the Minnesota Pollution Control Agency (MPCA) found that more than 70 percent of nitrates in the Minnesota environment comes from cropland; the rest is from sources such as wastewater treatment plants, septic and urban runoff, forest, and the atmosphere (MPCA, 2025). Nitrate concentrations and loads in surface water are high throughout much of southern Minnesota, largely as a result of leaching through large areas of intensely cropped soils and into underlying drain tiles and groundwater.

Minnesota state agencies and private organizations are working to address nitrogen levels by evaluating irrigation and fertilizer application practices. The MNDNR, local soil and water conservation districts, and the University of Minnesota are all evaluating irrigation strategy improvements centered around smarter irrigation. They are developing tools that assess soil moisture levels, crop stage (maturity), and precipitation received. Researchers are also evaluating the economics of subsurface irrigation. These strategies are designed to more efficiently water crops when and where they need it while conserving groundwater resources and limiting the vehicle (i.e., water deposits on the land) by which nitrogen can pollute groundwater.

Similarly, the Minnesota Department of Agriculture (MDA) is working to protect groundwater from agricultural contamination. The agency passed the Groundwater Protection Rule in late 2018 (MDA, 2019). The two-part rule minimizes potential sources of nitrate pollution to the state's groundwater and protects drinking water. Part one of the rule restricts fall application of nitrogen fertilizer in areas vulnerable to contamination; part two outlines steps to reduce the severity of the problem in areas where nitrates in public water supply wells are already elevated.

While the State works to identify vulnerable areas for groundwater contamination and protect groundwater resources through a variety of programs, perhaps the most prudent method is to simply shift the cropping system on the vulnerable soils, as practicable, from a nitrogen-intensive row-crop agriculture to land cover that does not involve nitrogen applications. The Project does just that by converting acres of nitrogen-intensive cropland to perennial vegetation that will not receive nitrogen application and further acts as a mechanism of capturing nitrogen and reducing the ability of that nitrogen to leave the Project boundary (Christianson et al., 2016).

Even though the Land Control Area is considered prime farmland, shifting the land cover to perennial vegetation instead of row crops for the life of the Project could be beneficial for limiting nitrogen infiltration into groundwater supply and nitrogen runoff into local water resources, thereby improving groundwater and surface water quality.

5.8 OTHER PROJECT BENEFITS

Lake Charlotte is committed to being a good steward to the community, landowners, and environment as part of development of the Project. As introduced above, upon construction of and implementation of the mitigative measures described in the Joint Site Permit Application, Agricultural Impact Mitigation Plan, and Vegetation Management Plan, the Project will directly and indirectly provide benefits and improve the water quality in the Blue Earth River Watershed. These benefits include:

- decreasing the amount of nutrients (including phosphorous and nitrogen) applied to the Preliminary Development Area during the 30-year life of the Project (i.e., row crop agricultural operations would temporarily cease during Project construction

and operation) thereby protecting groundwater resources from surface contaminants (see Figure 13);

- managing nutrients at the Project sites through incorporation, installation, and establishment and maintenance of native vegetative plant species, as detailed in the Vegetation Management Plan, and Agricultural Impact Mitigation Plan that will be implemented for the life of the Project;

- designing, engineering, permitting, constructing, operating and maintaining a stormwater management system (i.e., stormwater pond) in accordance with applicable MPCA rules and regulations to effectively address stormwater runoff from the Project;

- obtaining and implementing a National Pollutant Discharge Elimination System (NPDES) Construction Stormwater permit from the MPCA and the Stormwater Pollution Prevention Plan during construction to address, manage and control erosion, stormwater runoff from construction activities and re-establishment of vegetative cover post-construction;

- potentially increasing the water storage capacity and managing surface water runoff with the installation and establishment of perennial vegetation and other vegetative cover in combination with the stormwater management facilities (e.g., swales or ponds) to be installed for operation of Project which will help improve soil health and downstream water quality; and

- maintaining current county drain tile and judicial drainage ditches across the Project to ensure no impact to neighboring agricultural land uses and field drainage.

As the permitting process advances and the Project becomes more developed, additional offsetting benefits may be identified. Lake Charlotte is committed to identifying additional benefits and evaluating and incorporating such benefits into Project plans as it deems possible.

6.0 CONCLUSIONS & RECOMMENDATIONS

For the reasons demonstrated in the above analysis, Lake Charlotte believes it has met Prime Farmland Guidance recommendations and the requirements of the Rule to determine that there is no feasible or prudent alternative Project site.

FIGURES

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Figure 13: Sensitivity of Surficial Aquifers to Pollution
Figure 14a: Buildable Area Within Five Miles of POI (Prime Farmland Excluded)
Figure 14b: Buildable Area Within Five Miles of Royal Solar Project POI

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