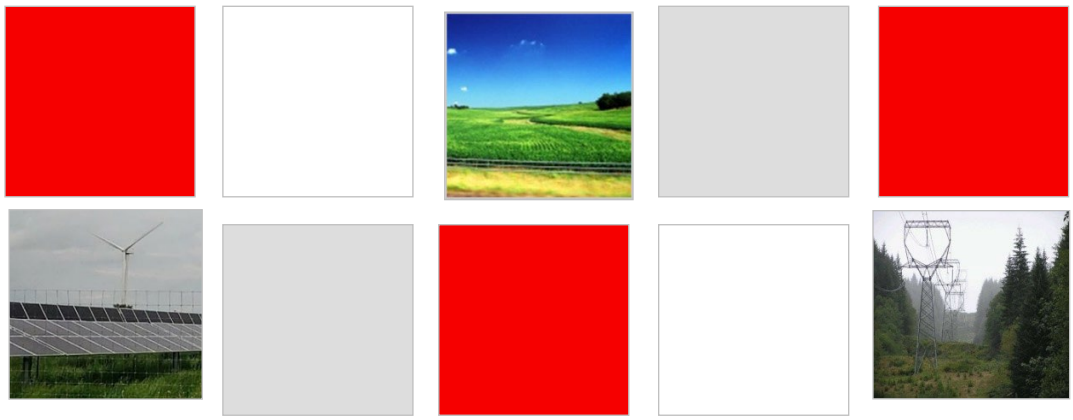

LEMON HILL SOLAR, LLC

Site Permit Application

Olmsted County, Minnesota

LEMON HILL SOLAR
A RANGER POWER PROJECT

Docket No. IP7156/GS-25-126

PREPARED BY

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PURPOSE AND NEED 2
1.2 APPLICANT INFORMATION 2
1.2.1 Ownership at Time of Filing 3
1.2.2 Proposed Ownership after Commercial Operations 3
1.3 PROJECT SCHEDULE 3
1.4 POTENTIALLY REQUIRED PROJECT PERMITS, APPROVALS, AND PLANS 4
1.4.1 Local Approvals 5
1.4.2 Certificate of Need 6
1.4.3 Site Permit 6
1.4.4 Route Permit 6
1.4.5 Other Potential Permits and Approvals 6
2.0 PROJECT INFORMATION 6
2.1 LOCATION 6
2.2 OVERALL PROJECT DESCRIPTION 7
2.3 PROJECT, ASSOCIATED FACILITIES, AND INTERCONNECTION DESCRIPTION 8
2.3.1 Project and Associated Facilities 8
2.3.2 Interconnection Description 9
2.3.3 Size and Capacity 9
2.4 PROHIBITED SITES AND EXCLUSION AREAS 9
2.4.1 Prime Farmland 10
2.5 ALTERNATIVES CONSIDERED BUT REJECTED 11
2.6 COST ANALYSIS 11
2.7 FUTURE EXPANSION 11
3.0 ENGINEERING AND OPERATIONAL DESIGN 11
3.1 DESIGN 11
3.1.1 Photovoltaic Arrays and Solar Field 12
3.1.2 Project Substation 13
3.1.3 Gen-Tie Line 14
3.1.4 Electrical Collection System and Power Conversion 14
3.1.5 Operations and Maintenance Building 17
3.1.6 SCADA Communication System 17
3.1.7 Fencing 17
3.1.8 Access Roads/Transportation System 17
3.1.9 Stormwater Ponds 19
3.1.10 Laydown Yard 19
3.1.11 Pipeline System 19
3.2 PROJECT LAYOUT 19
3.2.1 Setbacks 19
3.2.2 Project Development Area 20
3.3 CONSTRUCTION, COMMISSIONING, RESTORATION, OPERATION AND MAINTENANCE 20
3.3.1 Construction and Construction Management 22
3.4 SITE CLEARING AND VEGETATION REMOVAL 22
3.5 EARTHWORK 22
3.6 ACCESS ROAD CONSTRUCTION 23
3.7 SOLAR ARRAY CONSTRUCTION 23

3.8 ELECTRICAL COLLECTOR LINE SYSTEM 23
3.9 INVERTER AND ASSOCIATED FACILITY INSTALLATION 24
3.10 PROJECT SUBSTATION CONSTRUCTION 24
3.10.1 Gen-Tie Line 25
3.11 STORMWATER DRAINAGE BASINS 25
3.12 PROJECT FENCING INSTALLATION 25
3.13 RESTORATION 25
3.14 OPERATION AND MAINTENANCE 26
3.14.1 Supervisory Control and Data Acquisition System 27
3.14.2 Equipment Inspection 27
3.15 DECOMMISSIONING AND REPOWERING 28
3.15.1 Decommissioning 28
3.15.2 Repowering 30
4.0 ENVIRONMENTAL INFORMATION 30
4.1 ENVIRONMENTAL SETTING 31
4.2 HUMAN SETTLEMENT 31
4.2.1 Public Health and Safety 32
4.2.2 Electromagnetic Field 36
4.2.3 Displacement 38
4.2.4 Noise 38
4.2.5 Radio and Television Interference 43
4.2.6 Aesthetics 44
4.2.7 Socioeconomics 46
4.2.8 Environmental Justice 50
4.2.9 Cultural Values 53
4.2.10 Recreation 54
4.2.11 Public Services, Utilities, and Transportation 55
4.2.12 Zoning and Land Use 57
4.3 LAND-BASED ECONOMIES 60
4.3.1 Agriculture 60
4.3.2 Forestry 63
4.3.3 Tourism 63
4.3.4 Mining 64
4.4 ARCHAEOLOGICAL AND HISTORICAL RESOURCES 64
4.4.1 Existing Environment 64
4.4.2 Impacts on Cultural Resources 66
4.4.3 Mitigation 67
4.5 NATURAL ENVIRONMENT 67
4.5.1 Air 67
4.5.2 Soils, Geology, and Groundwater 68
4.5.3 Surface Waters 73
4.5.4 Vegetation 79
4.5.5 Wildlife 81
4.5.6 Rare and Unique Natural Resources 83
4.6 CLIMATE CHANGE 87
Impact of Project on Climate Change 88
Impact of Climate Change on Project 89
Mitigative Measures 89
4.7 POTENTIAL CUMULATIVE IMPACTS 90
Impacts and Mitigative Measures 91

4.8 UNAVOIDABLE IMPACTS 91
Impacts and Mitigative Measures 91
4.9 IRRETRIEVABLE AND IRREVERSIBLE IMPACTS 92
5.0 AGENCY AND PUBLIC OUTREACH 92
6.0 REFERENCES CITED 96

LIST OF TABLES

Table 1.3-1 Preliminary Project Construction Schedule 3
Table 1.4-1 Potential Permits/Approvals/Plans 4
Table 2.1-1 Project Location 7
Table 2.6-1 Estimated Project Costs 11
Table 3.2.1-1 Olmsted County Setback Requirements 19
Table 3.2.1-2 Lemon Hill Solar Initiated Setbacks 20
Table 3.2.2-1 Estimated Project Component Acreages in Preliminary Development Area 20
Table 4.2.1-1 Recorded Releases Within 1 Mile of the Site with a Potential Hydrological Connection 34
Table 4.2.2-1 Typical EMF Levels for 115kV and 230kV Power Transmission Lines 37
Table 4.2.4-1 Minnesota Rules Chapter 7030 NAC 1 Noise Limits 39
Table 4.2.4-2 Typical Noise-Generating Sources 39
Table 4.2.4-3 Typical Sound Levels from Construction Equipment 40
Table 4.2.4-4 Project Equipment Estimated Sound Levels 41
Table 4.2.4-5 Anticipated 161 kV Transmission Line Noise Levels with Heavy Rain 41
Table 4.2.4-6 Receptors Located Near the Project 42
Table 4.2.6-1 Proximity of Residences within 0.25 mile of the Site 45
Table 4.2.7-1 Population and Race Characteristics 47
Table 4.2.7-2 Housing Characteristics 47
Table 4.2.7-3 Income and Poverty 48
Table 4.2.7-4 Tax Allocation 49
Table 4.2.8-1 Environmental Justice Data for Site 51
Table 4.2.8-2 Minority Population by Race and Ethnicity and Low-Income Populations for Site 52
Table 4.2.11-1 Roads in Proximity to Project 56
Table 4.2.11-2 Annual Average Daily Traffic in the Project Vicinity 56
Table 4.4.1-1 Previously Reported Historic Architectural Resources within the Study Area 65
Table 4.5.1-1 Days in Each Air Quality Index Category 67
Table 4.5.3-1 Summary of Delineated Wetlands within the Survey Area 77
Table 4.5.3-2 Potential Impacts on Wetlands and Other Waters 78
Table 4.5.4-1 Land Cover within the Site 79
Table 4.5.6-1 Federally Listed Species Within the Vicinity of the Project 83
Table 4.6-1 Carbon-Free Standard Milestones 88
Table 5.0-1 Summary of Agency Communications 92
Table 5.0-2 Summary of Communications with Tribal Nations 93
Table 5.0-3 Tribal Engagement Contacts 94

LIST OF IMAGES

Image 3.1.1-1 PV Array 13
Image 3.1.4-1 AWM Hanger Configurations 15
Image 3.1.4-2 Solar Collection Trenches 15
Image 3.1.8-1 Typical Solar Access Road 18

LIST OF FIGURES

Figure 1 Project Location
Figure 2 Land Rights and Preliminary Development Area
Figure 3 Project Interconnect Facilities
Figure 4 Preliminary Facility Design
Figure 5 Prohibited and Exclusion Sites
Figure 6 Prime Farmland
Figure 7 Residences and Farmsteads in Project Vicinity
Figure 8 Topographic Map
Figure 9 Recreational Resources
Figure 10 Public Services, Utilities, and Transportation
Figure 11 Zoning
Figure 12 Archaeological Survey
Figure 13 Hydric Soils
Figure 14 Geological Features
Figure 15 Surface Waters
Figure 16 National Land Cover Database Data
Figure 17 CREP and RIM Program Easements
Figure 18 Unique and Natural Features

LIST OF APPENDICES

Appendix A Completeness Checklist
Appendix B Prime Farmland Impact Assessment Memo
Appendix C Preliminary Site Plan
Appendix D Agricultural Impact Mitigation Plan
Appendix E Vegetation Management Plan
Appendix F Decommissioning Plan
Appendix G Agency and Tribal Coordination and Correspondence
Appendix G-1 Outreach Letters Sent
Appendix G-2 Agency Correspondence
Appendix H Cultural Resources (Public and NONPUBLIC)
Appendix H-1 Cultural Resources Literature Review
Appendix H-2 Phase 1 Archaeological Reconnaissance Survey Report
Appendix I Project Emissions Estimate
Appendix J Operations and Maintenance Schedule
Appendix K Protected Species Documentation
Appendix L Landowner List

LIST OF TERMS AND ABBREVIATIONS

Term	Definition
AADT	Annual Average Daily Traffic
AC	Alternating Current
AIMP	Agricultural Impact Mitigation Plan
ANSI	American National Standards Institute
Application	Site Permit Application
AQI	Air Quality Index
AST	above ground storage tanks
B.P.	before present
BGEPA	Bald and Golden Eagle Protection Act
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
bgs	below ground surface
BMP	best management practice
Brownfields	petroleum brownfields program sites
BWSR	Minnesota's Board of Water and Soil Resources
CAA	Clean Air Act
CFR	Code of Federal Regulations
CFES	Carbon-free energy standards
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Commission	Minnesota Public Utilities Commission
CREP	Conservation Reserve Enhancement Program
CSW	Construction Stormwater
CWA	Clean Water Act
Dairyland	Dairyland Power Cooperative
dB	Decibel
dBA	A-weighted decibels
DC	Direct Current
DESRI	DESRI Holdings, L.P.
DOC	Minnesota Department of Commerce
DRO	diesel range organics
DWSMA	Drinking Water Supply Management Area
ECS	Ecological Classification System
EERA	Energy Environmental Review and Analysis
EF	electric field
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency

Term	Definition
EQB	Environmental Quality Board
ESA	Endangered Species Act
FAA	Federal Aviation Administration
Fed Brownfields	Redevelopment Exchange System ACRES Brownfield Database
FEMA	Federal Emergency Management Agency
FIND/FRS	Facility Registry Service/Facility Index
FHWA	U.S. Department of Transportation Federal Highway Administration
FSA	U.S. Department of Agriculture Farm Service Agency
gen-tie	generation interconnect
GHG	greenhouse gas
GIA	Generator Interconnection Agreement
GIS	geographical information system
GRO	gasoline range organics
GW	gigawatt
HIFLD	Homeland Infrastructure Foundation-Level Data
HUC	Hydrologic Unit Code
IBA	Important Bird Area
IPaC	Information for Planning and Consultation
L_{10}	sound level that is exceeded 10% of the hour
L_{50}	sound level that is exceeded 50% of the hour
L_{eq}	equivalent continuous sound level
Lemon Hill Solar	Lemon Hill Solar, LLC
LEPGP	Large electric power generating energy facility
LST Rem Site	Leaking Storage Tank Remediation Sites
MBTA	Migratory Bird Treaty Act
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDLI	Minnesota Department of Labor and Industry
Merjent	Merjent, Inc.
mG	milliGauss
MISO	Midcontinent Independent System Operator
MLCCS	Minnesota Land Cover Classification System
MLRA	Major Land Resource Area
MN	Minnesota
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MNSHIP	Minnesota's Statewide Historic Inventory Portal
MPCA	Minnesota Pollution Control Agency
MPCA AI	Minnesota Pollution Control Agency (MPCA) Agency Interests
MW	megawatt

Term	Definition
MWh	megawatt hours
NAAQS	National Ambient Air Quality Standards
NAC	noise area classification
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHD	USGS National Hydrography Database
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Database
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NPC	Native Plant Communities
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O&M	operations and maintenance
O_3	ozone
OSA	Office of the State Archaeologist
Pb	lead
PCBs	polychlorinated biphenyls
Phase I ESA	Phase I Environmental Site Assessment
PID	photoionization detector
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POI	Point of Interconnection
PPA	Power Purchase Agreement
ppm	parts per million
Preliminary Development Area	Approximately 966 acres within the Site where the solar facilities and associated infrastructure will be built and operated and also includes some public road rights-of-way where Project collection lines will be installed to connect the non-contiguous parcels of leased land
Project	Lemon Hill Solar Project
PV	photovoltaic
PWI	Public Waters Inventory
Ranger Power	Ranger Power, LLC
RCRA SQG	Resource Conservation and Recovery Act Small Quantity Generators List
REC	Recognized Environmental Conditions
RES	renewable energy standards
RIM	Reinvest in Minnesota

Term	Definition
ROW	right-of-way
SCADA	supervisory control and data acquisition
SDS	State Disposal System
SES	solar energy standards
SHPO	State Historic Preservation Office
Site	Approximately 1,945 acres of private land leased by Lemon Hill Solar and on which the primary Project facilities will be located (Figure 1)
SLVs	soil leaching values
SO_2	sulfur dioxide
SOBS	sites of biodiversity significance
SRVs	soil reference values
Survey Area	Area for environmental surveys
SVOC	semi-volatile organic compounds
SWF/LF	solid waste facilities/landfill
SWPPP	Stormwater Pollution Prevention Plan
TCPA	Township Cooperative Planning Association
U.S. Census	2020 United States Census Bureau
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VIC	Cleanup Program List
VMP	Vegetation Management Plan
VOC	volatile organic compounds
WCA	Wetland Conservation Act
WHPA	Wellhead Protection Areas
WP	watt peak

1.0 INTRODUCTION

Lemon Hill Solar, LLC (Lemon Hill Solar) proposes to construct and operate a 180-megawatt (MW) alternate current (AC) photovoltaic (PV) solar energy generating facility and associated infrastructure, known as the Lemon Hill Solar Project (Project). In addition to PV solar panels, Project infrastructure will include inverters, medium voltage collector lines, access roads, an operations and maintenance building, a high-voltage generation interconnect (gen-tie) transmission line, and substation equipment. The proposed Project will be located in Haverhill and Viola Townships in Olmsted County, Minnesota. The Project will use bi-facial PV modules affixed to tracking systems that allow the PV modules to follow the sun from east to west.

Lemon Hill Solar proposes to interconnect the Project via a gen-tie line to Dairyland Power Cooperative's (Dairyland) Substation in Olmsted County, Minnesota (Figure 3). Lemon Hill Solar filed a queue position with the Midcontinent Independent System Operator (MISO) in the MISO DPP 2021 West study cycle as J2219. It is anticipated that Lemon Hill Solar will execute a Generator Interconnection Agreement (GIA) with MISO for 180 MW; Lemon Hill Solar will notify the Commission when the GIA has been executed. This interconnection will provide sufficient outlet to accommodate all the solar energy generation from the Project. Lemon Hill Solar proposes to build the Project on a schedule that facilities an in-service date in 2028.

Throughout this application, the term "Site" refers to the parcels of private land leased by Lemon Hill Solar and on which the primary Project facilities will be located (Figure 1). The term "Preliminary Development Area" refers to the specific portions of the Site where the solar facilities and associated infrastructure will be built and operated and includes some public road rights-of-way where Project collection lines will be installed to connect the non-contiguous parcels of leased land. The Site is approximately 1,945 acres in size, and the Preliminary Development Area will occupy approximately 966 acres. The Site and Preliminary Development Area acreages include two parcels that were added to the Project in 2025 once land rights were acquired. Cultural resources surveys and wetland delineations have not been completed on these two parcels at the time this application was prepared. All subsequent sections of this application include analysis of these two parcels as part of the overall Site, and the two parcels are discussed separately when necessary to provide additional context regarding potential Project impacts where field survey data was not available. Additional survey of these two parcels will be completed prior to construction.

The Project requires a Site Permit from the Minnesota Public Utilities Commission (Commission). Lemon Hill Solar respectfully submits this application to the Commission for a Site Permit in accordance with the Minnesota Power Plant Siting Act (Minnesota Statute Chapter 216E) and Minnesota Administrative Rules Chapter 7850.

On February 21, 2025, Lemon Hill Solar submitted formal notice to the Commission of the Project's intent to submit an application using the alternative review process found in Minn. Stat. § 216E.04, Subd. 2(8) (2023) and Minnesota Rules 7850.2800-7850.3900. Additionally, on April 4, 2025, Lemon Hill Solar provided a written request to the Minnesota Department of Commerce (DOC), Energy Environmental Review and Analysis unit (EERA), for a solar energy generating system size determination in accordance with Minn. Stat. § 216E.021 (2023). The size determination response from EERA was issued on April 15, 2025 (Appendix G).

1.1 PURPOSE AND NEED

The Project will provide up to 180 MW of reliable, renewable energy. Estimated annual energy production will be approximately 338,500 megawatt hours (MWh), enough energy to power 36,700 homes annually. The Project will prevent 135,567 tons of carbon dioxide (CO_2) emissions annually. Lemon Hill Solar is siting and permitting the Project to meet or exceed applicable local and state requirements.

The Project will support the state's carbon-free energy standards (CFES), renewable energy standards (RES), and solar energy standards (SES) in Minn. Stat. § 216B.1691, which requires Minnesota utilities to provide 100 percent of their retail energy sales from carbon-free energy sources by 2040, as well as setting other interim renewable energy and solar energy targets. As such, the Project will support the state's growing demand for renewable energy and for utilities, independent power purchasers, and corporations seeking to use renewable energy for business growth. In addition, the Project will diversify electricity sources, address environmental concerns, meet anticipated growth in electrification (e.g., vehicles, heating), and address CFS, RES, SES, and policy goals, as described above. The Project will also benefit the local community through investment in construction spending, operation of the Project, property and business taxes, and landowner lease payments.

Lemon Hill Solar is working to secure a Power Purchase Agreement (PPA) or other enforceable mechanism to sell the electricity generated by the Project. The power generated by the Project will be offered for sale to wholesale customers, including Minnesota utilities and others that have identified a need for additional renewable energy and capacity.

1.2 APPLICANT INFORMATION

The Permittee for the Site Permit will be:

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1.2.1 Ownership at Time of Filing

Lemon Hill Solar is the owner of the Project at the time of filing this application and has obtained all necessary land rights for construction and operation of the Project.

The applicant is Lemon Hill Solar, LLC. Ranger Power, a Delaware limited liability company specializing in the development of utility-scale renewable energy projects in the United States, is developing the Project on behalf of Lemon Hill Solar. Lemon Hill Solar's indirect parent company is DESRI Holdings, L.P. (DESRI). DESRI and its affiliates acquire, own, and manage long-term contracted renewable energy assets in North America. As the applicant, Lemon Hill Solar will own and operate the proposed Project and is responsible for all regulatory, contractual, and financial obligations resulting from the Site Permit, land leases, and PPA.

1.2.2 Proposed Ownership after Commercial Operations

Lemon Hill Solar will own, operate, and maintain the Project after starting commercial operations. While not planned at this time, Lemon Hill Solar and DESRI reserve the right to sell or assign the Project to another qualified entity at any time, before, during, or after the Project is constructed. A sale of the Project would require approval by the Commission to transfer the Site Permit to the new owner, and any future buyer would be required to meet the conditions of the Site Permit as well as any other conditions at the local, state, or federal level.

1.3 PROJECT SCHEDULE

Permitting, site preparation, and construction of the Project is anticipated to occur during the timeframes indicated below in Table 1.3-1, Preliminary Project Construction Schedule; however, the schedule is subject to change.

TABLE 1.3-1

Preliminary Project Construction Schedule

Activity	Date
Obtain Financing	Q1 2027
Secure Land Rights	Complete
Obtain Site Permit from the PUC	Q2 2026
Obtain Other Permits	Q3 2026
Anticipated Interconnection Approval	Q1 2026
PV/Equipment Procurement	Q4 2026

TABLE 1.3-1

Preliminary Project Construction Schedule

Activity	Date
Mobilization/Civil Grading	Q4 2026
Begin Racking Installation	Q3 2027
Begin PV Module Installation	Q1 2028
Begin PV Commissioning	Q2 2028
Commercial Operations	Q4 2028
Decommissioning	2068

1.4 POTENTIALLY REQUIRED PROJECT PERMITS, APPROVALS, AND PLANS

Construction and operation of the proposed Project will likely require permits, approvals, and plans at the federal, state, and local levels. Potential permits, approvals, and plans are described below in Table 1.4-1.

TABLE 1.4-1

Potential Permits/Approvals/Plans

Agency	Permit/Approval/Plan	Applicability	Status and Timing
FEDERAL			
U.S. Army Corps of Engineers (USACE)	Section 404 Permit (Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act)	Dredging or filling jurisdictional Waters of the United States (wetlands/waterways).	To be obtained prior to construction as needed.
U.S. Environmental Protection Agency (EPA)	Spill Prevention, Control, and Countermeasures Plan	Project facilities with oil storage of more than 1,320 gallons.	To be prepared prior to construction as needed for construction related storage of fuel. To be prepared prior to operation for operation related storage of fuel if storage exceeds applicability thresholds.
STATE			
Minnesota Public Utilities Commission	Site Permit	Required for large electric power generating plants (LEPGP) 50 MW or greater.	To be obtained prior to construction.
Minnesota Pollution Control Agency (MPCA)	Section 401 Water Quality Certification	Required for Section 404 Individual and Nationwide Permits.	To be obtained prior to construction as needed.
	National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater Permit and Stormwater Pollution Prevention Plan	Construction activity that disturbs one or more acres of land.	To be obtained/prepared prior to construction.
	Storage Tank Registration	Required for back-up generator aboveground storage tanks exceeding 500 gallons and underground storage tanks exceeding 110 gallons	To be obtained prior to operation if storage tanks exceeding registration thresholds are installed.
Minnesota Department of Health (MDH)	Well Construction permit	Installation of a water supply well.	To be obtained prior to construction of a well (if needed for O&M building), as needed.

TABLE 1.4-1

Potential Permits/Approvals/Plans

Agency	Permit/Approval/Plan	Applicability	Status and Timing
Minnesota Department of Labor and Industry (MDLI)	Request for Electrical Inspection	Necessary to comply with state electrical codes.	Inspection to be conducted after installation of electrical equipment during construction and prior to operation.
Minnesota Department of Natural Resources (MNDNR)	Water Appropriation Permit	Required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year (dewatering).	Temporary Water Appropriation Permit, for Temporary Dewatering: To be obtained, as needed, if water withdrawals exceed 10,000 gallons per day or 1 million gallons per year.
Minnesota State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review; State and National Register of Historic Sites Review	Projects that require State permits or affect State registered properties or require Section 106 compliance	Obtain concurrence on Phase 1 inventory prior to construction.
Minnesota Department of Transportation (MnDOT)	Application for Utility Accommodation on Trunk Highway Right-of-Way	Installing utilities along, across, or within trunk highway right-of-way.	To be obtained prior to installation of utilities within MnDOT right-of-way, as needed.
	Access (driveway) Permit	Required for construction of a driveway/access road using MnDOT rights-of-way.	To be obtained prior to construction of driveway on MnDOT right-of-way, as needed.
	Oversize/Overweight Permit	Vehicles delivering equipment, materials, and supplies that exceed applicable MnDOT height/length and weight limits.	To be obtained prior to equipment deliveries, as needed.
COUNTY/LOCAL			
	Minnesota Wetland Conservation Act (WCA)	Activities affecting water resources.	To be obtained prior to construction in jurisdictional waters, if needed.
	Shoreland Development Permit	Required prior to constructing within a shoreland zone of a public water.	To be obtained prior to construction of new driveway access, as needed.
Olmsted County, MN	Utility Permit	Required for installation of utility infrastructure in a county highway right-of-way.	To be obtained prior to installation, as needed.
	Access Permit	Required for any changes proposed to driveway access along county highways	To be obtained prior to work, as needed.
	Oversized/Overweight Permit	Use of overweight/oversized vehicles on county roadways.	To be obtained prior to equipment deliveries, as needed.
	Septic System Permit	Installation of septic system.	To be obtained prior to construction of a septic system (if needed for operations and maintenance building), as needed.

1.4.1 Local Approvals

Pursuant to Minn. Stat. § 216E.10, Subd. 1 (2023), the issuance of a Site Permit for a large electric power generating plant is the sole site approval required to be obtained. The Site Permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government. In the event Project construction or operation requires changes to County roads (e.g., road improvements, additional aggregate), Lemon Hill Solar will consult with and obtain prior approval from the Olmsted County Highway Division.

Lemon Hill Solar has consulted with local officials early in the development process and will strive to incorporate feedback and reasonable recommendations from local stakeholders into the final design of the Project. A summary of public and regulatory outreach is described in Section 5.0.

1.4.2 Certificate of Need

Pursuant to Minn. Stat. § 216B.243, Subd. 2, no lar energy facility shall be sited or constructed in Minnesota without the issuance of a certificate of need by the Commission. However, in accordance with Minn. Stat. § 216B.243, Subd. 8, solar energy generating systems, for which a site permit application is submitted by an independent power producer under Chapter 216E, are exempt from the Certificate of Need process.

1.4.3 Site Permit

The Project meets the definition of a Large Electric Power Generating Plant (LEPGP) as defined in the Power Plant Siting Act and requires a Site Permit from the Commission prior to construction. In accordance with Minn. Stat. § 216E.04, subd. 2(8) (2023), Lemon Hill Solar seeks approval of its application under the alternative review process provided for under Minn. Stat. § 216E.04 (2023) and Minnesota Administrative Rules 7850.2800-7850.3900. Appendix A contains a Completeness Checklist summarizing where in the Application the required content is located.

The Applicant filed a Notice of Intent to Submit a Site Permit Application under the Alternative Permitting Process to the Commission on February 21, 2025.

1.4.4 Route Permit

The proposed 161 kV generation interconnect (gen-tie) line will connect the new Project substation, via a gen-tie line to Dairyland's Substation. The gen-tie line will not exceed 1,500 feet in length. As such, the gen-tie line will not meet the definition of a high voltage transmission line as found in Minn. Stat. Ch. 216E, and a route permit is not required.

1.4.5 Other Potential Permits and Approvals

Lemon Hill Solar will obtain all permits, licenses, and approvals that are required following issuance of the Site Permit. The potentially applicable permits and approvals for the construction and operation of the Project are shown in Table 1.4-1. Copies of agency correspondence concerning approvals are included in Appendix G (Agency and Tribal Coordination and Correspondence).

2.0 PROJECT INFORMATION

The following sections provide a description of the Site, Preliminary Development Area, and proposed Project infrastructure including land control, Project design, interconnection, prohibited areas, alternatives, and costs.

2.1 LOCATION

Lemon Hill Solar is proposing to build the solar facility in Haverhill and Viola Townships, in Olmsted County, Minnesota. Figure 1 depicts the location of the proposed Project facilities and Table 2.1-1 below provides the legal description of the Site in Township, Range, and Sections.

TABLE 2.1-1

Project Location

Township	Range	Section(s)
107N	12W	7, 17, 18, 19, 20, 29
107N	13W	11, 12, 13, 14, 23, 24

2.2 OVERALL PROJECT DESCRIPTION

The Site comprises approximately 1,945 acres of agricultural land located within Haverhill and Viola Townships in Olmsted County, Minnesota (Figure 1). Lemon Hill Solar has secured site control of all private lands for the proposed Project in the form of leases or transmission and collection easements (Appendix L Landowner list). In some cases, the Project will secure local government approvals to place collection lines in public rights-of-way. Lemon Hill Solar has not purchased any land in fee for the Project. The final Project design is anticipated to occupy approximately 966 acres, the Preliminary Development Area, with the additional acreage allowing for required buffers and flexibility in design. The Project will connect to the grid via a gen-tie line to Dairyland's Substation, which will be the Project's Point of Interconnection ([POI]; Figure 3). The proposed gen-tie line will not exceed 1,500 feet in length.

Lemon Hill Solar has designed an up to 180 MW AC solar PV system using single-axis trackers. Energy loss and electrical wiring have been minimized by optimizing the inverter locations and the electrical collector line system.

Equipment for the Project has not been finalized; however, Lemon Hill Solar used the Meyer Burger Glass Utility (550-to-565-watt peak [WP]) solar module for the proposed design, which is for ground-mounted solar power plants. The Meyer Burger solar module consists of 144 half cells with bifacial technology that is extremely durable and yields more energy over the same area even on cloudy or hot days. While the current design anticipates Meyer Burger technology, other panels and manufactures are under consideration. Any changes in technology moving forward are anticipated to build upon current Project efficiencies presented in this Application.

The Project's main components include PV panels mounted on a single axis tracking system, solar inverters, an operations and maintenance (O&M) building, and a substation. The racking system foundations will be pile driven, with the depth varying depending on the geotechnical investigation. The racking system foundations are not anticipated to require concrete; however, some concrete foundations may be needed depending on location and specific soil conditions. Associated facilities include electrical cables, conduit, switchgear, step-up transformers, supervisory control and data acquisition (SCADA) system, the gen-tie line, and metering equipment. The solar facility will be fenced and gated for security. After construction is complete, disturbed areas will be seeded with a beneficial seed mix to enhance soil and water retention and reduce stormwater runoff and erosion throughout the Site. The Applicant will work collaboratively with the Minnesota Department of Natural Resources (MNDNR) to maximize the opportunity to establish and manage the vegetation at the Project site pursuant to the Agricultural Impact Mitigation Plan (AIMP) (Appendix D) and the Vegetation Management Plan (VMP) (Appendix E).

Lemon Hill Solar proposes to interconnect the Project's new substation, via a gen-tie line to Dairyland's Substation. The gen-tie line will be supported by several wood or direct embedded steel posts that are anticipated to consist of a standard horizontal braced post. This interconnection will provide sufficient outlet to accommodate all the solar energy generation from the Project.

Because the Commission's Site Permit supersedes local permits, no township or county land use permits are required for development or construction of the Project. Based on the Olmsted County Zoning Map (Olmsted County, 2024a), the entire Site is zoned as A-1 Agricultural Protection District, and the Project is not located within any areas zoned as a shoreland district. The County's Zoning Ordinance includes "Solar Energy Farm" as a conditional use for the A-1 District (Olmsted County, 2024b). Section 10.52, Solar Energy Farms, outlines location and site design requirements and conditional use criteria. The Project will consider county requirements noted in the Ordinance where practicable and as discussed in Section 3.2.1.

See Section 1.4.1 regarding the site permit and preemption of local permits and zoning.

2.3 PROJECT, ASSOCIATED FACILITIES, AND INTERCONNECTION DESCRIPTION

2.3.1 Project and Associated Facilities

As further detailed in Section 3.0 and shown in Figure 4, the Project and associated facilities and equipment include:

- PV solar modules;
- Inverters;
- Step-up transformers (connecting solar panel inverters to collector lines/Project substation);
- Electrical wiring (connecting PV solar modules to solar panel inverters);
- Single-axis trackers;
- Collector lines (connecting solar panel inverters to Project substation);
- Security fencing and gates;
- Access roads;
- Stormwater treatment areas (associated with the Project);
- Operations and maintenance (O&M) building;
- Project substation;
- Dairyland substation;
- Power transformer(s);
- Overhead 161 kV Project gen-tie Line (Project substation to Dairyland's Substation)[1]

[1] Lemon Hill Solar requests that the Commission approve the 161 kv gen-tie line as an associated facility. There are no applicable local approvals required for this transmission line.

- Switchgear;
- Metering equipment; and
- Ancillary equipment or buildings as necessary.

2.3.2 Interconnection Description

The proposed 161 kV gen-tie line will be less than 1,500 feet in length and will connect the new Project substation to Dairyland's substation. A pad-mounted step-up transformer within the Project substation will increase the voltage to match the 161 kV of the Dairyland substation which will be developed, owned and operated by Dairyland Power Cooperative.

2.3.3 Size and Capacity

Lemon Hill Solar anticipates that approximately 966 acres are necessary to accommodate the final design and engineering of the Project. This includes the access roads, O&M building, solar panels, collector lines, and inverters.

Lemon Hill Solar has secured 100 percent land control, on private property, within the Site as either a lease or easement, but will still need permission for collector lines to be installed within the public right-of-way (ROW). Lemon Hill Solar has not purchased any land in fee for this Project. Lemon Hill Solar filed a Solar Size Determination Request with DOC EERA on April 4, 2025 (Appendix G). DOC EERA provided a written response on April 15, 2025, and determined that the Project is not associated with any other planned or existing solar projects and therefore is not required to be combined with another project for the purposes of the Site Permit. Based on the size of the proposed Project, Lemon Hill Solar must obtain a Site Permit from the Commission. Figure 3 shows the Project POI and preliminary facility design, including associated infrastructure. Additional information on the facility design is provided in Section 3.1, and the preliminary site plan is provided in Appendix C.

2.4 PROHIBITED SITES AND EXCLUSION AREAS

The proposed Site does not include any prohibited or exclusion areas as defined below.

Minnesota Rules 7850.4400, subp.1 prohibits power generating plants from being sited in prohibited areas, including: national parks; national historic sites and landmarks; national historic districts; national wildlife refuges; national monuments; national wild, scenic, and recreational riverways; state wild, scenic, and recreational rivers and its land use districts; state parks; nature conservancy preserves; state scientific and natural areas; and state and national wilderness areas. The proposed Project facilities are not located in any of the aforementioned prohibited sites (Figure 5).

In addition, Minnesota Rule 7850.4400, subp.3 requires applicants to avoid siting power generating plants in several exclusion areas unless there is no feasible and prudent alternative. These exclusion areas include: state registered historic sites; state historic districts; state Wildlife Management Areas; county parks; metropolitan parks; designated state and federal recreational trails; designated trout streams; and state water trails. The proposed Project facilities are not located in any of the listed exclusion areas (Figure 5).

2.4.1 Prime Farmland

Subject to certain exceptions, Minnesota Rule 7850.4400, subp. 4 prohibits LEPGPs 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 to the proposed location. The Site includes approximately 1,179 acres of prime farmland, 148 acres of prime farmland if drained, and 365 acres of farmland of statewide importance (Figure 6; Section 4.3.1). Given the 180 MW net generating capacity of the Project, this rule would allow use of up to 90 acres of prime farmland for the Project. According to the Soil Survey Geographic Database, the Preliminary Development Area contains 681 acres of prime farmland (75%), 54 acres of prime farmland if drained (6%), and 185 acres of other important farmlands (20%), for a total of 920 acres, which is 95% of the Preliminary Development Area (Figure 6) (U.S. Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS], 2025). These acreages of prime farmland will be taken out of production for the anticipated 40-year life of the Project but will not be permanently removed.

In May 2020, the Minnesota DOC issued a guidance document titled *Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternatives* (Minnesota DOC, 2020). The only exception to Minnesota Rules 7850.4400, subp. 4 is if there is no "feasible and prudent" alternative. The guidance document is intended to assist solar developers in defining feasible and prudent siting alternatives. Lemon Hill Solar completed an evaluation of potential alternatives to find a location for the Project that would use fewer acres of prime farmland. Lemon Hill Solar used publicly available solar generation data in Minnesota to determine solar potential in southern Minnesota. With this data, Lemon Hill Solar focused on identifying a suitable Project site near an existing transmission line with available capacity to maximize solar generation in an area where it can be economically delivered to the electrical grid.

Lemon Hill Solar proposes to interconnect the Project, via a gen-tie line to Dairyland's 161 kV Rochester to Wabaco line in Olmsted County, Minnesota. Lemon Hill Solar filed a queue position with the MISO in the MISO DPP 2021 West study cycle as J2219. It is anticipated that Lemon Hill Solar will execute a GIA with the MISO for 180 MW; Lemon Hill Solar will notify the Commission when the GIA has been executed. This interconnection will provide sufficient outlet to accommodate all the solar energy generation from the Project.

Lemon Hill Solar evaluated alternative sites within 5 miles of the Site. Those alternative sites were ultimately ruled out because they were unable to meet the limit set in Minnesota Rule 7850.4400, subp. 4 that an energy generation facility should not occupy more than 0.5 acre of prime farmland per MW of net generating capacity. In addition, Lemon Hill Solar evaluated the area within 5 miles of the proposed point of interconnection to determine if land was available and suitable for construction of the Project. The 5-mile search radius was largely driven by the economics of solar construction. A solar project of this size that requires more than 5 miles of new electrical transmission infrastructure to connect to existing grid infrastructure is generally uneconomical due to the costs of the new transmission infrastructure and the line losses that would be realized over distances greater than 5 miles. Optional sites that would require longer transmission facilities to connect a project to the grid would result in higher costs for tasks such as design, permitting, and construction. These sites would also necessitate completing a routing study, identifying possible suitable land and willing landowners, potentially impacting significantly more natural and cultural resources, creating additional visual impacts, and requiring additional operation and maintenance needs.

Documentation of this evaluation is provided in Appendix B to show that there is not a feasible and prudent alternative to the Project that satisfies the prime farmland exclusion rule.

2.5 ALTERNATIVES CONSIDERED BUT REJECTED

In accordance with Minn. Stat. § 216E.04, Subd. 2(8) (2023), the Project qualifies for the alternative review process under Minnesota Rules 7850.2800-7850-3900 because it is a LEPGP that is powered by solar energy. As such, Lemon Hill Solar is not required to analyze alternative sites pursuant to Minnesota Rules 7850.3100 unless it rejected alternative sites. Lemon Hill Solar did seek and analyze other areas in Minnesota where the Project could be sited to be compliant with the prime farmland exclusion rule (Section 4.3.1; Section 4.5.2; Appendix B). These alternatives were determined to not be feasible or prudent for siting the Project and were not carried forward as Project alternatives (Appendix B). Lemon Hill Solar selected the proposed Site due to minimal environmental and prime farmland impacts, proximity to the electrical grid and existing transmission infrastructure, willing landowners, and available capacity of the grid to which the Project will interconnect.

2.6 COST ANALYSIS

Estimated project costs are reflected in Table 2.6-1 Estimated Project Costs below.

TABLE 2.6-1

Estimated Project Costs

Task	Cost*
Planning and Permitting	$0.5-1 million
Development, Financing, Engineering, Procurement & Construction (Panels, Panel Racking, Cabling, Inverters, Fencing, Transformers, Construction Contractor/Labor)	$160-200 million
Operation (Vegetation Management, Insurance, Remote Monitoring, Equipment Maintenance and/or Replacement)	$1-2 million
Decommissioning	$1-4 million
Interconnection	$5-10 million
Project Substation & Gen-Tie Line	$20-35 million
TOTAL	**$187.5-252 million**

* All costs are subject to change. Costs are presented as a range to reflect the contingency, or variability, built into the estimates.

2.7 FUTURE EXPANSION

Lemon Hill Solar does not currently plan to expand the proposed Project. Land that is proposed for development will be leased from landowners for a term of 40 years.

3.0 ENGINEERING AND OPERATIONAL DESIGN

The following describes the Project design, facility equipment, associated facilities, O&M building, security fencing, and access to the Project. The Preliminary Facility Design is shown on Figure 4 and in the Preliminary Site Plan (Appendix C).

3.1 DESIGN

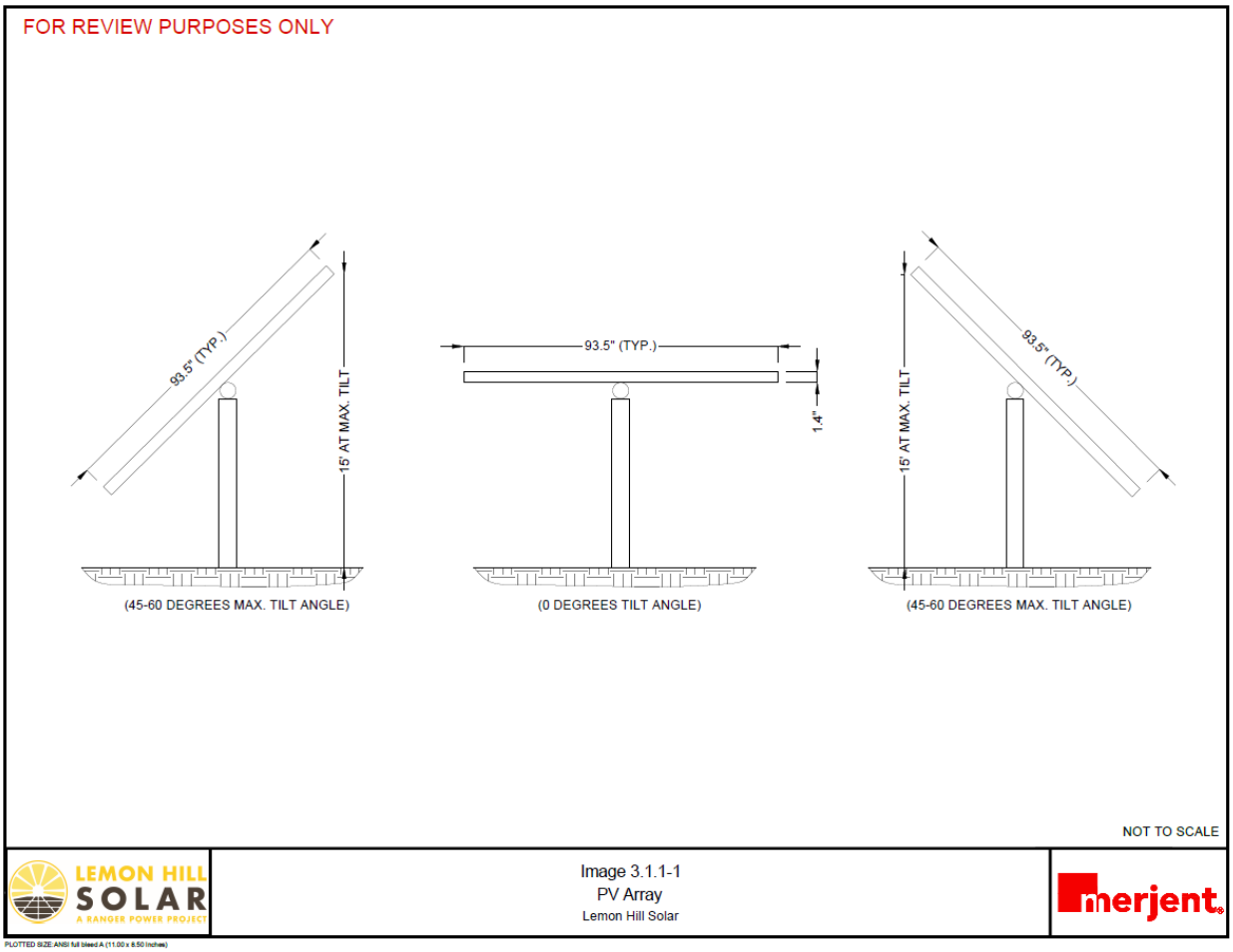
The Project's primary components include PV solar modules mounted on a single axis tracking system, inverters, a Project substation, Project gen-tie line, electrical collector lines, an O&M building, fencing, and access roads (Figure 4; Appendix C). One meteorological tower, less than 15 feet high, is proposed and will be used to collect relevant weather data that correlates to the plant's performance. Weather stations will be within the Preliminary Development Area and will

be up to 20 feet high. The final number, design, and locations will be determined during final engineering design.

3.1.1 Photovoltaic Arrays and Solar Field

The current design assumes use of Meyer Burger Glass Utility (550 to 565 WP) panels and SunGrow SG4400UD-MV-US inverters. The final selection of equipment will depend upon equipment that is available at the time of construction. For descriptive purposes, an individual tracker row is used as a basic unit of the Project. A tracker row is made up of modules mounted on a flat beam that is oriented north-south, with a break in the middle where the gear box is located. Lemon Hill Solar is proposing to use bi-facial modules affixed to tracking mechanisms that will allow the modules to follow, or track, the sun from east to west daily. The modules and tracking rack system are generally aligned in rows, oriented north and south with the PV solar modules facing east toward the rising sun in the morning, parallel to the ground during midday, and then west toward the setting sun in the afternoon. The modules are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day (Image 3.1.1-1). The tracking rack system allows the Project to optimize the angle of the modules in relation to the sun throughout the day, thereby maximizing production of electricity and the capacity value of the Project.

When the sun is directly overhead, the PV solar modules will be at a zero-degree angle (level to the ground) and approximately 4 to 7 feet off the ground. The tracker rows will follow the sun from a maximum of approximately 60 degrees east to 60 degrees west through the course of the day (the design tilt may vary). At the approximate maximum tilt of 60 degrees, the edge of the modules will be a maximum of 15 feet off the ground, and a minimum of 18 inches off the ground or greater, as determined by site specific constraints. The design will involve no spinning machinery (except for the tracker motor), no thermal cycle, and no water use (except for possible infrequent module washing and dust control). The racking system consists of all the components involved in fastening the modules to the tracker rows, plus the tracker beams, gearboxes, motors, and pile foundations. The Project will require approximately 378,390 PV panels to provide 180 MW of solar energy.



To the extent practical, the racking system foundations will be installed on piles and will not require concrete. Approximately 70,000 to 80,000 piles will be required for the Project; however, the number of piles will vary based on specifics within the structural design. Lemon Hill Solar will complete a geotechnical investigation prior to construction to determine if some concrete foundations will be required. The depth of pile foundations will vary based on the geotechnical investigation and final design. It is possible that new solar module designs could be introduced to the market prior to construction and those modules could increase the efficiency or cost-effectiveness of the Project (e.g., higher efficiency or higher wattage per module options). As such, it is important to maintain as much flexibility in the individual supplier and technology choice as possible to ensure selection of the best equipment to fit the Project at the time of procurement. Selection of newer, higher wattage equipment that may become available before the Project begins construction could potentially reduce the overall footprint of the Project while increasing efficiency and performance. Lemon Hill Solar will consider the costs and performance of each technology option, as well as environmental and safety standards, when making its final selection. This process has been included in the proposed Project timeline and the final selection should not alter the Project scope, timeframe, or budget.

3.1.2 Project Substation

The Project substation is proposed for an area east of County Road 102 NE and north of the existing overhead transmission line owned by Dairyland (Figure 3). The Project substation is

estimated to occupy approximately 3.6 acres of land and will connect the Project to the transmission grid. It will be designed in accordance with regional utility practices and codes.

The Project substation will include a parking area and will be accessible to operations and approved parties at all times using the Project's access roads. It will consist of supporting structures for high voltage electrical structures, breakers, transformers, lightning protection, and control equipment. The Project substation location will be graded and the ground surface dressed with crushed rock. Secondary containment areas for the transformer will be installed as necessary. The fenced area of the Project substation footprint will be approximately 250,000 square feet in size (subject to final substation layout). Underground 34.5 kV collector lines from the Project will deliver solar-generated energy to the Project substation. A pad-mounted step-up transformer within the Project substation will increase the voltage to match the 161 kV of the Dairyland substation, which will be developed, owned and operated by Dairyland Power Cooperative

Per MNDNR recommendations regarding other recent solar projects with substations, the Project substation's lighting will follow the Minnesota Department of Transportation's (MnDOT) approved products for luminaries, which recommends using shielded and downward facing lighting and lighting that minimizes blue hue. LED lights tend to emit blue light, which can be harmful to birds, insects, and fish. Lemon Hill Solar will choose lighting for the Project substation and O&M building that limits the maximum nominal color temperature to 4000 kelvin.

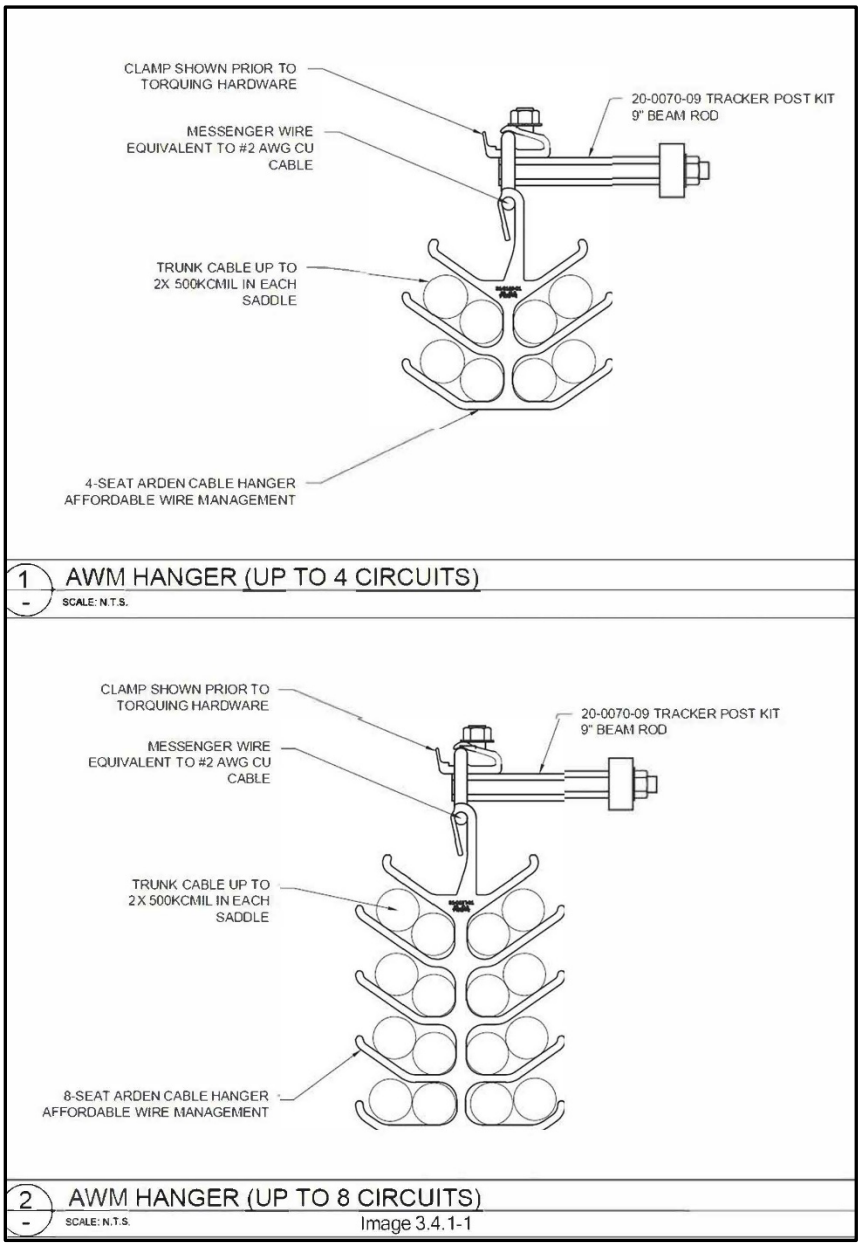
The area within the Project substation will be graveled to minimize vegetation growth in the area and reduce fire risk. The substation will be fenced with a 7-foot-high chain-link fence for security and safety purposes.

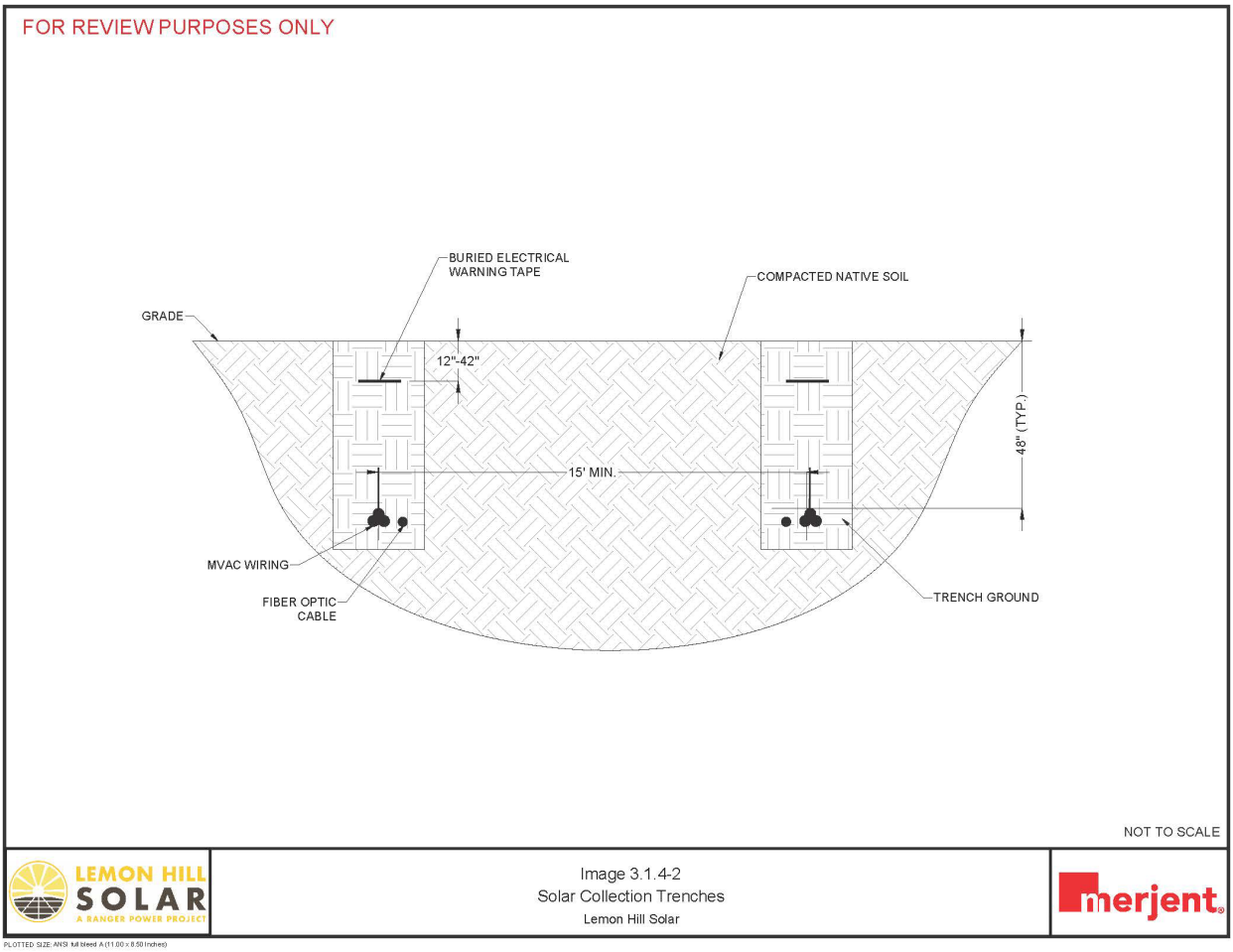
3.1.3 Gen-Tie Line

The Project will deliver electricity to the grid by way of a 161 kV overhead gen-tie transmission line approximately 530 feet long, pending final engineering design. The gen-tie line will be strung from a single dead-end structure located within the Project substation to another dead-end structure within the POI substation. The structures will be made of wood or steel and will be less than 150 feet tall. The type of conductor will be determined following the completion of detailed electrical design.

3.1.4 Electrical Collection System and Power Conversion

The solar panels deliver power to the inverters through underground collector lines. The collector line system (approximately 33.6 miles of collector lines) will either be buried in a trench or conduit or may be a combination of both above and belowground, in which case the direct current (DC) collector line will be strung under each row of panels and racking (Image 3.1.4-1), and the alternate current (AC) collection will be buried belowground. The collector line trenches will be approximately 1 to 2 feet wide and they will be at least 4 feet deep (Image 3.1.4-2) in accordance with the AIMP. The electrical collector line system cables will be installed using a trenching machine, excavator, or equivalent to a depth of approximately 4 feet to account for existing utilities or other features. During trench excavations, the topsoil and subsoil will be removed and stockpiled separately. Once the collector lines are laid in the trench, the trench will be backfilled with subsoil followed by segregated topsoil. Stockpiled topsoil will be replaced over the subsoil in sufficient quantities to ensure restoring the trench to the original grade after settling. Best management practices (BMP) that will be used during earthmoving activities are described in detail in the AIMP.


CLAMP SHOWN PRIOR TO TORQUING HARDWARE
MESSENGER WIRE EQUIVALENT TO #2 AWG CU CABLE
TRUNK CABLE UP TO 2X 500KCMIL IN EACH SADDLE
4-SEAT ARDEN CABLE HANGER AFFORDABLE WIRE MANAGEMENT
20-0070-09 TRACKER POST KIT 9" BEAM ROD
1 - AWM HANGER (UP TO 4 CIRCUITS)
SCALE: N.T.S.
CLAMP SHOWN PRIOR TO TORQUING HARDWARE
MESSENGER WIRE EQUIVALENT TO #2 AWG CU CABLE
TRUNK CABLE UP TO 2X 500KCMIL IN EACH SADDLE
8-SEAT ARDEN CABLE HANGER AFFORDABLE WIRE MANAGEMENT
20-0070-09 TRACKER POST KIT 9" BEAM ROD
2 - AWM HANGER (UP TO 8 CIRCUITS)
SCALE: N.T.S.
Image 3.4.1-1



The specific electrical collector line technology used will be site-specific depending on geotechnical analysis, constructability, and availability of materials. Final engineering and procurement will help determine the construction method for the electrical collector line system.

A specific inverter has not been selected for the Project. The proposed inverter at the time of the application submittal is the SG4400UD-MV-US. The inverter is approximately 19.9 feet by 9.5 feet by 8 feet, and 60 inverters are included in the preliminary layout. Lemon Hill Solar will select a final inverter based on availability at the time of procurement. Lemon Hill Solar will consider the cost and performance of each option, as well as environmental and safety standards, when making its final selection. This process has been included in the proposed Project timeline and the final selection should not alter the Project scope, schedule, or budget.

Each inverter will be located on an inverter/transformer skid that will also include the SCADA system. The skids will be placed on concrete slabs or pier foundations, depending on soil conditions. Inverters convert the DC output of the PV modules to AC, which is required for delivery to the electrical grid. After the inverter has converted the electricity, it is stepped-up via a transformer from low voltage to medium or intermediate voltage (stepped up to 34.5 kV). The final number of inverters for the Project will depend on the inverter size, inverter and module availability, as well as the final array configuration.

3.1.5 Operations and Maintenance Building

The Project will include construction and use of an O&M building (Figure 4; Appendix C). The O&M building will be located within the Project Boundary, near the proposed substation, in an upland area. The O&M building is anticipated to occupy 0.6 acre and will be used to conduct maintenance and repair of Project equipment and solar module components, store parts and other equipment, and store other operation and maintenance supplies (e.g., materials for cleaning PV panels). The O&M building will be locked when not in use by Project staff and it will also store the SCADA system that will remotely monitor Project facilities.

3.1.6 SCADA Communication System

An automated SCADA system located in the O&M building will provide remote supervision and control of solar array and performance. O&M activities will be consistent with applicable North American Electric Reliability Corporation (NERC) Reliability Standards. Solar arrays and the substation are monitored remotely by staff at the operations facility, and the Project will use a SCADA system, which will monitor operations 24 hours per day, 7 days a week. Faults are reset remotely, when possible, to ensure high panel availability. Communication between the solar arrays, Project substation, and O&M building is accomplished using fiber optic lines that run between each facility and will be installed with the collection lines.

3.1.7 Fencing

Permanent security fencing will be installed along the perimeter of each grouping of the solar arrays (Figure 4; Appendix C). Perimeter fencing will consist of a lightweight agricultural woven wire fabric topped with smooth wire and secured to wooden posts which will be directly embedded in the soil or set in concrete foundations as required for structural integrity. The perimeter fencing will extend a maximum total height of approximately 7 feet above grade.

Warning signs, including “high voltage keep out” signs, will be placed in accordance with the National Electrical Safety Code (NESC) requirements along the fence line. This fencing will be designed to prevent the public and larger wildlife from gaining access to solar array electrical equipment which could cause harm or injury.

To comply with the NESC, security fencing around the Project substation will consist of a 7-foot-high chain-link fence topped with barbed wire. Fence posts will be spaced a maximum of 10 feet apart and high voltage warning signs will also be installed on the Project substation fence. As indicated above, a lockable gate will be installed with the Project substation site fencing. This fencing and gate will be designed to prevent the public and wildlife from gaining access to electrical equipment which could cause injury.

3.1.8 Access Roads/Transportation System

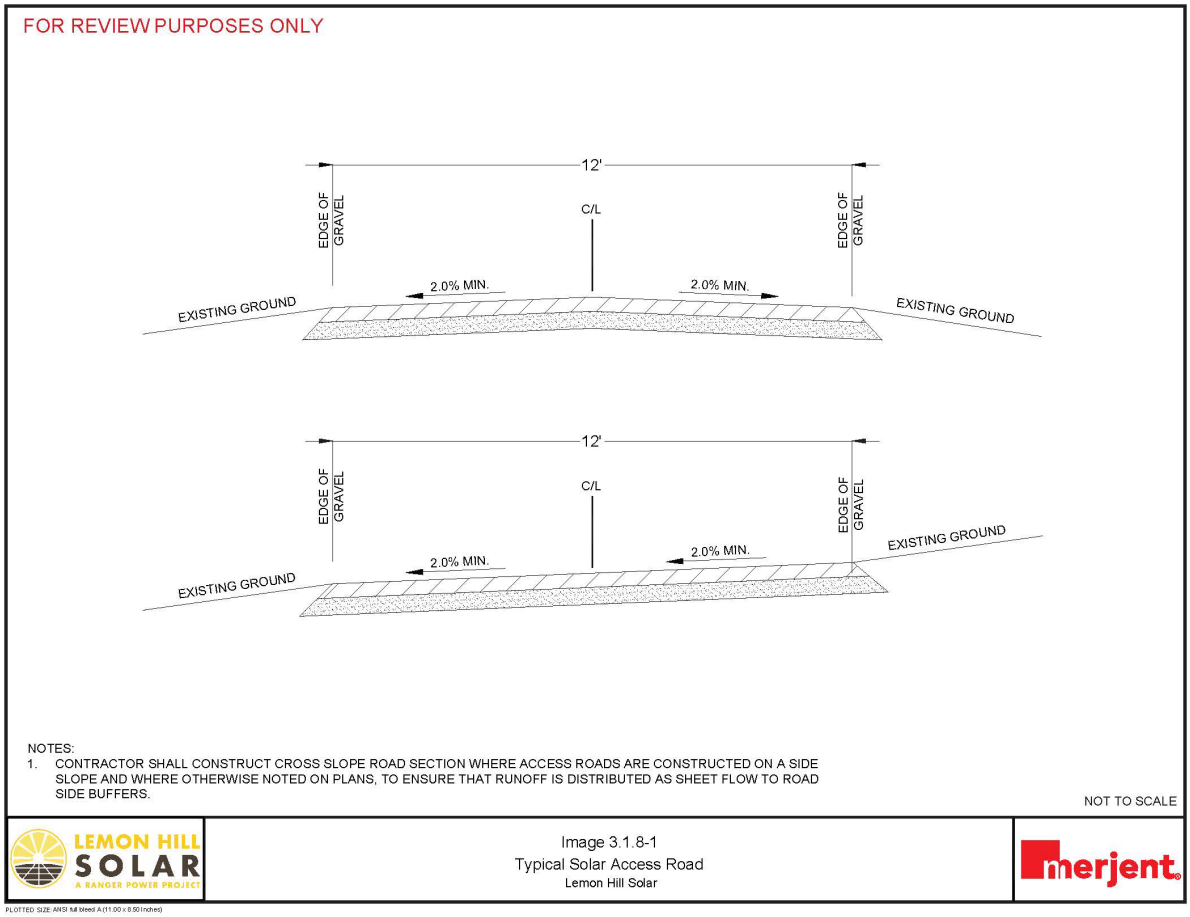
The Project will include approximately 28 graveled access roads totaling 14 miles in length that lead to the inverters and the O&M building (Figure 3; Figure 4). The final length of the access roads will depend on the equipment selected and final engineering. These roads are typically 12 to 16 feet wide along straight portions of the roads and wider along curves at internal road intersections (approximately 45 feet) as indicated in Image 3.1.8-1.

During construction, access roads may be temporarily widened and then reduced in width for long-term site access upon completion. The Project substation and O&M building will be accessed

using a newly furnished gravel road extending east from County Road 102 NE to the Project facilities. All access roads developed for construction of the Project will be maintained as permanent access roads during the operational life of the Project. During Project decommissioning, access roads will be removed and the land returned to its prior use in accordance with the AIMP, unless other arrangements are requested by the landowner.

Upgrades or other changes to the public roads, which may include but are not limited to road improvements, additional aggregate, and driveway changes, may be required for construction or operation of the Project. Lemon Hill Solar will work with Olmsted County to facilitate upgrades to meet required standards and with landowners for final design considerations as needed.

Lemon Hill Solar will continue to coordinate with county and state road authorities as the Project develops. Lemon Hill Solar will obtain driveway and/or access permits from relevant road authorities relating to access to the Project through public roads, as well as installation of temporary facilities that may be proposed to occupy portions of public road rights-of-way during the construction process. Lemon Hill Solar will also obtain relevant permits and/or authorizations from road authorities relating to electric cables and/or feeder lines that may be placed in or across a public road right-of-way.



3.1.9 Stormwater Ponds

The preliminary design for the Project includes several stormwater ponds throughout the Preliminary Development Area that vary in size (Figure 4). These stormwater ponds are generally located in existing low areas. The final design and location of these stormwater ponds will be determined based on the Project's final design and will be included in the final design documents provided to the Commission prior to construction.

3.1.10 Laydown Yard

At least one laydown yard will be used to store Project and construction equipment during construction and for construction personnel vehicle parking. The location of the laydown yard will be determined during the final design phase prior to construction. The yard will be constructed using gravel and will be located on flat ground temporarily leased from a private landowner for this purpose. After Project construction, the gravel will be removed, the soils decompacted, and the land returned to its original condition in accordance with the AIMP, unless otherwise agreed to with the landowner.

3.1.11 Pipeline System

No pipeline system will be built, accessed or needed to accomplish the Project. As no pipelines will be needed for the Project, this section is not applicable to the Application.

3.2 PROJECT LAYOUT

The final layout will minimize environmental impacts and optimize electrical generation. While not required (Section 1.4.1), Lemon Hill Solar has sited the Project to comply with the County's published setbacks for solar facilities, where possible, and will comply with other local, state, and federal regulations as required. In addition, all MNDNR buffer requirements under Minn. Stat. § 103F.48 have been met. The preliminary Project layout is provided in Figure 4.

3.2.1 Setbacks

The Project is considered a LEPGP as defined in Minn. Stat. § 216E.01, Subd. 6 (2023) and Minn. Admin. R. 7850.1000, Subp. 13; therefore, as described in Section 1.4.1, the Site Permit issued by the Commission supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

As a voluntary measure, Lemon Hill Solar has attempted to incorporate Olmsted County setbacks and applicable ordinance standards in addition to meeting applicable State requirements. Chapter A-1 Agricultural Protection District of the Olmsted County Zoning Ordinance includes setbacks for solar projects under the county's jurisdiction. Olmsted County's setbacks are included in Table 3.2.1-1 below for reference.

TABLE 3.2.1-1

Olmsted County Setback Requirements[c]

Setback Type	County Setback Distance (feet)	Project Design Setback (feet) – closest to array [a]
Dwelling Sites	N/A	250
Cemeteries	N/A	1,435
Road Right-of-Way	N/A	70
Front Yard Property Line[b]	45	70

TABLE 3.2.1-1

Olmsted County Setback Requirements[c]

Setback Type	County Setback Distance (feet)	Project Design Setback (feet) – closest to array [a]
Side Yard Property Line[b]	45	47
Rear Yard Property Line[b]	25	90

[a] Based on current preliminary design and currently built infrastructure within the Site. Final distances may vary but, in any case, Lemon Hill Solar will work with the county to meet minimum setback requirements where feasible.

[b] Setbacks from property lines are based on non-participating landowners.

[c] We reviewed both Haverhill and Viola Township Zoning Ordinances and neither appear to contain applicable setbacks more stringent than those from Olmsted County.

Additionally, Lemon Hill Solar implemented the following setbacks and BMPs into the design of the Project as a matter of internal best practice (Table 3.2.1-2; Figure 4). Setbacks are calculated from the nearest solar array.

TABLE 3.2.1-2

Lemon Hill Solar Initiated Setbacks

Setback Type	Project Design Setback (feet) – closest to array
Wetlands	13
Transmission lines	65
Occupied dwelling	250
Public waters	300

3.2.2 Project Development Area

Table 3.2.2-1 provides the Project's estimated acreages for each component within the 1,945-acre Site, based on the preliminary design (Figure 4). The Preliminary Development Area is 966 acres.

TABLE 3.2.2-1

Estimated Project Component Acreages in Preliminary Development Area

Project Component	Acres
Access Roads	20.8
Inverters	0.6
Project Substation	5.6
Project O&M building	0.6
Solar Modules (excludes vegetated spacing between modules)	264
Collector Line System	39
Stormwater Facilities	6.4
Unused Area (acreage within the Preliminary Development Area with no facilities, including vegetated spacing between modules)	632

[a]The total is larger than the Site due to overlap in project infrastructure.

3.3 CONSTRUCTION, COMMISSIONING, RESTORATION, OPERATION AND MAINTENANCE

A variety of activities must be completed to carry the Project through construction and into operation. Below is a list of activities necessary to develop the Project. Pre-construction activities will be completed between submittal of this Application and the start of construction. Construction

will not begin until the Site Permit is approved and all pre-construction permit requirements have been completed to the satisfaction of the Commission.

- Pre-construction
  - Geotechnical analysis;
  - Underground utility identification and location;
  - Project substation design;
  - Final design: solar array, access roads, electric collector line system;
  - Procurement of facility components (e.g., solar modules, tracking system, inverters, and transformers); and
  - Pre-construction filings and other activities required in the approved Site Permit
- Construction
  - Site preparation, grubbing, grading, and vegetation establishment;
  - Construct laydown areas and set up temporary job site trailers;
  - Civil construction of access roads;
  - Construct fencing;
  - Install PV pile foundation posts;
  - Tracker installation;
  - PV solar module installation;
  - Install belowground collector line system;
  - Install electrical enclosure/inverters;
  - Construct Project substation;
  - Construct O&M building; and
  - Construct Project gen-tie Line
- Post-construction
  - Restore disturbed areas not intended for permanent above-ground facilities (Permanent above-ground facilities include the Project substation, O&M building, and access roads);
  - Test facility; and
  - Begin commercial operation.

3.3.1 Construction and Construction Management

Project construction will begin with workforce mobilization and the initial site preparation work, including grading, vegetation removal, and any necessary tree removal.

Typical construction equipment such as scrapers, bulldozers, dump trucks, watering trucks, motor graders, vibratory compactors, and backhoes will be used during construction. Specialty construction equipment that may be used during construction include:

- Skid steer loader;
- Pile driver;
- Medium duty crane;
- All-terrain forklift;
- Concrete truck and boom truck;
- High reach bucket truck; and
- Truck-mounted auger or drill rig.

Upon completion of construction, heavy equipment will be removed from the Site.

3.4 SITE CLEARING AND VEGETATION REMOVAL

Construction is expected to start as early as Q4 2026 subject to permitting and other factors. A majority of the Site and Preliminary Development Area are agricultural fields and contain little other vegetation or other natural features (Figure 2). Depending on timing of the start of construction, crops may be harvested prior to construction; mowed down to remove vegetation; or not planted, if construction occurs between fall and late spring. Site preparation and the sequence of activities will ultimately be determined when construction starts. Temporary and perennial vegetation seed mixes, herbicide treatments, and mowing will be used in combination to prepare the site for revegetation while keeping soil stabilized during construction and reducing the establishment of noxious or invasive species. The VMP (Appendix E) includes the process for scheduling and sequencing site preparation activities under different construction start timeline scenarios.

3.5 EARTHWORK

The majority of soil disturbances will occur during the first phase of Project construction when grading takes place; this will include constructing the internal access roads, substation, and O&M building site. The contractor may need to move soil to level portions of the Project site or to complete minor grading of topsoil to minimize disruption and avoid erosion. The earthwork activities will be completed using typical earthmoving construction equipment such as scrapers, bulldozers, front-end loaders, excavators, and skid-steers. BMPs that will be used during earthwork are described in the AIMP (Appendix D).

Topsoil that sits higher than other areas will be moved to lower areas that need to be leveled. Topsoil will be moved outside of the graded areas, where necessary, and stored in designated locations for later use. Once topsoil is removed from the graded areas, the contractor will remove the subsoil material as required for construction from on-site elevated areas and relocated to on-site low spots. Prior to relocating subsoil materials to the low spots, topsoil in the low areas will be stripped and set aside before the fill is added, then re-spread over the new fill. The subsoil material will be compacted in place. When compaction is complete, the topsoil will be re-spread over the reconditioned subsoil material.

Subsoil handling will be similar to the handling of topsoil as described above. Excess subsoil will be segregated and relocated to low spots. Low spots will be filled with subsoil after topsoil is stripped and set aside; topsoil will then be respread over the new fill.

3.6 ACCESS ROAD CONSTRUCTION

As a component of earthwork, permanent Project entrances, access roads, and turnouts will be constructed to support the Project. Access road construction will start with the stripping and segregating of topsoil materials from the proposed roads. The contractor will then compact the subgrade materials to the specified compaction requirements as laid out by the civil and geotechnical engineer. After suitable compaction levels are reached and verified, the contractor will then install the road as designed, with a gravel surface generally 4 to 12 inches deep. The gravel will be placed level with the existing grade to facilitate drainage and minimize ponding. After the road surface is compacted, the contractor will shape Project drainage ditches, where needed, as based on the grading plan, which will be developed prior to construction.

Topsoil removed from permanent access roads (Figure 4) will be moved to storage locations near the site of removal and graded for storage. At the time of topsoil removal, storage locations will be identified (including boundary and depth) and recorded on site maps to facilitate final reclamation as part of decommissioning.

3.7 SOLAR ARRAY CONSTRUCTION

After grading activities are complete, the racking system foundations will be pile driven, with the depth varying depending on the geotechnical investigation. In general, the racking system foundations are not anticipated to require concrete; however, some concrete foundations may be needed depending on location and specific soil conditions. Foundations will typically be made of galvanized steel. The pile is driven using a hydraulic ram, screw installer that moves along tracks, or similar. Soil disturbance for this task will be negligible since the pile driver equipment that will be used does not excavate soil. Pile driving equipment is commonly about the size of a small tractor and often equipped with tracks to disperse its weight over a larger ground surface and reduce soil disturbance, rutting, and compaction.

The remainder of the racking system will be installed on top of the driven pilings; this is typically completed by construction crews using hand tools and tracked equipment to distribute the materials. The racking system consists of all the components involved in fastening the modules to the tracker rows, plus the tracker beams, gearboxes, and motors.

During racking and array assembly, multiple crews and various types of vehicles will be working within the Site. To the extent practicable, vehicular traffic will be limited to permanent and temporary access roads to minimize soil disturbance, mixing, and compaction. These vehicles could include flatbed trucks, small all-terrain vehicles, pick-up trucks, and trailers used to transport equipment and workers throughout the Site. Installation crews will proceed along staked temporary access roads in a pre-established route to minimize off-road traffic.

3.8 ELECTRICAL COLLECTOR LINE SYSTEM

The collector line system will either be buried in a trench or conduit or may be a combination of both above and belowground, in which case the DC collector lines will be strung under each row of panels and racking, and the AC collector lines will be buried belowground. Final engineering and procurement will determine the construction method for the electrical collector line system;

as such, additional areas of collector line system may be installed via directional bore. Lemon Hill Solar assumes the trench installation method as a worst-case scenario. Measures to mitigate activities and conditions that have the potential to cause sediment runoff, such as trenching, will be outlined in the construction stormwater permit and associated stormwater pollution prevention plan (SWPPP), which will be prepared prior to and implemented during construction of the Project.

The electrical collector line system cables will be installed using a trenching machine, excavator, or equivalent to a depth of approximately 4 feet to account for existing utilities or other features. During trench excavations, the topsoil and subsoil will be removed and stockpiled separately. Once the collector lines are laid in the trench, the trench will be backfilled with subsoil followed by segregated topsoil. Stockpiled topsoil will be replaced over the subsoil in sufficient quantities to ensure restoring the trench to the original grade after settling. BMPs that will be used during earthmoving activities are described in detail in the AIMP (Appendix D).

3.9 INVERTER AND ASSOCIATED FACILITY INSTALLATION

Inverter installation will begin with topsoil removal. Topsoil will be stockpiled at designated locations to be identified prior to construction and graded to facilitate revegetation. Each inverter will be pile driven and located on a mounded gravel pad. Inverters are commonly set in place using a hydraulic crane or similar equipment. The foundation for an inverter typically includes metal piles (approximately 10 to 12) that are installed vertically into the ground. The inverter arrives on a metal skid, which is either mechanically attached to the vertical piles with bolts or similar, or is welded directly to the piles. Electrical cables and conduit will be installed and junction boxes will be located on the rear of the PV panels to house required cabling connecting equipment. Other associated facilities that will also be installed include switchgear, step-up transformers, SCADA system, and metering equipment.

3.10 PROJECT SUBSTATION CONSTRUCTION

Project substation construction will begin with removing and segregating topsoil and placing it in a designated location that will be identified prior to construction. Site preparation will also involve installation of substructures and electrical equipment. Equipment needed for the installation of concrete foundations and equipment embedments may include trenching machines, concrete trucks, pumpers and vibrators, forklifts, boom trucks, and cranes. Structures to be installed at the substation include high voltage electrical structures, breakers, transformers, lighting protection, and control equipment. The graded surface will be dressed with crushed rock between and among installed substation equipment. Adequate lighting will be installed around the substation site for worker safety during construction and operation.

Larger substation foundations will typically be installed using a small backhoe to excavate, prior to pouring the concrete slabs. More minor substation foundations will typically use an auger drill type machine. Using either method, the disturbance limit will be within the footprint of the substation for both the foundation equipment and the concrete delivery trucks. BMPs that will be used during earthmoving activities are described in the AIMP. Topsoil removed from the Project Substation will be segregated from the subsoil and preserved in a nearby designated location for later restoration during Project decommissioning. The topsoil stockpile area(s) will be recorded and graded to facilitate long term preservation and revegetation. Subsoil will be removed during excavation and re-used, as needed, or moved to a pre-established approved area for storage. As part of later decommissioning, subsoil will be replaced first, followed by topsoil placement. The soil will be replaced and brought back to pre-construction contours.

3.10.1 Gen-Tie Line

The Project will deliver electricity to the grid by way of a 161 kV overhead gen-tie transmission line approximately 530 feet long, pending final engineering design. The gen-tie line will be strung from a single dead-end structure located within the Project substation to another dead-end structure within the POI substation. The structures will be made of wood or steel and will be less than 150 feet tall. The type of conductor will be determined following the completion of detailed electrical design.

3.11 STORMWATER DRAINAGE BASINS

During construction, stormwater BMPs (e.g., drainage basins) will have topsoil removed and temporarily stored in a pre-established suitable location. Subsoil will then be excavated, and the sides of the drainage basin sloped to design requirements, including inlet and outlet areas. Excavated subsoil will be distributed as fill material to areas where leveling is required. Topsoil will be replaced, and the basins vegetated with a wet seed mix.

3.12 PROJECT FENCING INSTALLATION

The contractor or a subcontractor fencing company will be engaged to construct the perimeter fencing around the Project as described above. The fencing will consist of lightweight agricultural woven wire fabric topped with smooth wire and secured to wooden posts and extend about 7 feet above grade.

The fencing around the Project Substation will be a 7-foot-high chain link fence topped with barbed wire, with adequate hazard and high voltage warning signs to comply with the NESC. A lockable gate will be installed with the Project Substation site fencing. This fencing and gate will be designed to prevent the public and wildlife from gaining access to electrical equipment which could cause injury.

Corner fence posts will be augured to about 4 feet, or a depth per manufacturer's specifications, and embedded in concrete for structural support. Tangent posts will typically be directly buried 4 feet, similar to corner posts. Holes created by fence poles will be filled in with stockpiled soil to pre-construction conditions. Commissioning

Equipment inspections will be conducted prior to commercial operations of the proposed Project, and in compliance with applicable Site Permit requirements. Inspection and testing will occur for each component of the solar array, as well as the associated communication, meteorological, collector line, and SCADA systems. Testing, inspections, and commissioning will occur at periods during construction and upon completion of the construction phase.

3.13 RESTORATION

As portions of the Project near completion, temporary staging and laydown areas and other temporary disturbance areas will be restored. The Project will be graded to natural contours, where possible, and soil will be decompacted in accordance with the Project AIMP (Appendix D). Disturbed areas will be reseeded and re-vegetated with specific seed mixes in accordance with the VMP (Appendix E) and the SWPPP. These seed mixes are designed to be used with the vegetation management practices of periodic mowing and selective spot herbicide applications. All areas that will not contain permanent facilities (area under the arrays and the laydown yards) will be stabilized with erosion control measures, such as silt fence, sediment control logs,

temporary seeding, and mulching as needed, until permanent vegetation has been established. Lemon Hill Solar anticipates that the short-term establishment practices will occur from years 0 through 5, with long-term maintenance practices occurring from year 6 onward.

The VMP provides a guide to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. The VMP outlines vegetation management tasks during the establishment and maintenance phases, including monitoring for and treating invasive species, mowing, and re-seeding, as needed.

The Project will use an adaptive management approach for vegetation maintenance as outlined in the VMP. Monitoring vegetation during the active growing season (June to September) is a key aspect of adaptive management. Consequently, site evaluations are planned during the vegetation establishment and maintenance phases. Monitoring will be useful in identifying issues, tracking progress, and reevaluating management needs.

The VMP outlines several vegetation maintenance strategies that may be implemented at the Project, including mowing and selective herbicide use (Appendix E). Mowing may be used when vegetation reaches a height of approximately 18 to 24 inches during the initial mowing period to bring it back to a height of roughly 4 to 6 inches and will help control weed species until the desired perennial vegetation becomes established. Herbicides will be employed only where it is determined that mowing alone will not accomplish perennial weed control.

3.14 OPERATION AND MAINTENANCE

Following commissioning and during commercial operation, the care, custody, and control of the Project facilities will transfer from the construction team to the operations staff. The construction manager will work with the operations staff, the equipment suppliers, and other construction and maintenance personnel to ensure a smooth transition from the start of construction to the commercial operation date of the Project. The operations staff will have full responsibility for the facility to ensure operations and maintenance activities are conducted in compliance with approved permits, prudent industry practices, and the equipment manufacturer's recommendations.

The Project will be professionally maintained and operated by Lemon Hill Solar, an affiliate, or a qualified contractor. Primary tasks include regularly scheduled inspection(s) of electrical equipment, vegetation management as well as snow removal on access drives, as needed.

The expected service life of the Project is 40 years or longer based on the useful commercial lifespan of modules. Lemon Hill Solar estimates that the Project will result in up to three to five full-time staff positions to operate and maintain Project facilities. A maintenance plan will be created for the Project to ensure the performance of the solar facilities. Once construction is complete, regular traffic to the Project is expected to include two maintenance trucks and up to six commuter vehicles on a weekly basis with potentially more personnel on site at intervals associated with scheduled maintenance. The main scheduled activities are described in more detail in the Operations and Maintenance Schedule (Appendix J).

All maintenance activities will be performed by qualified personnel and will be performed during the day to the extent that they do not disrupt energy production. Activities that have the potential for substantial noise generation will be performed during the day to minimize impacts in areas where residents are present. It may be desirable to perform certain maintenance functions after sunset to minimize loss of power production.

The operation of the Project is partitioned, to a certain extent, to minimize the effect of unscheduled maintenance on overall energy production. As an example, if a module needs repair, that section of the array can be disconnected from the larger array by opening the combiner box circuit. The module can then be replaced, and the combiner box circuit closed. Because of the way the facility is designed, a temporary shutdown such as this would result in only a minimal loss of production capability during that time. Additionally, the power production circuits are separated from the tracking circuits. This allows the PV solar modules to operate during an unscheduled outage of the tracker system.

The generating facility will be operated through a real-time control system for most operations functions, discussed further below.

3.14.1 Supervisory Control and Data Acquisition System

Performance monitoring of the Project will consist of real-time and continuous assimilation of the data acquired by the onsite meteorological station. A SCADA system will be part of the O&M building and will provide data on solar energy generation and production, availability, meteorology, and communications. The solar arrays will communicate directly with the SCADA system for remote performance monitoring, energy reporting, and troubleshooting. Any anomaly will be identified immediately and could be addressed by action from the Control Center or by dispatching local technicians to the site. In addition to real time monitoring and support, analysts can analyze trends in operating data to predict anomalies or failures before they arise. Operators will be notified immediately of any abnormalities allowing for timely corrective action.

3.14.2 Equipment Inspection

Inspection of the main equipment will occur at regular intervals, as outlined below and in the Operations and Maintenance Schedule (Appendix J), including:

- PV solar modules: visual check of the modules, tracking system and surrounding grounds to verify the integrity of the modules and tracking structure, the presence of animals and nests, etc.;
- Inverters, transformer(s) and electrical panels: visual check of the devices including connection equipment and the grounding network - check for presence of water and dust;
- Electrical check: check of the main switches and safety devices (fuses);
- Noise: check of abnormal sounds;
- Cabling and wiring: visual check of electrical lines (where visible) and connection box to verify its status;
- Routine visual inspection of the gen-tie line, structures, and components; and
- Project substation: scheduled visual inspections.

3.15 DECOMMISSIONING AND REPOWERING

At the end of the Project's useful life, Lemon Hill Solar will either take necessary steps to continue operation of the Project (such as re-permitting and retrofitting) or will decommission the Project and remove facilities. A Project Decommissioning Plan is included in Appendix F.

3.15.1 Decommissioning

At the end of commercial operations, Lemon Hill Solar will be responsible for removing all the solar arrays and other associated facilities. At the end of the Site Permit term, Lemon Hill Solar reserves the right to extend operations of the Project by applying for an extension of the Site Permit, if necessary, and continuing operation. Should Lemon Hill Solar decide to continue operation, a decision would be made as to whether the Project would continue with the existing equipment or to upgrade the facilities with newer technologies.

Decommissioning of the Project would include removing the solar arrays (modules, racking and foundation posts), inverters, fencing, access roads, cables and lines, and the O&M building. Standard decommissioning practices will be used, including dismantling and repurposing, salvaging/recycling, or disposing of the solar energy improvements, and restoration. A detailed Decommissioning Plan outlining the decommissioning process for the Project is provided in Appendix F and is generally summarized below.

3.15.1.1 Timeline

Decommissioning is estimated to take approximately 40 weeks to complete, and the decommissioning crew(s) will ensure that all equipment and materials are recycled or disposed of properly.

3.15.1.2 Financial Resource Plan

As discussed further in the Decommissioning Plan (Appendix F), total decommissioning costs for the Project are estimated to be approximately $7.8 million and estimated salvage revenue is approximately $5.85 million, resulting in an estimated net decommissioning cost of approximately $1.9 million. Lemon Hill Solar will be responsible for all costs to decommission the Project and associated facilities. Because of the uncertainty in predicting future decommissioning costs and salvage values, Lemon Hill Solar will review and update the decommissioning estimate every 5 years as described in the Decommissioning Plan. Lemon Hill Solar will either secure a financial surety, such as a bond, letter of credit, or other form of financial assurance to create adequate financial reserves for decommissioning purposes. The Commission or its designee will be a beneficiary of the financial assurance. Lemon Hill Solar will post the financial security prior to construction. Lemon Hill Solar will abide by the applicable Site Permit condition(s) and ensure the Project is decommissioned in accordance with the Site Permit and the Decommissioning Plan. In addition to Site Permit conditions, Lemon Hill Solar has included an obligation to decommission the Project components in the landowner lease agreements.

3.15.1.3 Removal and Disposal of Project Components

The removal and disposal details of the Project components are found below:

- **Modules:** Modules will be inspected for physical damage, tested for functionality, and disconnected and removed from racking. Functioning

modules will be packed, palletized, and shipped to an offsite facility for reuse or resale. Non-functioning modules will be shipped to the manufacturer or a third party for recycling or disposal.

- **Racking:** Racking and racking components will be disassembled and removed from the steel foundation posts, processed to appropriate size, and sent to a metal recycling facility.

- **Steel Foundation Posts:** All structural foundation steel posts will be pulled out to full depth, removed, processed to appropriate size, and shipped to a recycling facility. The posts can be removed using backhoes or similar equipment. During decommissioning, the area around the foundation posts may be compacted by equipment and, if compacted, the area will be decompacted in a manner to adequately restore the topsoil and sub-grade material to a density consistent for vegetation.

- **Underground Cables and Lines:** All underground cables and conduits will be removed to a depth of 4 feet to not impede the reintroduction of farming. If soil is excavated during decommissioning, topsoil will be segregated and stockpiled for later use prior to any excavation and the subsurface soils will be staged next to the excavation. The subgrade will be compacted per AIMP standards. Topsoil will be redistributed across the disturbed area.

- **Inverters, Transformers, and Ancillary Equipment:** All electrical equipment will be disconnected and disassembled. All parts will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at Lemon Hill Solar's sole discretion, consistent with applicable regulations and industry standards.

- **Equipment Foundation and Ancillary Foundations:** The ancillary foundations are pile foundations for the equipment pads, if needed. As with the solar array steel foundation posts, the foundation piles will be pulled out completely. Duct banks will be excavated up to 4 feet below ground surface, if any are present. All unexcavated areas compacted by equipment used in decommissioning will be decompacted pursuant to the AIMP in a manner to adequately restore the topsoil and subgrade material to a density similar to the surrounding soils. All materials will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at Lemon Hill Solar's sole discretion, consistent with applicable regulations and industry standards.

- **Fence:** All fence parts and foundations will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at Lemon Hill Solar's sole discretion, consistent with applicable regulations and industry standards. The surrounding areas will be restored to pre-Project conditions to the extent feasible.

- **Access Roads:** Facility access roads will be used for decommissioning purposes, after which removal of such roads will be discussed with applicable landowners, using the following process:

- After final clean-up, access roads may be left intact through mutual agreement of the landowner and Lemon Hill Solar unless otherwise restricted by federal, state, or local regulations; and

- If an access road is to be removed, aggregate will be removed and shipped from the site to be reused, sold, or disposed of appropriately, at Lemon Hill Solar's sole discretion, consistent with applicable regulations and industry standards. Clean aggregate can often be used as "daily cover" at landfills for no disposal cost. All internal service roads are currently anticipated to be constructed with geotextile fabric and 8 inches of aggregate over compacted subgrade. Any ditch crossing connecting an access road to public roads will be removed unless the landowner requests it remain. The subgrade will be decompacted to a depth of approximately 18 inches using a chisel plow or other appropriate subsoiling equipment. All rocks larger than 4 inches will be removed. Topsoil that was stockpiled during the original construction will be distributed across the open area. The access roads and adjacent areas that are compacted by equipment will be decompacted.

3.15.1.4 Restoration

Solar facility sites are largely pervious, vegetated surfaces. Decommissioning and removal of equipment will not result in excessive earth disturbance; however, some restoration and site stabilization will be required upon completion of work. The areas of the facility that are disturbed will consist of the array areas where construction vehicles travel, the footprint of the access roads, the corridors of the perimeter fencing, equipment pad areas, stormwater management basins, and underground electric lines. The site will be decompacted pursuant to the AIMP standards by disking and mixing with suitable sub-grade materials selected to support revegetation and to match the existing soil types. Disturbed areas will be seeded with an appropriate local grass seed mix and topsoil per the AIMP and VMP, if not returned to agricultural use.

3.15.2 Repowering

As the solar market continues to produce less expensive and more efficient solar modules, repowering the Project may be a viable option as the Project ages. Potential triggers for initiating a repower may be aging or faulty equipment, maintenance costs, extending the useful life of the Project, or increasing the generation output of the Project. Lemon Hill Solar will continually evaluate the Project's generation output, maintenance costs, and other contributing factors in conjunction with available technology upgrades to determine if repowering the Project is a worthwhile investment. Any proposed repowering of the Project will abide by all local, state, and federal regulations. A new or amended Site Permit may be necessary and will be sought if required.

4.0 ENVIRONMENTAL INFORMATION

This section provides an overview of the natural environment and cultural resources within and surrounding the 1,945-acre Site and an assessment of potential Project impacts on those resources.

The Preliminary Development Area was used as the basis for estimating the temporary impacts that may result from the proposed Project. The Preliminary Development Area is the area needed for construction and operation of the Project based on the preliminary design. The Preliminary Development Area encompasses, in part, project components within the fenced area including PV arrays, inverter station, transformers, access roads, collector lines, and Project substation. The Preliminary Development Area also includes collector lines and access roads, portions of which may be outside the fenced area.

4.1 ENVIRONMENTAL SETTING

The Project is located within the boundaries of Viola and Haverhill Townships in Olmsted County, Minnesota (Figure 1). It is approximately 3.3 miles northwest of the City of Eyota, Minnesota, and approximately 3.3 miles east of the City of Rochester, Minnesota. Land use in the Project area consists primarily of agricultural fields (row crops), with rural residences adjacent to the Preliminary Development Area. Roads within and surrounding the Site are county state aid highways, county roads, or township roads. The Site is generally bounded by 65th Street NE to the north, 55th Avenue NE to the west, Silver Creek Road NE to the south, and 100th Avenue NE to the east. The Project is intersected north to south by County Road 24 NE and 70th Ave NE and east to west by Viola Road NE.

According to the NRCS Land Resource Region and Major Land Resource Area (MLRA), the Project is located within the Central Feed Grains and Livestock Region and Upper Mississippi River Bedrock Controlled Uplands and Valleys (USDA NRCS, 2022). This MLRA is characterized by gently sloping to rolling farmed summits with steep wooded colluvial valley walls joining alluvial valleys and floodplains.

The MNDNR and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR, 1993). Through the ECS, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Project is located in the Paleozoic Plateau Section within the Rochester Plateau Subsection, which are in the Eastern Broadleaf Forest Province. This Rochester Plateau Subsection is made up of level to gently rolling older till plains.

The Rochester Plateau Subsection is primarily covered by glacial drift, ranging from 100 to 200 feet deep in the west, and 10 to 100 feet deep in the east. Bedrock commonly includes Ordovician dolomite, limestone, and sandstone, with Cambrian sandstone, shale, and dolomite exposed along the walls of the Mississippi River. Dominant soils in the subsection include Udalfs, with localized Aquents along the floodplains of major rivers. Annual precipitation in the area typically ranges from 29 inches in the western portion to 34 inches in the southeast. Growing season precipitation ranges from roughly 11 to 16 inches, and the growing season ranges from 136 to 156 days. Pre-settlement vegetation was primarily tallgrass prairie and bur oak savanna. Fire was important in upland prairie and oak savanna dominated communities (MNDNR, 1993).

4.2 HUMAN SETTLEMENT

The Project is located in rural Viola and Haverhill Townships, Olmsted County, MN. According to the 2020 U.S. Census Bureau (U.S. Census), Viola Township has a population of 548 people, and Haverhill Township has a population of 1,498 people (U.S. Census Bureau, 2020a). The municipal boundary of the City of Eyota is approximately 3.3 miles southeast of the Project and

the municipal boundary of the City of Rochester is approximately 3.3 miles west of the Project. Refer to Figure 1 for proximity to municipal areas.

4.2.1 Public Health and Safety

4.2.1.1 Existing Environment

Emergency services within the Site include the Olmsted County Sheriff, Rochester Fire Department or regional volunteer fire departments including the Eyota Fire Department and the Elgin Fire Department, and emergency medical services. The nearest hospital/urgent care facility is the Olmsted Medical Center, in Rochester, MN. The location of Allied Radio Matrix for Emergency Response (ARMER) tower locations in Olmsted County was not readily available at the time this application was prepared. No Project interference with such systems is anticipated regardless of the locations of ARMER towers due to the low-profile nature of PV solar arrays and associated facilities.

According to the Phase I Environmental Site Assessment (Phase I ESA) completed for a majority of the Site , *Phase I Environmental Site Assessment, Lemon Hill Solar Project, May, 2024* (Merjent 2024a), areas within the Project are listed in regulatory databases including Facility Registry Service/Facility Index (FIND/FRS), Animal Feedlots, Minnesota Pollution Control Agency Interests (MPCA AI), and Agricultural Spills (Ag Spills) databases.

There are also parcels adjoining the Project that are listed in Ag Spills, Clandestine Drug Labs (CDL), MPCA AI, FIND/FRS, Spills reported to the Pollution Control Agency (Spills), Historic spills reported to the Pollution Control Agency (Hist Spl), Resource Conservation and Recovery Act Small Quantity Generators (RCRA SQG), The Assessment, Cleanup, and Redevelopment Exchange System ACRES Brownfield Database (Fed Brownfields), Minnesota Above Ground Storage Tanks (AST), MPCA Leaking Storage Tank Remediation Sites (LST Rem Site), Voluntary Investigation and Cleanup Program List (VIC), Petroleum Brownfields Program Sites (Brownfields), and Solid Waste Facilities/Landfill (SWF/LF) databases.

The Phase I ESA identified three Recognized Environmental Conditions (REC):

- Penz Property (REC #1): The Penz Property, adjoining west to the Subject Property and not within the leased area, is a former Department of Defense radar installation, turned state-run juvenile detention center with automotive repair training. The property is listed in regulatory databases including Federal Brownfields, Brownfields/ Voluntary Investigation and Cleanup, Leaking Storage Tank Remediation Site, Spills, Solid Waste Facility/ Landfill, and RCRA Small Quantity Generator Listings. Soil and/or groundwater impacts have been documented on the property, as recently as 2020.
- Uecker Site (REC #2): Evidence of debris, abandoned equipment, tire piles, two Aboveground Storage Tanks (ASTs)/ fuel tanks, an unlabeled 55-gallon drum, and a potential burning area that was identified in the central portion of the agricultural field.
- Hofschulte Site (REC #3): Abandoned Hofschulte farmstead, adjoining the Subject Property, located northwest of 48th Street NE and CR 23 NE, within the Hofschulte parcel. One AST/ fuel tank was observed during the site reconnaissance, in addition to deteriorating buildings, vehicles, boats, and equipment scattered around the property.

Merjent conducted a Limited Phase II Investigation (Limited Phase II) to determine if there was a release that impacted the Project:

Penz Property – REC #1

- Based on a review of publicly available files, the extent and magnitude of the soil and groundwater impacts have been defined, and appear stable at the Penz Property, posing minimal risk to the Project. Moreover, while remnant structures and piled debris/tires currently remain on the Penz Property, all point source hazardous waste/materials are believed to have been characterized and removed between 2017 and 2018, including all ASTs; therefore, additional or previously unknown impacts are unlikely.

Uecker Site – REC #2

- A total of five soil samples were collected and analyzed for diesel range organics (DRO) with silica gel cleanup, gasoline range organics (GRO), volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), RCRA metals, and polychlorinated biphenyls (PCBs). All soil samples analyzed met Minnesota Pollution Control Agency (MPCA) unregulated fill criteria. Arsenic was identified in all five soil samples; however, these concentrations can be attributed to background metal concentrations in Olmsted County. Various other metals were detected in each sample at concentrations below the corresponding MPCA Screening Soil Leaching Values (SLV) and Soil Reference Values (SRV). All other soil analysis (DRO with silica gel, GRO, VOCs, SVOCs, and PCBs) were below laboratory detection limits.

Hofschulte Site - REC #3

- A total of six soil samples were collected and analyzed for DRO, DRO with silica gel cleanup, GRO, VOCs, SVOCs, and RCRA 8 Metals. All soil samples analyzed met MPCA unregulated fill criteria. Arsenic was identified; however, the concentration can be attributed to background metal concentrations in Olmsted County. Various other metals were detected in each sample at concentrations below the corresponding MPCA Screening SLVs and SRVs. All other soil analysis (DRO, DRO with silica gel, GRO, VOCs, and SVOCs) were below laboratory detection limits.

Based on these results, the RECs have been addressed and do not pose a potential for contamination to be present within the Site.

There were also two Agricultural Spills (Ag Spills) with databases listings within the Project. The two agriculture spills were closed in 1989 and 1994.

Other properties within 1 mile of the Site with a potential hydrological connection to the Site, are listed in Table 4.2.1-1. These properties were evaluated during the Phase I ESA and do not have the potential to impact soil or groundwater in the Site.

Based on a review of MPCA's What's in my Neighborhood website, there are no documented releases on parcels that were not included in the Phase I ESA (MPCA, 2025b).

TABLE 4.2.1-1

Recorded Releases Within 1 Mile of the Site with a Potential Hydrological Connection

Site	Database	Location (distance and location from Site)	Status	Listing(s)
58th St NE Rochester, MN 55906	Clandestine Drug Lab	Adjoining, South	NA	Clandestine Drug Lab (CDL 442) – vehicle, seized in 04/2003. Listing was vehicle based, and no environmental impacts were noted.
Scotts Helicopter	Department of Agriculture Spills	Adjoining, SSW	Closed	Ag Spill (PLK101034905) – Small Spills & Investigations; Result of a helicopter crash in field, Closed in 2010.
Mark & Katy Johnson 6002 70th Ave NE Rochester, MN 55906	Permitted Solid Waste Facilities	Adjoining, NW	NA	SWF/LF (217300) – Active permitted Solid Waste Generator
Progressive Ag Center	Historic Spills reported to the Pollution Control Agency	0.05-mile WNW	Closed	Hist Spl (54489737) – Small Spills & Investigations; Caller reporting white smoke from broken hose on tool bar of 1,000 anhydrous ammonia fertilizer tank in field.
Progressive Ag	Department of Agriculture Spills	0.12-mile W/NW	Closed	Ag Spills (PLK219086) – Old emergency incident, closed in 2009.

Source: Phase I Environmental Site Assessment, Lemon Hill Solar Project, May 2024. Merjent, 2024a.

4.2.1.2 Impacts on Public Health and Safety

Public health and safety issues during construction and operations potentially include injuries due to falls, equipment use, and electrocution. During construction and operation of the proposed Project, public safety will be a priority. Safety concerns may include slow moving construction equipment on public roads, construction equipment crossing public roads, and construction operations.

PV technologies and solar inverters are not known to pose significant health dangers to the public (NC Clean Energy Technology Center, 2017). Public health and safety issues during construction and operations include increased highway traffic during the relatively short construction period and dangers posed to trespassers making contact with high voltage equipment.

Based on the Phase I ESA and Limited Phase II, there are no documented releases that have the potential to impact or contaminate the Site.

Risks of site contamination from solar construction are less than for most other industrial uses because PV technologies employ few toxic chemicals used in very small quantities (NC Clean Energy Technology Center, 2017). Onsite storage at the O&M building may include hydraulic oil stored in a plastic or poly tote or 55-gallon drums on secondary containment pallets and potentially fuel tank(s), for maintenance vehicles and emergency generator(s), that would have secondary containment, as required to meet applicable regulations.

Due to the reduction in pollution and greenhouse gas emissions from fossil-fuel-fired electric generators as a result of more solar energy production, the overall impact of solar development on human health can be viewed as positive. Pollution reduction results from a partial replacement of fossil-fuel fired generation by emission-free electricity, which reduces harmful sulfur dioxide

(SO_2), nitrogen oxides (NO_X), and particulate matter (PM) less than 2.5 microns in diameter ($PM_{2.5}$) (NC Clean Energy Technology Center, 2017).

PV systems do not emit any material during their operation; however, they do generate electromagnetic fields (EMF). EMF is further discussed in Section 4.2.2.

There is potential for electric shock to personnel entering any of the electrical equipment cabinets or otherwise coming in contact with equipment carrying voltages. Arc flash is another electrical hazard, which is an explosion of energy that can occur during a short circuit. This explosive release of energy causes a flash of heat and a shockwave, both of which can cause serious injury or death. Properly trained and equipped technicians and electricians know how to safely install, test, and repair PV systems, but there is an inherent risk of injury when hazardous voltages and/or currents are present.

The incidence of fires resulting from or intensified by PV systems is limited because only a small portion of panel components are flammable, and those components cannot self-sustain a significant fire. Flammable components of PV panels include the thin layers of polymer encapsulates surrounding the PV cells, polymer backsheets, plastic junction boxes on the rear of the panel, and insulation on wiring. Other panel components are non-flammable and include one or two layers of protective glass comprising over three-quarters of the panel's weight. Heat from a small flame is not adequate to ignite a PV panel, but heat from a more intense fire or energy from an electrical fault can ignite a PV panel. While it is possible for electrical faults in PV systems to start a fire, this is extremely rare (NC Clean Energy Technology Center, 2017).

Construction and operation of the Project will have minimal impacts on the health and safety of the local population, and the level of emergency services potentially needed by the Project is expected to be low. The Project development will not impact sites of concern identified in the Phase I Environmental Site Assessment. The Project will be constructed to meet applicable National Safety Council, MISO, state, and local electrical standards, including fencing and locked gates to exclude people who are not authorized to access the Project, and therefore will pose minimal safety and security risks to the public.

While it is possible that Project infrastructure (e.g., arrays) could be damaged or affected by extreme weather events, the Project will be designed and constructed such that Project materials are not expected to leave the Site. Lemon Hill Solar and/or their maintenance contractor will regularly inspect the infrastructure for damage, and if found, will repair or replace impacted materials and dispose of generated waste in accordance with applicable requirements to prevent risk to public safety.

Lemon Hill Solar's established safety procedures, as well as industry safety procedures, will be followed during construction and operation of the Project.

4.2.1.3 Mitigation

Based on the Phase I ESA and Limited Phase II, there are no documented releases that have the potential to impact or contaminate the Site; therefore, mitigation is not required.

During active construction, measures will be taken to ensure the safety of local residents, including but not limited to signage where active construction is occurring, flaggers at roads, and barriers around active construction zones. Lemon Hill Solar will follow Occupational Safety and Health Act (OSHA) requirements for emergency response management plans and will develop a

plan for communicating emergency situations which will include equipment and resources available for a response. If necessary, a Spill Prevention Control and Countermeasure Plan (SPCC) will be developed to address oil pollution prevention and spill response requirements as specified in 40 CFR Part 112.

Properly trained and equipped technicians and electricians will be responsible for safely installing, testing, and repairing PV systems. The NESC requires appropriate levels of warning signs on all electrical components based on the level of danger determined by the voltages and current potentials. The NESC further requires the site to be secured from unauthorized visitors with either a six-foot chain link fence with three strands of barbed wire or an eight-foot fence, with adequate hazard warning signs to deter trespassing.

New solar-specific building code requirements also mitigate fire concerns. Concern for firefighting a PV system can be reduced with proper fire fighter training, system design, and installation.

4.2.2 Electromagnetic Field

4.2.2.1 Existing Environment

The term “electromagnetic field” (EMF) refers to electric and magnetic fields associated with the use of any electrical device (e.g., powerlines, electrical wiring, and electrical equipment). Electric fields arise from the voltage or electrical charges. Magnetic fields are from the flow of current through wires that increase in strength as the current increases. The strength of an EMF will dissipate rapidly with increasing distance from the source (National Institute of Environmental Health Sciences [NIEHS], 2022). Overhead electric distribution lines are currently present within the Site and are an existing source of EMF.

One high voltage transmission line crosses the southeastern portion of the Site. The 161 kV line is owned and operated by Dairyland and is the line into which the Project will interconnect to deliver electricity produced on site to the broader transmission system.

There are no state or federal standards for EMF exposure; however, the Minnesota Environmental Quality Board (EQB) developed a standard of a maximum electric field limit of 8 kV per meter measured at 1 meter (3.28 feet) above the ground, and the standard is typically adopted by the Commission for projects under its jurisdiction (Minnesota State Interagency Working Group, 2002). The standard was designed to prevent serious hazards from shocks due to induced voltage under powerlines (NIEHS, 2002).

4.2.2.2 Impacts

Since the 1970s, research has been ongoing to determine biological responses and health effects as a result of exposure to EMF. In 1992, Congress established the U.S. EMF Research and Public Information Dissemination Program to study whether exposure to EMF from the generation, transmission, or use of electric power posed a risk to human health. The expert working group reviewed EMF studies and generally concluded that “(t)he scientific evidence suggesting that extremely low frequency EMF exposures pose any health risk is weak” (NIEHS, 2002).

The U.S. National Cancer Institute summarized the research on *Electromagnetic Fields and Cancer* as follows:

Numerous epidemiologic studies and comprehensive reviews of the scientific literature have evaluated possible associations between exposure to non-ionizing EMFs and risk of cancer in children (13–15). (Magnetic fields are the component of non-ionizing EMFs that are usually studied in relation to their possible health effects). Most of the research has focused on leukemia and brain tumors, the two most common cancers in children. Studies have examined associations of these cancers with living near power lines, with magnetic fields in the home, and with exposure of parents to high levels of magnetic fields in the workplace. No consistent evidence for an association between any source of non-ionizing EMF and cancer has been found (National Cancer Institute, 2022).

The NIEHS provides typical EMF levels for varying voltage transmission lines as measured at 1 meter above ground.

- For a 230 kV overhead transmission line, typical electrical fields were reported at 2.0 kV per meter directly below the line before dissipating to 1.5 kV per meter at 50 feet and 0.3 kV per meter at 100 feet. In addition, the average magnetic fields directly below a 230 kV transmission line were calculated at 57.5 milliGauss (mG) before dissipating to 19.5 mG at 50 feet and 7.1 mG at 100 feet (NIEHS, 2002).
- For a 115 kV overhead transmission line, typical electrical fields were reported at 1.0 kV/m directly below the line before dissipating to 0.5 kV/m at 50 feet and 0.07 kV/m at 100 feet. In addition, the average magnetic fields directly below a 115 kV transmission line were calculated at 29.7 mG before dissipating to 6.5 mG at 50 feet and 1.7 mG at 100 feet (NIEHS, 2002).

The overhead transmission gen-tie line for the Project is proposed to be 161 kV; as such, EMF levels for the Project gen-tie line are anticipated to be between the range of those associated with a 115 kV line and 230 kV line as outlined above and in Table 4.2.2-1.

TABLE 4.2.2-1

Typical EMF Levels for 115 kV and 230 kV Power Transmission Lines

EMF Type (units)	Below line	50 feet (15 m)	100 feet (30 m)
	230 kV Transmission Line		
Electric field (kV/m)	2.0	1.5	0.3
Mean magnetic field (mG)	57.5	19.5	7.1
	115 kV Transmission Line		
Electric field (kV/m)	1.0	0.5	0.07
Mean magnetic field (mG)	29.7	6.5	1.7

Note: kV/m = kilovolt per meter, m = meter, and mG = milligauss
Source: NIEHS, 2002. Electric and Magnetic Fields Associated with the Use of Electric Power. Available online at: https://www.niehs.nih.gov/sites/default/files/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf.

Magnetic fields will also be produced by collector lines. A study of magnetic fields associated with collector lines was completed by Canadian researchers at a wind facility. The researchers measured magnetic fields of 27.5 kV collector lines, which is a slightly lower voltage than the collector lines proposed for the Project (34.5 kV). Magnetic fields measured 1 meter above buried 27.5 kV collector lines were consistently found to be within study area background levels (0.2 to 0.3 mG). Measurements were also taken directly below 27.5 kV overhead collector lines;

magnetic field levels immediately below ranged from 0.3 to 16.5 mG, and within 10 to 25 meters offset distance levels decreased to background levels (McCallum et al., 2014).

In combination, multiple studies have concluded that the strength of EMF present at the perimeter of a solar facility is lower than the typical American's average EMF exposure (Cleveland, T., 2017). In addition, studies of typical electrical fields have found measurements to be well below the Commission's maximum electric field limit of 8 kV per meter measured at 1 meter above ground, as noted in the NIEHS study mentioned above.

Within Lemon Hill Solar's Site, the nearest residence to solar arrays is approximately 0.05 mile (250 feet) away, and the nearest residence to an inverter or electrical collector line is approximately 0.1 mile (579 feet) and 0.01 mile (53 feet) away, respectively (Table 4.2.6-1; Figure 7). At these distances, electric and magnetic fields would be expected to have dissipated to background levels.

4.2.2.3 Mitigation

EMF impacts as a result of the Project will be negligible; as such, no mitigation measures are proposed beyond adherence to equipment and construction standards and accepted industry practices.

4.2.3 Displacement

4.2.3.1 Existing Environment

The Project is located in an agricultural area with a few scattered rural residences, farmsteads, and outbuildings (Figure 7).

4.2.3.2 Impacts

Project infrastructure has been designed with applicable setbacks as discussed in Section 3.2.1. The Project will not result in the displacement of residential homes, farming operation buildings, or business structures, as they have been excluded from the Preliminary Development Area. Lemon Hill Solar will continue to work with landowners to inform them of the Project design and construction process, to ensure the Project will not interfere with existing residences, farmsteads, or outbuildings.

4.2.3.3 Mitigation

Impacts resulting from displacement are not anticipated; therefore, no mitigation is proposed.

4.2.4 Noise

Noise is defined as unwanted sound. It may be made up of a variety of sounds of different intensities, across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more weight. The A-weighted decibel scale (dBA) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that we do not hear as well, such as very high and very low frequencies.

4.2.4.1 Noise Standards

The State of Minnesota has established noise standards under Minn. R. 7030.0400 and 7030.0500. These rules quantify noise level limits for various Noise Area Classification (NAC) categories. Different standards are specified for daytime (7:00 AM to 10:00 PM) and nighttime (10:00 PM to 7:00 AM) hours. Limits for residential areas, which fall under NAC 1, are the most stringent. These limits are listed in Table 4.2.4-1 below.

TABLE 4.2.4-1

Minnesota Rules Chapter 7030 NAC 1 Noise Limits

Noise Level Metric	Daytime Limit (dBA)	Nighttime Limit (dBA)
L_{50}	60	50
L_{10}	65	55

Note: L_{50} is the sound level that is exceeded 50 percent of the measurement period; L_{10} is the sound level that is exceeded 10 percent of the measurement period.

These limits are expressed as L_{50} and L_{10}, which are statistical noise level metrics representing the sound level that is exceeded 50 percent and 10 percent of the measurement period, respectively. The MPCA provides guidance on noise propagation and attenuation in its manual, *A Guide to Noise Control in Minnesota* (MPCA, 2015). This guidance states that sound attenuates (is reduced in amplitude) over distance and is perceived as becoming quieter. This occurs as the sound travels outward to an increasingly larger sphere and the energy per unit of area decreases. When the distance from a point source is doubled, the sound level decreases by 6 dBA. Similarly, when the sound energy doubles, such as having two sources of 50 dBA instead of one source of 50 dBA, the sound level increases by 3 dBA. The human ear can usually tell the difference when sound changes by 3 dBA, and a 5 dBA change is clearly noticeable.

4.2.4.2 Pre-Construction Noise

Common sound sources within a rural, agricultural environment such as the Site include, but are not limited to, farm equipment such as tractors and combines; farm support vehicles and equipment; grain handling, storage, and drying operations; traffic on surrounding roadways; birds; and wind rustling through the vegetation. Typically, the ambient acoustic environment of a rural or agriculturally oriented community has continuous sound levels (L_{eq}), which is an energy-based time-averaged noise level, ranging from 30 dBA to 60 dBA. Rural residential areas have a typical daytime noise level of 40 dBA and a typical nighttime noise level of 34 dBA (American National Standards Institute [ANSI], 2013). Background noise levels can vary due to a number of factors, including increased farming activities occurring during harvest time. A comparison of typical noise-generating sources is outlined in Table 4.2.4-2 below (Federal Aviation Association [FAA], 2022).

TABLE 4.2.4-2

Typical Noise-Generating Sources

Source	Noise Level (dBA)
Rock band	110
Car horn at 3 feet	110
Inside subway train (New York)	105
Gas Lawnmower at 3 feet	95
Garbage disposal or shouting at 3 feet	85
Noisy urban	80

TABLE 4.2.4-2

Typical Noise-Generating Sources

Source	Noise Level (dBA)
Vacuum cleaner at 10 feet	78
Busy highway at 50 feet	73
Normal speech at 3 feet	68
Commercial area	65
Quiet urban	58
Quiet rural	45
Bedroom at night	29
Threshold of hearing	12

Source: Federal Aviation Association, 2022.

4.2.4.3 Construction Noise

During Project construction, intermittent noise will be emitted by the construction vehicles and equipment, including pile drivers for installation of piles. These noise impacts will be temporary, and the amount of noise will vary based on what type of construction is occurring at the Project on a given day, and the distance from the receptor to the noise source. Table 4.2.4-3 below shows the typical sound pressure levels in dBA at 50 feet for various construction equipment (U.S. Department of Transportation Federal Highway Administration [FHWA] 2006).

TABLE 4.2.4-3

Typical Sound Levels from Construction Equipment

Equipment	Max Sound Pressure Level at 50 feet (dBA)
Backhoe	80
Compactor	82
Concrete Mixer	85
Dozer	85
Generator	81
Grader	85
Loader	85
Pile Driver (Impact)	101
Truck	88

Source:U.S. Department of Transportation Federal Highway Administration, 2006.

4.2.4.4 Operational Noise

Noise calculations were conducted using a desktop analysis to calculate cumulative Project sound at all occupied residences within 0.25 mile of the proposed Project fence line. As described below, predicted maximum total sound levels as a result of Project operation do not exceed the applicable nighttime limit of 50 dBA set forth in Minn. Admin. R. 7030.0040. Accordingly, minimal sound impacts, within regulatory limits, are expected from Project operation.

Project equipment and layout configuration details are shown below in Table 4.2.4-4, along with overall A-weighted sound pressure levels. Levels represent the maximum sound output for Project components, which is at the source of the sound. The sound levels will decrease as distance increases, as shown in Table 4.2.4-4. The Site is mainly rural, so the “very quiet suburban and

rural residential" land use category background ambient noise level of 40 dBA was assumed according to ANSI 12.9-2013 Table C.1 (ANSI, 2013).

TABLE 4.2.4-4

Project Equipment Estimated Sound Levels

Sound Source	# of Units	Equipment Model/Reference	Sound Pressure Level at 3 feet (Single Unit)	Distance to Sound Pressure Level of 40 dBA (Single Unit)
Solar Inverter	60	Sungrow SG4400	83 dBA	330 feet
Main Power Transformer	1	200 MVA Substation Transformer (NEMA Standard)	85 dBA	543 feet

Transmission lines can generate a small amount of sound energy during corona activity where a small electrical discharge is caused by the localized electric fields (EF) near energized components and conductors ionize the surrounding air molecules. Corona is the physical manifestation of energy loss and can transform discharge energy into small amounts of sound, radio noise, heat, and chemical reactions of the air components. Several factors, including conductor voltage, shape and diameter, and surface irregularities such as scratches, nicks, dust, or water drops can affect a conductor's electrical surface gradient and its corona performance.

Noise emission from a transmission line occurs during certain weather conditions. In foggy, damp, or rainy weather, powerlines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the background noise level of the rain is usually greater than the noise from the transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain.

The worst-case scenario is when the transmission line is exposed to heavy rain conditions (e.g., one inch per hour). Anticipated noise levels for heavy rain conditions for a typical 161 kV line based on the results from the Bonneville Power Administration Corona and Field Effects Program version 3 (U.S. Department of Energy, Bonneville Power Administration, Undated) are listed in Table 4.2.4-5. The industry standard for utilities is calculated based on L_{50} for audible noise emissions.

TABLE 4.2.4-5

Anticipated 161 kV Transmission Line Audible Noise Levels (dBA) with Heavy Rain

		Cross Section Distance to 161 kV Transmission Line (feet)										
Load Condition	Line Current (Amp)	-300	-200	-100	-50	-25	0	25	50	100	200	300
Average Historic Load	541	15.45	17.38	20.53	23.25	25.08	26.64	26.11	24.11	21.06	17.66	15.64
Peak Historic Load	1115	15.46	17.39	20.55	23.29	25.16	26.77	26.22	24.17	21.09	17.68	15.65
Peak Rated Load	2000	15.51	17.45	20.64	23.44	25.43	27.24	26.61	24.36	21.18	17.74	15.71
Maximum Operating Temperatu	2182	15.53	17.47	20.66	23.49	25.51	27.38	26.73	24.42	21.21	17.76	15.73

4.2.4.5 Impacts

As stated, the Project will create some intermittent noise during construction and the amount of noise will vary based on what type of construction is occurring at the Project on a given day. Construction associated noise will likely be perceptible at nearby residences. According to the Federal Highway Administration Construction Noise Handbook, the majority of the construction equipment that could be used on the site, such as grading equipment and backhoes, is anticipated to generate noise between 81 and 85 dBA. Sound levels from grading equipment are similar to the typical tractors and larger trucks used in agricultural communities during planting or harvest. Lemon Hill Solar anticipates impact driving of the piles for rack supports (foundations for the solar panels) to be the most significant source of construction noise at roughly 101 dBA at 50 feet (FHWA, 2006). Installation of each rack support takes between thirty seconds to a few minutes depending on the soil conditions; Lemon Hill Solar anticipates this activity will take up to 3 to 6 months (depending on construction crew size). However, construction noise will not be concentrated in the same location but will move around the Project site during that time as each stage of construction is completed in sequence; for example, site preparation at some array locations may occur while pile driving is occurring at others. The noise from construction activities will dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor.

As shown in Table 4.2.4-6 and on Figure 7, there are 68 homes (receptors) within 3,200 feet of the proposed Project Boundary. Receptors were identified using aerial imagery, as noted in Table 4.2.4-6.

TABLE 4.2.4-6

Receptors Located Near the Project[a]

Distance from Project (feet)	Number of Receptors
50	3
100	1
200	6
400	5
800	13
1600	14
3200	26
TOTAL	**68**

[a] Residences were identified using the Environmental Systems Research Institute 2023 basemap and Olmsted County imagery dated 2023 to complete a desktop review. 2023 was the most up-to-date aerial for the Site at the time this Application was prepared.

Lemon Hill Solar will provide notice of construction to all properties adjacent to the project prior to the commencement of construction. The notice shall include the contact information for a dedicated project contact person to answer questions about construction.

The results of noise modeling conducted by technology manufacturers outlined in Table 4.2.4-4 show that operational noise levels will be less than 40 dBA at least 330 feet from an inverter. The nearest inverter to a residence will be 579 feet away. As such, the noise from the inverter is not projected to have a perceptible impact on nearby residences.

The noise levels will be less than 40 dBA at least 543 feet from the main power transformer located within the Project Substation. The Dairyland substation, located adjacent to the Project

Substation, will also house a power transformer. The main power transformer will be 1,476 feet away from the closest residence; at that distance there are no perceptible noise impacts from this transformer. Based on their location, the noise from the two transformers is not projected to have any impact on nearby residences. During operation, the Project will not generate an increase in ambient noise levels near the project that exceed state noise standards.

Operational noise levels produced by a 161 kV transmission line are generally less than outdoor background levels and are therefore not usually perceivable. As such, appreciable operational noise impacts are not anticipated from the gen-tie line. Further, proper design and construction of the transmission line in accordance with industry standards will help to ensure that noise impacts are not problematic.

4.2.4.6 Mitigation

During construction, the Project will generate a temporary increase in ambient noise levels in the vicinity of the Project that may exceed state noise standards. Lemon Hill Solar will mitigate potential noise impacts by limiting construction to daylight hours and using construction equipment and vehicles with properly functioning mufflers and noise-control devices.

The solar panels, once installed, will act as a barrier and provide some sound mitigation by nature of their design (FHWA, 2006). During operation, the Project will not generate an increase in ambient noise levels that will exceed state noise standards at occupied residences; therefore, no operational mitigation measures are necessary.

4.2.5 Radio and Television Interference

Existing Environment

Three Federal Communications Commission towers, including one cellular tower owned by AT&T Mobility Spectrum, one microwave tower owned by Dairyland Power, and one radio broadcast tower owned by Minnesota Public Radio, were identified within one mile of the Project Boundary based on publicly available Homeland Infrastructure Foundation-Level Data (HIFLD, 2023). One additional, unidentified tower was found within one mile of the Project Boundary during an aerial photo review of the Site. No towers were identified within the Site.

4.2.5.1 Impacts

Corona from transmission line conductors can generate electromagnetic “noise” at the same frequencies that radio and television signals are transmitted, which may cause interference with radio and television reception. This interference can increase as a result of loose hardware on a transmission line.

Transmission line corona disruption of radio and television signals typically depends on the frequency and strength of the radio or television signals.

- Interference of AM radio frequency typically occurs under a transmission line and dissipates rapidly within the right-of-way to either side.

- FM radio receivers usually do not pick up interference from transmission lines. Corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and the range is quite small in the FM broadcast band (88 to

108 megahertz). The interference rejection properties that are inherent in FM radio systems make them limit amplitude type disturbances.

- Television interference is uncommon but may occur when a large transmission structure is located between the receiver and a weak distant signal, creating a shadow effect. Television interference can also result from loose and/or damaged hardware.

- A two-way mobile radio situated behind or adjacent to a large metallic structure (e.g., steel tower) may experience interference because of signal-blocking effects. Communication can be restored by moving the two-way radio so that the metallic tower is not immediately between the two units. This can generally be resolved by moving the radio less than 50 feet.

4.2.5.2 Mitigation

The Project's proposed 161 kV gen-tie line will be approximately 530 feet long, not located near any residences, and will be built adjacent to the existing Dairyland Power 161 kV transmission line. The minimal additional length of high voltage transmission line next to a much longer transmission line of the same voltage is not expected to impact radio or television reception at nearby receptors. Therefore, no mitigation measures are proposed. In addition, Lemon Hill Solar will complete regularly scheduled maintenance such that reception interference from loose hardware is not expected for the Project. If radio or television interference occurs due to the Project, Lemon Hill Solar will work with the affected landowner/business to restore reception to pre-Project quality.

4.2.6 Aesthetics

4.2.6.1 Existing Environment

The Site is located in a rural, agricultural setting (Figure 1; Figure 7). The topography of the Site is generally flat with elevations ranging from 1,160 to 1,300 feet above sea level (Figure 8). Farmsteads in the area often include a house and outbuildings and average 1 to 3 rural residences within a square mile. Most farms have planted windbreaks consisting of trees and shrubs around them. Paved and gravel roads form grids around farm fields separated by 1 to 2 miles with Highway 42 approximately 1.5 miles east of the Site. Surface water features within the Site primarily support removal of water from agricultural fields via numerous drain tiles and ditches. As discussed in Section 4.2.12, land use within the Site is predominantly agricultural. Corn and soybeans are the most common agricultural crops grown. Some livestock is also raised in the area.

Thirty-nine rural residences are located within 0.25 mile of the Site, including three residences within the Site (Figure 7). Table 4.2.6-1 provides distances to the nearest residences from the Site, including approximate distance to the Preliminary Development Area, distance to substation, inverters, collector line and panels based on the Preliminary Site Plan in Appendix C.

TABLE 4.2.6-1

Proximity of Residences within 0.25 mile of the Site

Residence ID	Distance from Residence to Panel (miles)	Distance from Residence to Inverter (miles)	Distance from Residence to Collector line (miles)	Distance from Residence to Preliminary Development Area (miles)	Distance from Residence to Substation (miles)	Natural Screening in Place between Residence and Panels*
2	0.26	0.36	0.36	0.25	2.10	Some
3	0.16	0.27	0.26	0.15	2.14	Yes
13	0.05	0.15	0.02	0.02	0.15	Yes
14	0.08	0.16	0.02	0.02	0.16	Yes
15	0.07	0.21	0.22	0.06	0.54	Yes
16	0.27	0.40	0.40	0.26	0.80	Yes
17	0.17	0.24	0.25	0.16	0.71	Yes
28	0.24	0.25	0.24	0.17	0.92	Yes
29	0.47	0.60	0.54	0.46	0.73	Some
30	0.36	0.51	0.45	0.35	0.66	Yes
45	0.13	0.28	0.04	0.04	0.69	Some
46	0.12	0.14	0.12	0.03	0.57	Yes
47	0.13	0.14	0.12	0.12	1.13	Some
48	0.08	0.11	0.11	0.08	1.46	Some
49	0.05	0.13	0.03	0.01	1.41	Yes
50	0.27	0.27	0.26	0.26	1.54	Yes
54	0.34	0.44	0.05	0.05	1.51	Yes
55	0.19	0.33	0.03	0.03	1.58	Yes
56	0.07	0.23	0.03	0.03	1.80	yes
57	0.14	0.30	0.03	0.03	1.80	Yes
58	0.06	0.21	0.05	0.05	2.14	Some
59	0.05	0.14	0.04	0.04	2.28	Some
60	0.14	0.28	0.03	0.03	2.46	Yes
61	0.21	0.31	0.04	0.04	2.44	Yes
62	0.18	0.24	0.10	0.10	2.51	Yes
63	0.19	0.33	0.32	0.19	3.09	Yes
64	0.07	0.15	0.14	0.06	3.11	Minimal
81	0.13	0.17	0.02	0.02	2.58	Some
82	0.07	0.13	0.06	0.05	2.44	Yes
83	0.07	0.15	0.04	0.04	2.96	Some
86	0.35	0.38	0.38	0.35	3.71	Yes
102	0.13	0.30	0.30	0.12	3.41	Yes
103	0.16	0.33	0.33	0.15	3.46	Yes
104	0.25	0.42	0.42	0.25	3.05	Some
119	0.21	0.40	0.18	0.17	1.83	Yes
131	0.26	0.44	0.44	0.25	1.14	Minimal
132	0.19	0.31	0.13	0.13	1.96	Yes
133	0.17	0.23	0.23	0.17	1.15	Yes
136	0.27	0.29	0.28	0.27	3.62	Some

* Vegetation only; topography not analyzed.

4.2.6.2 Impacts on Aesthetics

The Project will convert predominately agricultural lands to a Solar Facility for the life of the Project and will alter the current viewshed. Rows of solar PV solar modules together with perennial vegetation will be constructed over most of the Preliminary Development Area. PV solar modules use dark anti-reflective glass panels that are designed to absorb sunlight to produce electricity. PV solar modules commonly used for this type of project absorb up to 98 percent of the incoming sunlight depending on the angle of the sun, glass texture and use of anti-reflective coatings. Therefore, during operation of the facility there will be little glare from the PV solar modules used for the Project.

Solar arrays will occupy most of the disturbed area of the Project. Electrical transformers and inverters, a Project substation, an O&M building, and access roads will take up the rest of the disturbed area. Most of the facility, including the solar arrays, will be low-profile, typically less than 15 feet tall. While the proposed substation and O&M building are similar in visual impacts on existing electrical facilities and buildings in the area, the Project solar arrays will create new aesthetic impacts, changing the viewshed in these areas from crops to solar arrays.

Since the Site is generally flat with existing trees around rural residences and outbuildings and with vegetative cover along wind breaks, the visual impact of the Project is expected to be limited to higher elevation points, as well as immediately surrounding land. The distance at which the facility is visible will vary greatly depending on topography, natural and man-made obstructions, and the viewer's position on the landscape. No tree clearing is anticipated. New Project lighting will be limited to the O&M building and Project substation. Lighting at the substation will be as required by NESC standards.

Solar energy generation facilities consist of glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. To limit reflection, solar photovoltaic panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating. Modern panels reflect as little as two percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings. As such, the impacts on both residential and non-residential viewers, such as vehicle passengers on local roads, are expected to be minimal.

4.2.6.3 Mitigation

Since the visual impact of the Project is expected to be limited to higher elevation points, as well as immediately surrounding land, it will be mitigated to an extent with a low level of reflectivity from the panels, by existing vegetative screening at most residences and additional mitigative plantings pending finalization of landowner agreements.

4.2.7 Socioeconomics

The Project is located in Olmsted County, Minnesota (Figure 1). Population data is provided at the state, county, and census tract levels for the purpose of comparing the demographics in the Site to a larger area. Information for this section was retrieved from the U.S. Census Bureau's 2020 Decennial Census, 2010 Decennial Census Data, 2013 Decennial Census Data, U.S. Census QuickFacts, and the 2022 American Community Survey 5-Year Estimates.

This discussion does not address every socioeconomic measure but instead analyzes the most applicable statistics related to the demographic and economic characteristics of the population in

the Site. The socioeconomic characteristics in the Project area, including population, race, housing, income, and poverty, provide the demographic and economic context within which potential impacts of the construction and operation of the Project will be assessed.

4.2.7.1 Population and Race

The Project is located in Olmsted County, Minnesota and occurs over three Census Tracts in the county; Census Tracts 16.03, 20, and 23. Between April 1, 2010, and April 1, 2020, the population in Minnesota, Olmsted County, and Census Tract 16.03 increased, while the population of Census tracts 20 and 23 decreased. Olmsted County has a significantly higher population density compared to Minnesota, while Census tracts 16.03 and 23 both have population densities greater than the state of Minnesota, and Census Tract 20 has a population density of less than half of that of the state's. The median age in Census Tract 16.03, Census Tract 20, and Census Tract 23 are higher than the median age of Minnesota. Population and race characteristics in Minnesota, Olmsted County, and the Project related Census Tracts are included in Table 4.2.7-1.

The total minority populations in Census Tract 16.03, Census Tract 20, and Census Tract 23 are lower than the total minority population in Minnesota (22.4 percent) at 18.2, 6.5, and 12.3 percent, respectively. The total minority population as a percentage of total population in Olmsted County is slightly higher than the total minority population as a percentage of total population in Minnesota. Detailed information about race and ethnicity can be found in Table 4.2.8-2.

TABLE 4.2.7-1

Population and Race Characteristics

Category	Minnesota	Olmsted County	Census Tract 16.03	Census Tract 20	Census Tract 23
Population, 2020 Census	5,706,494	162,847	4,564	6,591	5,712
Population, 2010 Census	5,303,925	144,248	3,539	6,645	6,080
Population Change (%) [a]	+7.6	+12.9	+29.0	-0.8	-6.1
Population Density (persons per square mile) [b]	71.7	249.2	187.0	30.7	368.9
Median Age	38.5	37.6	43.1	38.9	42.2
Total Minority (%) [c]	22.4	22.7	18.2	6.5	12.3

[a] Percent population change is based on Population Census April 1, 2020, as compared to Population Census April 1, 2010.
[b] Population density was not available at the census tract level. NA = Not Available.
[c] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.
Source: U.S. Census Bureau, 2020a; U.S. Census Bureau, 2022a and 2022b; U.S. Census Bureau, 2024.

4.2.7.2 Housing

The housing characteristics including total households, average household size, total housing units, occupied housing units, and unoccupied housing units are detailed in Table 4.2.7-2 below.

TABLE 4.2.7-2

Housing Characteristics

Category	Minnesota	Olmsted County	Census Tract 16.03	Census Tract 20	Census Tract 23
Total Households	2,256,126	65,970	1,684	2,572	2,407
Average Household	2.5	2.4	2.7	2.6	2.5

TABLE 4.2.7-2

Housing Characteristics

Category	Minnesota	Olmsted County	Census Tract 16.03	Census Tract 20	Census Tract 23
Size					
Total Housing Units	2,493,956	69,216	1,724	2,755	2,452
Occupied Housing Units (%)	90.5	95.3	97.7	93.4	98.2
Vacant Housing Units (%)	9.5	4.7	2.3	6.6	1.8

Source: U.S. Census Bureau, 2020a; U.S. Census Bureau, 2022a and 2022b; U.S. Census Bureau, 2024.

4.2.7.3 Income and Poverty

As shown in Table 4.2.7-3 below, the per capita income of Minnesota is $44,947 which is higher than the per capita income of Census Tract 20 ($43,743) and lower than the per capita incomes of Olmsted County ($49,799), Census Tract 16.03 ($68,821), and Census Tract 23 ($55,094). The median hosehold income of Minnesota is $84,313 which is lower than the median household incomes of Olmsted County ($90,420), Census Tract 16.03 ($134,514), Census Tract 20 ($94,079), and Census Tract 23 ($97,629). The unemployment rate of Minnesota is 2.7 percent which is higher than the unemployment rates of Olmsted County (2.4 percent), Census Tract 16.03 (1.6 percent), Census Tract 20 (1.5 percent), and Census Tract 23 (0.6 percent). The percentage of persons living below the poverty level in Minnesota is 9.3 percent which is higher than the percentage of persons living below the poverty level in Olmsted County (7.9 percent), and Census Tracts 16.03, 20, and 23 (4.4 percent, 4.5 percent, and 2.7 percent).

TABLE 4.2.7-3

Income and Poverty

Category	Minnesota	Olmsted County	Census Tract 16.03	Census Tract 20	Census Tract 23
Per Capita Income ($)	44,947	49,799	68,821	43,743	55,094
Median Household Income ($)	84,313	90,420	134,514	94,079	97,629
Unemployment Rate (population over 16 years) (%)	2.7	2.4	1.6	1.5	0.6
Persons Living Below Poverty Level (%)	9.3	7.9	4.4	4.5	2.7

Source: U.S. Census Bureau, 2020e.

The top three industries in Minnesota are: educational services, healthcare and social assistance; manufacturing; and retail trade. The top three industries in Olmsted County are: educational services, healthcare and social assistance; retail trade; and professional, scientific, and management, and administrative and waste management services. The top three industries in Census Tract 16.03 are educational services, healthcare and social assistance; professional, scientific, and managements, and administrative and waste management services; and manufacturing. The top three industries in Census Tract 20 are educational services, health care and social assistance; manufacturing; and construction. The top three industries in Census Tract 23 are educational services, health care and social assistance; arts, entertainment, and recreation, and accommodation and food services; and retail trade (U.S. Census Bureau, 2022e).

4.2.7.4 Impacts on Socioeconomics

The Project is designed to be socioeconomically beneficial to the participating landowners and those who reside near the Site, local governments, and communities. The development of solar energy in this part of Minnesota has been important in diversifying, supporting, and strengthening the tax base of Olmsted County.

During Project construction, area businesses will experience increased revenue due to higher demand for lodging, food services, fuel, transportation, and general supplies. The Project will also create new local job opportunities for various trade professionals who live and work in the area, and it is typical to advertise locally to fill required construction positions. Opportunity exists for sub-contracting to local contractors for gravel, fill, and civil work. Additional personal income will also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes.

General skilled labor is expected to be available in Olmsted County or Minnesota to serve the Project's basic infrastructure and site development needs. Specialized labor will be required for certain aspects of the Project. It may be necessary to import specialized labor from other areas of Minnesota or neighboring states. The relatively short construction duration often precludes special training of local or regional labor, and much of the workforce needed to construct a solar facility must be Minnesota licensed electricians because much of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code.

Lemon Hill Solar will issue a Request for Proposal to contractors to construct the Project. Lemon Hill will include preferences for contractor bids that use local construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. Lemon Hill Solar will require the selected contractor to work with labor unions, local subcontractors, or other vendors to implement a project construction staffing model that attempts to maximize local hiring and local economic benefits for the Project, while ensuring the Project is safely built on time and on budget.

Effects on temporary or permanent housing are anticipated to be negligible. During construction, out-of-town laborers will likely use lodging facilities nearby. The operations and maintenance of the facility will require approximately three to five long-term personnel. The Project anticipates that sufficient temporary lodging and permanent housing will be available within the Project areas, to accommodate construction laborers and long-term personnel.

The Project is expected to produce beneficial socioeconomic effects in the area. Wages will be paid, and expenditures will be made to local businesses and landowners during the Project's construction and operation. Easement agreement payments and purchase option payments paid to the landowners will offset potential financial losses associated with removing a portion of their land from agricultural production. A tax allocation analysis has been completed for Olmsted County and surrounding townships regarding the Project and it is detailed in Table 4.2.7-4.

TABLE 4.2.7-4

Tax Allocation

Taxing District	Life of Project Total	Property Tax, Annual (2026 Projected)	Production Tax, Annual (2026 Projected)
Olmsted County	$18,708,430	$103,221	$378,400

Viola Township	$1,953,676	$10,758	$39,545
Haverhill Township	$2,239,465	$5,150	$55,055
School	$2,563,865	$52,436	N/A
Fire District	$55,850	$1,142	N/A
State of Minnesota	$5,128,814	$104,893	N/A
Total	**$30,650,100**	**$277,600**	**$473,000**

Solar farms also generate a significant financial benefit to the local economy and local taxing bodies and create well-paid local jobs that will benefit the overall market demand of properties in the area. Construction contractors and subcontractors will be paid at least prevailing wages. Any incremental impact on the local labor market will be positive: in addition to providing employment for approximately two hundred temporary construction workers, the Project is expected to create 3 to 5 permanent maintenance jobs to service and maintain facility components. Lemon Hill Solar will strive to hire locally for the permanent maintenance jobs if possible. To the extent the lease payments, additional tax revenues, and construction investments are subject to a local multiplier effect that adds robustness to the local economy, some incremental increase in local job opportunities would be expected to accompany that, but the Project has not conducted any specific studies and is not relying on any specific projected increase in jobs as part of this application.

4.2.7.5 Mitigation

No measures to mitigate socioeconomic impacts are needed because the Project is anticipated to achieve a positive socioeconomic effect on local residents and the state and local economy. Adverse socioeconomic impacts will be limited to the temporary loss of the agricultural production on the land currently farmed; however, these temporary losses are offset by the payments to the landowners from the Project. Owners of land where the Project will be constructed have entered into easement and lease agreements or purchase contracts with the Applicant and are compensated for the use and/or purchase of the applicable land based upon these agreements.

4.2.8 Environmental Justice

Environmental justice refers to the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (MPCA, 2022a). In general, the evaluation of environmental justice circumstances is intended to ensure all people benefit from equal levels of environmental protection and have the same opportunities to participate in decisions that may affect their environment or health (MPCA, 2022a).

Minority and/or low-income communities are often concentrated in small geographical areas within the larger geographically and/or economically defined population. Minority communities and low-income communities may constitute a very small percentage of the total population and/or geographical area; therefore, this analysis was completed at the census tract and block group geographic level.

An environmental justice review for the Project was completed using the methodology outlined in Minn. Stat. § 216B.1691, Subd. 1(e) (rev. 2023) that defines areas with environmental justice concerns in Minnesota:

(e)"Environmental justice area" means an area in Minnesota that, based on the most recent data published by the U.S. Census Bureau, meets one or more of the following criteria:

(1) 40 percent or more of the area's total population is nonwhite;

(2) 35 percent or more of households in the area have an income that is at or below 200 percent of the federal poverty level;

(3) 40 percent or more of residents over the age of five have limited English proficiency; or

(4) the area is located within Indian country, as defined in United State Code, title 18, section 1151.

4.2.8.1 Existing Environment

The Project is located in Census Tracts 16.03, 20, and 23. Olmsted County was used as a reference community to ensure that all affected environmental justice communities are correctly identified. Table 4.2.8-1includes data on population, total minority, population at or below 200 percent of federal poverty level, and limited English proficiency of residents over the age of five. The most recently available data was used for analysis: 2022 U.S. Census American Community Survey 5-Year Estimate File #B03002 and File #S1701.

TABLE 4.2.8-1

Environmental Justice Data for Site

State, County, Census Tract	2022 Population	Total Minority (%)[a]	Population at or Below 200 Percent of Federal Poverty Level (%)	English Spoken Less Than "Very Well" (%)
Minnesota	5,695,292	22.3	22.4	4.5
Olmsted County	162,307	22.4	18.7	4.9
Census Tract 16.03	4,567	18.2	8.8	3.4
Census Tract 20	6,656	6.5	13.3	0.4
Census Tract 23	6,303	12.3	9.0	4.4

[a]Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.
Source: U.S. Census Bureau, 2022b and 2022c.

No federally recognized Tribal Areas are crossed by the Project. As shown in Table 4.2.8-1, the Project is not located in an environmental justice community as defined by Minn. Stat. § 216B.1691, Subd. 1(e) (rev. 2023).

An environmental justice review was also conducted in accordance with the Environmental Protection Agency's Promising Practices guidance. Minority populations are groups that include Black or African American; American Indian or Alaska Native, Native Hawaiian/Pacific Islander, and Hispanic individuals. Following the Promising Practices guidance, the 50 percent and meaningfully greater analysis methods were used to identify minority populations. Using this methodology, minority populations are defined as either: the aggregate minority population of the block groups in affect area exceeds 50 percent or the aggregate minority population percentage in the block group affect is 10 percent higher than the aggregate minority population percentage in the county. Additionally, Promising Practices low-income threshold criteria method was used

to identify low-income populations. Low-income populations are block groups where the percent of low-income population in the identified block group is equal to or greater than that of the county.

The Project is located in Census Tract 16.03, Block Group 2; Census Tract 20, Block Group 5; and Census Tract 23, Block Group 3. Olmsted County was used as a reference community to ensure that any affected environmental justice communities are correctly identified. Table 4.2.8-2 includes race and ethnicity and low-income population data. The most recently available data was used for analysis: 2022 U.S. Census American Community Survey 5-Year Estimate File#B03002 and File #B17017.

TABLE 4.2.8-2

Minority Population by Race and Ethnicity and Low-Income Populations for Site

State, County, Census Tract	White Alone, Not Hispanic or Latino (%)	Black or African American Alone (%)	American Indian or Alaska Native Alone (%)	Asian Alone (%)	Native Hawaiian /Pacific Islander Alone (%)	Some Other Race Alone (%)	Two or More Races (%)	Hispanic or Latino (%)	Total Minority (%)[a]	Low-Income House-holds (%)
Minnesota	77.7	6.6	0.8	5.0	0.0	0.4	3.8	5.7	22.3	9.4
Olmsted County	77.6	7.0	0.1	6.2	0.1	0.3	3.4	5.3	22.4	8.4
Census Tract16.03 Block Group 2	87.2	0.0	0.4	0.7	0.0	0.0	0.0	11.7	12.8	0.0
Census Tract 20, Block Group 5	93.9	0.2	0.0	2.2	0.0	0.0	3.4	0.2	6.1	4.1
Census Tract 23, Block Group 3	87.4	0.3	0.0	8.3	0.0	0.9	2.7	0.4	12.6	2.2

[a] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.

Source: U.S. Census Bureau, 2022b and 2022f.

As shown in Table 4.2.8-2, the block groups where the Project is proposed are not considered environmental justice communities.

4.2.8.2 Impacts on Environmental Justice

As no areas of concern for Environmental Justice were found within the Site, this Project will not negatively impact minority groups or other groups/areas of concern.

4.2.8.3 Mitigation

No measures to mitigate environmental justice impacts are needed because the Project will not negatively impact environmental justice communities.

4.2.9 Cultural Values

4.2.9.1 Existing Environment

Cultural values include those perceived community beliefs or attitudes in a given area, which provide a framework for a community. These values provide a framework for individuals and community thought and action. Area residents may view infrastructure projects as consistent or inconsistent with these values. At times, projects invoking varying reactions can temporarily weaken community unity. Some may believe that the changed look and feel of infrastructure projects erode the rural feeling that is part of a resident's sense of place.

Cultural values can be informed by ethnic heritage. Residents of Olmsted County derive primarily from European ancestry. According to the U.S. Census Bureau (2020a) approximately 82.9 percent of the population is derived from European heritage, followed by 7.3 percent Black or African American; 6.7 percent Asian American; 2.7 percent Native Hawaiian and Other Pacific Islander, or other race; and 0.4 percent Native American or Alaska Native. The majority of the population in Olmsted County identifies as Caucasian with an ethnic background of European origin. The region surrounding the Project has cultural values tied to the area's German, Norwegian, and Irish heritage, and the agricultural economy.

Cultural values are also informed by work and leisure pursuits, for example, farming and hunting, as well as land use, such as agricultural cropland. Community events in the Project area are usually tied to seasonal/municipal events, and national holidays. Cultural representation in community events appears to be tied to geographic features, such as nearby lakes and parks, agricultural economy (e.g., farmer's markets), seasonal events, national holidays, and municipal events. Cultural representation in community events also appears to be connected to community organizations (e.g., American Legion, Future Farmers of America, 4-H club), art, food, seasonal events, national holidays, and municipal events. Examples of regional cultural events include summertime festivals such as the Olmsted County Fair (Olmsted County Fair, 2024).

4.2.9.2 Impacts

Solar energy experiences a relatively high degree of acceptance at the socio-political level and greater public favor compared to other kinds of renewable energy.[2] For example, the Olmsted County General Land Use Plan (Land Use Plan) recognizes that to meet Minnesota's carbon free energy goals, "there will need to be a significant uptick in the amount of renewable energy that is produced" and that southeastern Minnesota has "high suitability ratings for two renewable sources, solar and wind."[3] The Land Use Plan also recognizes that "[d]epending on their location, solar farms can protect vulnerable groundwater, preserve current soil quality via perennial vegetation, create pollinator habitat, and be co-located with other agricultural uses such as grazing. They generate a stable source of income for farmers and provide tax relief eligibility."[4]

[2] Wüstenhagen, R., Olsink, M., & Bürer, M.J. (2007). *Social acceptance of renewable energy innovation: An introduction to the concept.* DOI: https://doi.org/10.1016/j.enpol.2006.12.001

[3] Olmsted County Planning Department (2022). *Olmstead County General Land Use Plan*. 5.17-5.18 https://www.olmstedcounty.gov/sites/default/files/2023-01/GLUP2045Final.pdf

[4] Land Use Plan at 5.20.

The Project contributes to the growth of renewable energy and is likely to strengthen and reinforce this value in the area.

However, the support for renewable energy projects seen in the general public does not necessarily extend to the local level when it comes to project implementation.[5] The development of the Project will change the character of the area, converting agricultural land to an energy-generating facility. The value residents put on the character of the landscape within which they live is subjective, meaning its relative value depends upon the perception and philosophical or psychological responses unique to individuals. Because of this, construction of the project might—for some residents—change their perception of the area's character thus potentially eroding their sense of place. As such, the Land Use Plan recognizes that balancing renewable energy development and agricultural uses must be carefully considered.[6]

The Site is not located within municipal areas where community events typically occur. Therefore, construction and operation of the Project is not anticipated to result in a negative impact on community cultural events. In addition, the Project would encumber only a fraction of active farmland in Olmsted County, and that encumbrance would be temporary for a period of 40 years while providing a measure of economic security to the participating landowners. As a result, and because the Project is consistent with the community's cultural values as documented in the county's Land Use Plan in terms of balancing renewable energy development with agricultural uses, construction and operation of the Project is not anticipated to result in a negative impact on community cultural values.

4.2.9.3 Mitigation

Lemon Hill Solar engaged in significant community outreach prior to filing this application. The goal of this outreach was to introduce solar development to the community, listen to concerns, and increase acceptance through education and building strong connections. Once constructed, Lemon Hill Solar will be a long-term member of the community, and as such, Lemon Hill Solar will strive to find ways to contribute positively through involvement in local events, participation in community organizations and by creating local employment opportunities.

4.2.10 Recreation

4.2.10.1 Existing Environment

Common recreational activities within Olmsted County include camping, hiking, biking, fishing, horseback riding, swimming, canoeing, snowmobiling, and hunting (Olmsted County, 2024c). A portion of the Site overlaps with the statutory boundary of the Rochester State Game Wildlife Refuge (Figure 9), which is currently used for hunting.

No campgrounds or playgrounds are located within the Site. The closest park or campground is located near Chester, MN which is over 3 miles to the southwest of the Site.

In addition, the Haverhill State Wildlife Management Area is located approximately 0.5 mile southwest of the Site, and the Great River Ridge State Trail, which runs along the repurposed

[5] Bell, D., Gray, T., & Haggett C. (2007). *The 'Social Gap' in Wind Farm Siting Decisions: Explanations and Policy Responses*. DOI: https://doi.org/10.1080/09644010500175833

[6] Land Use Plan at 5.20.

Chicago and Northwestern Railroad, is approximately 0.7 mile east of the Site (Figure 9). There are no snowmobile trails within the Site.

One privately owned parcel associated with the Rochester State Game Wildlife Refuge (approximately 80 acres) overlaps with the Rochester State Game Wildlife Boundary. The private landowner of the parcel within the Rochester State Game Wildlife Refuge is a participant in the Project and is leasing the parcel to Lemon Hill Solar. This parcel is currently not available for public use and will not be available for hunting or other recreational activities throughout the life of the Project.

Other recreational areas more than 1 mile from the Project include the Silver Creek Reservoir, which is approximately 1.1 miles southwest of the Site, and Chester Woods Park, approximately 3.4 miles south of the Site (Olmsted County, 2024c).

4.2.10.2 Impacts on Recreation

Construction of the Project is not anticipated to disrupt nearby recreational activities. Construction may cause temporary impacts on those using nearby recreational activities; however, impacts are anticipated to be short term and minor. Per correspondence with the MNDNR (MNDNR, 2024e), over 90 percent of the land within the Rochester State Game Wildlife Refuge Boundary is private property, and hunting on private property would require landowner permission. The MNDNR additionally verified that additional approvals are not required for development on private lands within the Rochester State Game Wildlife Refuge. The portion of the Site (one parcel, approximately 80 acres) that overlaps with the Rochester State Game Wildlife Boundary is used for row crop agriculture and is not available to the public; therefore, impacts on recreation, due to the Project, are anticipated to be minor.

Lemon Hill Solar will coordinate with MNDNR, U.S. Fish and Wildlife Service (USFWS), Olmsted County, and Viola and Haverhill Townships to ensure construction and operation of the Project will not cause any significant impacts on nearby natural resources.

Section 4.5.3 further discusses rivers and streams in and near the Site. Within the Site there are no water resources that provide recreational opportunities; therefore, impacts are expected to be minor. Section 4.3.3 discusses potential impacts on tourism by the Project.

4.2.10.3 Mitigation

Impacts on recreational facilities and/or features are anticipated to be minor; therefore, no mitigation is proposed.

4.2.11 Public Services, Utilities, and Transportation

4.2.11.1 Existing Environment

The Site is located in a rural, agricultural and residential area where public services such as electricity, natural gas, and water systems, along with fire protection and law enforcement are available.

There is one 161 kV overhead electric transmission line owned by Dairyland Power Cooperative in the southeast portion of the Site and one liquid petroleum pipeline owned by Magellan Pipeline located across the Site from southeast to northwest (Figure 10).

There are no railroads or airports within the Site. The nearest railroad is Dakota, Minnesota and Eastern Railroad (also known as Minnesota DME), located 3 miles south of the Site. The nearest airport is 7.8 miles west of the Site and is privately owned. The nearest public airport is Rochester International Airport, located 13 miles southwest of the Site.

There are five county roads and six township roads adjacent to or crossing through the Site (Table 4.2.11-1; Figure 10). No public transportation services are available in the vicinity of the Project. Traffic data from the MnDOT was available for five county roads in proximity to the Site and is included in Table 4.2.11-2 (MnDOT, 2023).

TABLE 4.2.11-1

Roads in Proximity to Project

Route Name	Alternate Name	Ownership
Viola Road NE	County Road 2	County
100th Avenue SE	N/A	Township
T-298	N/A	Township
T-282	N/A	Township
65th Street NE	County Road 124	County
51st Street NE	N/A	Township
CSAH 24	County Road 24	County
70th Avenue NE	County Road 119	County
48th Street NE	N/A	Township
CR-102	County Road 102	County
75th Avenue NE	N/A	Township

TABLE 4.2.11-2

Annual Average Daily Traffic in the Project Vicinity

Roadway	Year	AADT Traffic Volume Total (vehicles)
Viola Road NE (County Road 2)	2018	1350
CSAH 24 (County Road 24)	2018	820
65th Street NE (County Road 124)	2014	520
70th Avenue NE (County Road 119)	2014	90
CR-102 (County Road 102)	2014	50

Note: AADT = annual average daily traffic.

As discussed in Section 4.2.1, construction and operation of the Project will have minimal impacts on the health and safety of the local population, and the level of use/service potentially needed by the Project is expected to be low; therefore, the Project will pose minimal safety and security risks to the public or site workers and no impacts on public services such as fire protection and law enforcement are anticipated. Lemon Hill will follow safety procedures to avoid accidents, and they will coordinate with emergency services prior to construction.

Since the Project will tie into an existing transmission line, Lemon Hill Solar will coordinate any planned outages associated with the Project with Dairyland and local utilities and will avoid or minimize disruptions to service in the area. Specific standards are required for the design and operating process of the Project and associated facilities. These standards and mitigation are outlined by NERC, Federal Energy Regulatory Commission, and NESC, which aid in the compatibility of new construction with existing utilities. All existing utilities will also be identified

and marked prior to construction using public and private utility locator services; therefore no permanent impacts on utility services are anticipated. Solar panels, inverters, stormwater ponds, and substations will be located a minimum of 65 feet from all existing transmission lines and pipelines.

Lemon Hill Solar will coordinate with MnDOT to confirm that construction of the Project will not interfere with routine roadway maintenance. At the peak of construction, approximately two hundred temporary construction workers will be traveling to the Site. Temporary, infrequent localized traffic delays may occur when heavy equipment enters and exits local roadways near the Project or equipment and materials are delivered to the Project construction site (deliveries are typically via semi-trucks). Any heavy equipment will be put on a trailer if it is being moved from one parcel to another. To minimize traffic impacts, Lemon Hill Solar will coordinate with local road authorities to schedule large material and/or equipment deliveries to avoid periods when traffic volumes are high whenever practical. Traffic control barriers and warning devices will also be used when appropriate. Safety requirements to maintain flow of public traffic will be followed at all times and construction operations will be conducted to offer the least practical obstruction and inconvenience to public travel. Temporary access for construction of the Project will be along existing county and township roads and Lemon Hill will obtain the necessary permits from the county and townships. Immediate impacts on these roads may include increased use as an access road for vehicles and equipment associated with Project construction. Once construction is complete, regular traffic to the Project is expected to include two maintenance trucks and up to six commuter vehicles on a weekly basis with potentially more personnel on site at intervals associated with scheduled maintenance. It is anticipated that one to two technicians may be within the Project site at any given time. Technicians will utilize utility task vehicles or pickup trucks to navigate within the Site.

Since no railroads or airports are present within the Site or within 3 miles of the Site, impacts are not anticipated.

4.2.11.2 Mitigation

Since the coordination and safety procedures outlined above will be implemented during Project construction and permanent impacts on utilities and county and township roads during and after Project construction are not expected, no mitigation is proposed.

4.2.12 Zoning and Land Use

4.2.12.1 Zoning

Existing Environment

Based on the Olmsted County Zoning Map (Olmsted County, 2024a), the entire Site is zoned as (A-1) Agricultural, and the Project is not located within any areas zoned as a shoreland district (Figure 11). The County's Zoning Ordinance allows "Solar Energy Farm" as a conditional use for Agricultural Districts (Olmsted County, 2024b). County Ordinance Section 10.52, Solar Energy Farms, outlines location and site design requirements and conditional use criteria. The Project will consider county requirements noted in the Ordinance where practicable and as discussed in Section 3.2.1.

The County Ordinance applies to solar energy systems over 100 kilowatts that are not subject to oversight by the Minnesota Power Plant Siting Act (Minn. Stat. § 216E.10, Subd. 1 (2023), which

states that the Commission's Site Permit is the only site approval required for construction of the solar project, and therefore supersedes and preempts all regional, county, or local zoning, building, or land use rules, regulations, or ordinances.

Based on the Olmsted County Zoning Map (Olmsted County, 2024a), portions of the Site also fall within the Decorah Edge Overlay District. Section 9.20 Decorah Edge Overlay District in the County's Zoning Ordinance applies to "unplatted lands zoned to accommodate commercial or industrial development or residential development at a density greater than four lots per quarter-quarter section within the Decorah Edge as defined and mapped in accordance with the Olmsted County Wetland Conservation Ordinance" (Olmsted County, 2024b).

Due to the preemption from all regional, county, or local zoning, building, or land use rules, regulations, or ordinances that are afforded to projects receiving a Site Permit from the Commission, the Project is not subject to the restrictions described in the Zoning Ordinance for the Decorah Edge Overlay District. In addition, Olmsted County Ordinance Chapter 3706 – Decorah Edge, Section 6.5.4 provides exceptions to the Edge Support Area Protection requirements. Per Section 6.5.4 of the Ordinance, if a project or activity meets criteria to obtain an exemption and 'no-loss determination' under Minnesota's Wetland Conservation Act (WCA), it is exempt from Decorah Edge protection requirements outlined in Ordinance Section 9.20 (Olmsted County, 2010). The Project, as designed, will be eligible for an exemption and no-loss determination under WCA (see Section 4.5.3.7 for additional details), and therefore would be exempt from Chapter 3706 of the County Ordinance (if the ordinance applied to the Project).

The Olmsted County General Land Use Plan planning principles incorporate the county's planning values and consist of the following that relate to the Project:

- Wisely use the energy resources, urban systems, and land area of Olmsted County by concentrating urban and suburban development and creating an orderly pattern of development.
- Encourage practices and technologies that maximize efficiency of resource use and minimize waste.
- Preserve the natural and cultural resources that provide a "sense of place" for the county.
- Ensure that growth pays for itself by incorporating long-term costs and benefits into the community decision-making process.
- Conserve and restore natural resources, including agricultural resources, and protect the ecological systems of the natural environment and economic uses of those resources.
- Encourage the creation of economic opportunities in an equitable fashion for all citizens.

Renewable energy production, including the Project, is compatible with the county's General Land Use Plan.

The Project is located in unincorporated areas of Olmsted County and certain townships have elected to handle jurisdiction over planning and zoning permits instead of the County. These

13 townships formed the Township Cooperative Planning Association (TCPA) to have a centralized office and information center for all member townships and for TCPA staff to be able to assist each member township with day-to-day township operations. Each member township has its own set of zoning ordinances that are required to be as strict or stricter than those of Olmsted County. TCPA townships handle all building permits, zoning permits, and conditional use permits (among other permits; a full list is available on the TCPA website). Olmsted County retains jurisdiction over permits such as utility right-of-way, floodplain, and shoreland development permits.

As the Project is located in Haverhill and Viola Townships, both member townships of the TCPA, any building, zoning, or conditional use permits would typically go through the TCPA. However, since the Project is obtaining a state Site Permit with the Minnesota Public Utilities Commission, TCPA approval will not be required for the Project. Pursuant to Minn. Stat. § 216E.10, Subd. 1, the issuance of a Site Permit for a large electric power generating facility is the sole site approval required to be obtained. The Site Permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government. Since a Site Permit will be required for this project, a Conditional Use Permit from the TCPA will not be required.

Impacts of Zoning

Lemon Hill Solar has taken the County's solar facility design preferences and conditional use criteria as described in the Zoning Ordinance under consideration when designing the Project.

Mitigation

The Project is compatible with the rural, agricultural character of Olmsted County and has incorporated the design preferences of the County's Zoning Ordinance to the extent practicable, as discussed in Section 3.2.1 of this application. Lemon Hill Solar has communicated regularly with Olmsted County and township representatives (Section 5.0) and considered the input received while developing the Project.

4.2.12.2 Land Use

Existing Environment

Based on the U.S. Geological Survey's (USGS) National Land Cover Database (NLCD) (USGS, 2021), the primary land use in the Site is agriculture, primarily in the form of cultivated crops, hay, and pasture. According to the USGS (2021), crop land is the predominant type of agricultural use, followed by pastureland and deciduous forest. The majority of the agricultural land in the Site is used to grow row crops such as corn and soybeans.

There are 39 residences located within 0.25 mile of the Project. including three residences within the Site (refer to Table 4.2.6-1 for additional detail on residences within 0.25 mile of the Project).

Impacts

The Project will change the land use within the Preliminary Development Area from the predominant agricultural use to solar energy generation for the life of the Project. The conversion of agricultural land to solar energy generation will have a relatively minimal impact on the rural character of the surrounding area and Olmsted County.

As discussed further in Section 4.3, Land-Based Economies, Olmsted County has an estimated 308,004 acres of land used for farm operation or agricultural purposes. As such, impacts on agricultural land for the operation of the Project, including for the solar facility and transmission line footprint, will amount to less than 0.3 percent of agricultural land in Olmsted County.

The Project as designed is consistent with the Olmsted County Zoning Ordinance and the Olmsted County General Land Use Plan (Olmsted County, 2024b). Olmsted County supports the use of solar collection systems and the development of solar energy farms. The Project supports the development of solar energy farms in balance with the protection of public safety and the existing natural resources of the county.

Mitigation

Lemon Hill Solar has developed an AIMP (Appendix D) and VMP (Appendix E), that will be implemented throughout the construction and operation of the Project. The AIMP and VMP identify measures that Lemon Hill Solar and its contractors will take to avoid, minimize, mitigate, and/or repair potential negative impacts that may result from the construction, operation, and eventual decommissioning of the Project. The AIMP and VMP outline measures to ensure the Site may be returned to agricultural use following the closure and decommissioning of the Project at the end of its useful life, including descriptions of BMPs that will be used during construction to minimize long-term impacts on soils. Agency comments will be incorporated into the AIMP and VMP prior to finalizing either plan.

Landowners will be able to continue normal agricultural activities within portions of the Site that are not converted to solar panels, access roads, or other Project facilities. After the useful life of the Project and once equipment is removed, the Site will be restored to agricultural use in accordance with the AIMP, the VMP, Project lease and easement agreements, and the Site Permit, or it may be converted to another use at the landowner's discretion if the economic conditions at the time indicate another use is appropriate for the site. The Project is also not anticipated to preclude any current or future planned use of adjacent properties.

Permanent land use or zoning impacts are not anticipated as a result of the Project. The Project is compatible with the rural, agricultural character of Olmsted County, Olmsted County's General Land Use Plan, and the goal of the County's zoning regulations. As such, no additional mitigation measures are proposed beyond those outlined in the AIMP and VMP.

4.3 LAND-BASED ECONOMIES

4.3.1 Agriculture

4.3.1.1 Existing Environment

According to the U.S. Census Bureau, Olmsted County is approximately 653.5 square miles (418,240 acres) in size (U.S. Census Bureau, 2024). According to the USDA 2022 Census of Agriculture, Olmsted County approximately 308,004 acres within Olmsted County are categorized as land in farms, with 258,221 acres of that being used as cropland (USDA, 2022). Predominant crops in Olmsted County include corn for grain (121,676 acres), soybeans for beans (79,016 acres), forage/hay/haylage (19,009 acres), vegetables (10,570 acres), and sweet corn (6,075 acres). The top livestock types in the county by number are cattle and calves, hogs and pigs, chicken (both for eggs and meat), goats, horses and ponies, and sheep and lambs.

The 2022 market value of agricultural products sold in Olmsted County was approximately $337 million; of that approximately $226 million was associated with crops, including nursery and greenhouse crops, and $111 million was associated with livestock, poultry, and their products (USDA, 2022).

Agricultural use makes up approximately 89.6 percent of the Site, based on USGS's NLCD (USGS, 2021). The remaining portion of the Site is made up of various land types that include herbaceous vegetation and deciduous forest (Section 4.5.4, Vegetation).

Drain tiles are known to be on Site and will be identified using a combination of contractor survey, historical aerial imagery, site visits, and via landowner provided maps and information. Efforts will be taken to avoid existing drain tiles and preserve existing main lines, to prevent any upstream or downstream impacts and preserve drainage on the specific property.

4.3.1.2 Impacts on Agriculture

Based on NLCD data, the Preliminary Development Area will temporarily impact approximately 875 acres of agricultural land (90 percent of the Preliminary Development Area) that will be taken out of row crop production (corn, soybeans, very small amount of alfalfa and sorghum sudangrass) or hay/pasture use for the operational life of the Project. This is not considered to have a significant impact on land-based economies in the vicinity of the Project, as it amounts to less than 0.3 percent of the agricultural land in Olmsted County. Surrounding areas will continue to be used for agricultural production during the construction and operation of the Project. Some agricultural land may also be impacted by the Project due to temporary disturbance associated with construction of Project infrastructure including steel piles, access roads, inverter skids, fencing, transmission power poles, and Project substation.

Pastureland is present within the Site and livestock operations are located within and adjacent to the Site; however, no direct impacts on livestock operations are anticipated. No conversion of feedlots or pastureland is proposed by the project.

4.3.1.3 Mitigation

As outlined in the land easement agreements, Lemon Hill Solar will provide payments to the owners of the land used for the Project. The effect of these payments is, in part, to replace the revenue that would have been generated if agricultural production were continued by the landowners. Areas disturbed during construction and not converted to Project facilities will be restored to pre-construction conditions to the extent practicable. Project lands will be vegetated as outlined in the VMP. This restoration is intended to maintain the existing topography and landform characteristics of the Project to allow it to blend in with the surrounding area. Certain areas within the Project may allow some agricultural practices to continue, such as haying or grazing, depending on the type of infrastructure that is present. Additionally, agricultural production will be able to continue during construction and operation at locations within the Site but outside the solar facility fences.

Measures to mitigate and minimize topsoil removal include limiting removal to areas designated for spot grading and construction of roads and structures. Impacts on soils will be further mitigated by incorporating erosion control measures during and following construction. Lemon Hill Solar's construction contractor will implement erosion and sediment control BMPs outlined in the SWPPP, which will be specifically prepared for the Project, and as provided below. BMPs during construction and operation for general agricultural impact mitigation are outlined in the Project

AIMP included in Appendix D. Vegetation management during construction and operation will be implemented in accordance with the Project VMP included in Appendix E.

The SWPPP and AIMP will also outline measures for managing topsoil and compaction minimization during construction. During the operating life of the Project, erosion control will be further accomplished by establishing beneficial perennial vegetation in accordance with the VMP within and directly adjacent to the Project perimeter fence installed around the PV solar arrays. Culverts may be installed under gravel access roads, as necessary, to redirect surface water runoff. These actions will work to preserve soils in place and typically result in less soil erosion and topsoil loss than typically occurs during row crop farming.

As discussed in the AIMP and VMP, and as will be described in the future SWPPP, the following is an overview of best practices and mitigation planned during construction:

- During construction, one of the primary means to protect and preserve the topsoil at the Project site will be to separate the topsoil from the other subgrade/subsoil materials when earthmoving activities, excavation, or trenching are taking place;
- A temporary halt of Project construction activities may be called if weather conditions could cause adverse impacts on soil, pose a risk to worker safety, or heavy equipment would cause significant soil compaction or rutting;
- Lemon Hill Solar will remain flexible and implement new practices and procedures that will help ensure the quality of the Project land while maintaining the safety of the workers, as needed under the directive of adaptive management;
- Stripped topsoil will be stored on site and newly spread topsoil will be loosely compacted and/or “tracked” to give a smooth-surface and employ the wind and stormwater erosion prevention BMPs;
- When performing foundation work, topsoil will be stripped and stored for later use. Once the construction is complete, topsoil piles will be distributed in a thin layer adjacent to the Project component (e.g., substation, inverter) and the topsoil revegetated with an appropriate seed mix;
- Trenching activities will require excavation of topsoil and subgrade materials (which will be segregated), and trenches will be backfilled with unscreened native backfill and covered with topsoil;
- Silt fencing or similar BMPs will be used on the downside of all hills, near waterways, and near drain tile inlets to minimize erosion and sedimentation;
- Lemon Hill Solar is committed to preserve soil drainage performance on neighboring, non-participating properties and restoring drain tile systems on participating properties as needed during operations, or upon decommissioning if tiles are not deemed necessary during solar operations; and
- Construction-related debris and unused material will be removed by Lemon Hill Solar and the contractor.

Livestock operations are located within and adjacent to the Site; however, no direct impacts on livestock are anticipated except for minor disturbances during construction. No conversion of feedlots or pastureland is proposed by the Project.

4.3.2 Forestry

4.3.2.1 Existing Environment

The Project is located primarily on agricultural land (Figure 4). In addition, there are no areas within the Site considered to be forestry resources for commercial use. Tree cover within the Site is primarily associated with undeveloped wetlands and waterways, fence lines, and shelterbelts or windbreaks adjacent to homesteads, farmstead structures, or livestock areas.

4.3.2.2 Impacts on Forestry

No economically significant forestry resources will be impacted by the Project.

4.3.2.3 Mitigation

No impacts on forestry resources are anticipated; therefore, no mitigation is proposed.

4.3.3 Tourism

4.3.3.1 Existing Environment

Recreational activities within Olmsted County that attract tourists include camping, hiking, biking, fishing, horseback riding, swimming, canoeing, snowmobiling, and hunting (Olmsted County, 2024c). A portion of the Site overlaps with the statutory boundary of the Rochester State Game Wildlife Refuge. The private landowner of the parcel within the Rochester State Game Wildlife Refuge and the Site is a participant in the Project and is leasing the parcel to Lemon Hill Solar. The overlapping area of the Rochester State Game Wildlife Refuge and Site will continue to be privately owned, with hunting access approved or denied by the property owner/lease; therefore, any disruption to recreational activities is anticipated to be minor.

The Haverhill State Wildlife Management Area is located approximately 0.6 mile southwest of the Site, and the Great River Ridge State Trail, which runs along the repurposed Chicago and Northwestern Railroad is approximately 0.7 mile east of the Site (Figure 9).

Other recreational areas more than 1 mile from the Project include the Silver Creek Reservoir, which is approximately 1.1 miles southwest of the Site, and Chester Woods Park, approximately 3.4 miles south of the Site and are discussed in Section 4.2.10.

4.3.3.2 Impacts on Tourism

The Project is not anticipated to directly or indirectly impact the Haverhill State Wildlife Management Area or Great River Ridge State Trail, since they are located 0.56 and 0.67 mile east of the Project, respectively. In addition, one parcel is located within the Rochester State Game Wildlife Refuge and is currently used for hunting. This parcel will not be available for hunting or other recreational activities throughout the life of the Project. The current, primary use of this parcel is for row crop agriculture; therefore, impacts on recreation due to the Project are anticipated to be minor. Based on the distance the Project is from tourism-related activities,

indirect impacts due to noise or visual changes are not anticipated. None of the tourism areas outside of the Site are likely to be impacted by Project activities.

4.3.3.3 Mitigation

No permanent impacts on tourism are expected, therefore no mitigation is proposed.

4.3.4 Mining

4.3.4.1 Existing Environment

Based on aerial photographs, site reconnaissance, and data from the Aggregate Source Information System (MnDOT, 2024a) and Aggregate Finder – Map (MNDNR, 2024b), no active or prospect mines or gravel pits are located in the Site.

4.3.4.2 Impacts on Mining

No mining operations are present within the Site; therefore, impacts are not anticipated.

4.3.4.3 Mitigation

No impacts on mining are anticipated; therefore, no mitigation is proposed.

4.4 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

4.4.1 Existing Environment

Information on known archaeological sites and historic structures was gathered in March and April 2024 and in April 2025 from the Minnesota State Historic Preservation Office (SHPO) and the Minnesota Office of the State Archaeologist (OSA), both in St. Paul, Minnesota. The desktop investigation and literature review queried the area including and within 1 mile of the Site (collectively the Study Area). The sources of the SHPO and OSA datasets include previous professional cultural resources surveys and otherwise reported archaeological sites, historic structures (also known as architectural history sites), and historic cemeteries. Sites in these datasets typically include, but are not limited to, Native American mounds and earthworks, prehistoric burial grounds and habitation sites, remains of EuroAmerican home- and farmsteads, logging camps or other industrial land use, and standing buildings, bridges, or other features of the built environment. Sites not included in these datasets may include locations known to Native Americans to have cultural importance.

4.4.1.1 Previously Recorded Archaeological Sites

No Previously recorded archaeological sites were identified in the Study Area (Appendix H).

4.4.1.2 Historical Cemeteries

According to the Historical Cemeteries layer provided on the OSA Portal, there is one historical cemetery located within the Study Area but outside of the Site. According to the OSA Portal data, the potential location of the St. John’s Lutheran Cemetery is in the NE 1/4, NE 1/4 of Section 12 in Township 107 North, Range 13 West. Review of modern aerial imagery shows the actual location of the cemetery in an approximately 0.6-acre plot in the northeast corner of Section 12. The cemetery is located approximately 0.5 mile from the nearest Project Boundary.

4.4.1.3 Previously Recorded Historic Structures

Results of the SHPO data request and Minnesota's Statewide Historic Inventory Portal (MNSHIP) review identified 15 recorded historic architectural resources within the Study Area (Table 4.4.1-1). These structures consist of bridges and culverts. All 15 structures are outside of the Site.

TABLE 4.4.1-1

Previously Reported Historic Architectural Resources within the Study Area

Historic Inventory Number	Property Name	Property Type	NRHP Status
OL-VIO-00007	CR 119 over Silver Creek	Structure	Not Eligible
OL-VIO-00017	Great River Ridge State Trail Bridge (MnDOT R0450)	Structure	Unevaluated
OL-VIO-00018	Great River Ridge State Trail Bridge (MnDOT R0449)	Structure	Unevaluated
OL-VIO-00019	Great River Ridge State Trail Bridge (MnDOT R0448)	Structure	Unevaluated
OL-VIO-00022	Great River Ridge State Trail Bridge (MnDOT R0445)	Structure	Unevaluated
OL-VIO-00023	Great River Ridge State Trail Bridge	Structure	Unevaluated
OL-VIO-00024	Great River Ridge State Trail Bridge	Structure	Unevaluated
OL-VIO-00025	Great River Ridge State Trail Bridge (MnDOT R0444)	Structure	Unevaluated
OL-VIO-00026	Great River Ridge State Trail Bridge (MnDOT R0444)	Structure	Unevaluated
OL-VIO-00034	Culvert 97463	Structure	Not Eligible
OL-VIO-00035	Culvert R0213	Structure	Unevaluated
OL-VIO-00036	Culvert R0253	Structure	Not Eligible
OL-VIO-00039	Bridge 88737	Structure	Not Eligible
OK-VIO-00040	Bridge 55J16	Structure	Unevaluated
XX-RRD-CNW049	Chicago and North Western Railway	Structure	Unevaluated

4.4.1.4 Archaeological Survey

Lemon Hill Solar contracted Merjent to conduct an archaeological survey in summer 2024, of those portions of the Site assessed as having high and medium probability to contain significant archaeological sites. Merjent submitted a landform sampling strategy to SHPO for review and comment prior to the field survey. This landform sampling strategy and probabilistic survey model was derived from the MnDOT statewide Survey Implementation Model, MM4 (MnDOT, 2024b), and from Thomas' (1986) *Refiguring Anthropology: First Principles of Probability and Statistics*. The high probability areas include:

- areas within 500 feet (150 meters) of an existing or former water source of 40 acres (19 hectares) or greater in extent, or within 500 feet (150 meters) of a former or existing perennial stream;
- areas located on topographically prominent landscape features;
- areas located within 300 feet (100 meters) of a previously reported archaeological site; or
- areas located within 300 feet (100 meters) of a former or existing historic structure or feature (such as a building foundation or cellar depression).

A total of 100 percent of the medium probability areas were intensively inventoried. Medium probability areas include:

- areas between 500 and 1,000 feet (150 to 305 meters) of an existing or former water source of 40 acres (19 hectares) or greater in extent, or between 500 and 600 feet (150 to 183 meters) of a former or existing perennial stream;

- areas located between 300 and 800 feet (100 to 244 meters) of a previously reported archaeological site; or

- areas located between 300 and 800 feet (100 to 244 meters) of a former or existing historic structure or feature (such as a building foundation or cellar depression).

As a control, 5 percent of the areas outside of the high and medium probability areas that have been assessed as having a relatively low potential for containing archaeological resources (such as inundated areas, former or existing wetland areas, poorly drained areas, and areas with a 20 percent or greater slope) were surveyed. Other low potential areas and areas in which Holocene (less than 10,000 years old) deposits have been significantly disturbed (such as road right-of-way ditches) were excluded from intensive field survey (Thomas, 1986).

A Phase I archaeological field survey of the Project footprint was undertaken between October 21 and November 2, 2024 (Figure 12). The archaeological survey followed the survey methods described in the Phase I Survey Plan and Methods. During the Phase I archaeological survey, a single chert tertiary flake was discovered on the ground surface. The find locale was subsequently assigned archaeological site number 21OL0077 by the OSA. Intensive pedestrian survey and shovel testing around the 21OL0077 site locale did not result in the discovery of additional cultural material.

The two parcels added to the Project in spring 2025 have not been surveyed. The Phase I survey for these parcels is scheduled for early summer 2025. The survey will follow the methodology outlined above. Any cultural resources identified during the 2025 survey will be avoided. The results of the survey will be submitted to the SHPO in the form of an amended survey report within 1 month of the completion of the survey. The results will be submitted to the Commission as soon as they are available.

4.4.2 Impacts on Cultural Resources

Based on the Phase Ia literature review and results of the Phase I archaeological survey (Merjent, 2024a), Merjent recommends that:

1) archaeological site number 21OL0077 does not meet the National Register of Historic Places (NRHP) criteria and is therefore not eligible for listing on the NRHP;

2) no historic properties will be affected by the Project as proposed; and

3) no further archaeological work is recommended for the Project as planned.

The Phase I survey report for the original Project layout was submitted to SHPO on January 8, 2025. In correspondence dated March 3, 2025, SHPO responded with the determination that there are no properties listed in the NRHP or State Register of Historic Places, or within the Historic Sites Network, that will be affected by the Project.

4.4.3 Mitigation

Lemon Hill Solar will prepare an Unanticipated Discovery Plan for reference during construction activities. Should an NRHP-eligible site be identified during construction, the Applicant will coordinate with SHPO and the OSA to avoid, minimize, or mitigate adverse effects. Such efforts may be achieved through, but not limited to, Project design changes (avoidance), engineering or construction controls (minimization), or data recovery excavation (mitigation). While not expected, in the event archaeological materials and/or human remains are identified during Project construction activities, such activities will cease in the immediate area, and a professional archaeologist will be contacted to investigate the find. In the event of a confirmed archaeological site, steps will be taken to record and evaluate the site in consultation with SHPO and the OSA. If the site is determined to be eligible for inclusion on the NRHP, consultation among these parties will determine any procedures for avoidance, minimization, or mitigation. Should human remains be identified, the procedures as outlined in United States Code, Title 25, Section 3001 “Native American Graves and Repatriation Act” and Minn. Stat. Ch. 307, “Private Cemeteries” will be followed in coordination with the OSA and Minnesota Indian Affairs Council.

4.5 NATURAL ENVIRONMENT

4.5.1 Air

Section 109(b) of the Clean Air Act (CAA) requires that the EPA establish National Ambient Air Quality Standards (NAAQS) requisite to protect public health and welfare (40 Code of Federal Regulations Part 50). The CAA identifies two classes of NAAQS: primary standards, which are limits set to protect the public health of the most sensitive populations, such as asthmatics, children, and the elderly; and secondary standards, which are limits set to protect public welfare, such as protection against visibility impairment or damage to vegetation, wildlife, and structures. The EPA has promulgated NAAQS for six criteria pollutants: ozone (O_3), PM less than 10 microns in diameter (PM_{10}), PM less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb). Minnesota is in compliance with the primary and secondary NAAQS for all criteria pollutants except Pb, which has one nonattainment area in Dakota County (USEPA, 2024a; MPCA, 2024a).

4.5.1.1 Existing Environment

In Minnesota, air quality is tracked using air quality monitoring stations across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI) on an hourly basis for O_3, $PM_{2.5}$, SO_2, NO_2, and CO. The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of five levels of quality: good, moderate, unhealthy for sensitive groups, unhealthy, or very unhealthy (MPCA, 2023).

The air quality monitor located nearest to the Project is in Rochester, Minnesota, approximately 10 miles to the southwest. This station monitors O_3 and $PM_{2.5}$. The AQI for Rochester for the past five years is provided in Table 4.5.1-1 (MPCA, 2024b).

TABLE 4.5.1-1

Days in Each Air Quality Index Category (Rochester, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2023	190	160	14	1	0

TABLE 4.5.1-1

Days in Each Air Quality Index Category (Rochester, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2022	280	78	1	0	0
2021	275	84	2	0	0
2020	292	73	1	0	0
2019	271	93	0	0	0

Source: MPCA, 2024b.

Air quality has generally been considered good for the majority of the past five reported years in Rochester. Since 2019, the largest number of days classified as moderate, unhealthy for sensitive groups, or unhealthy occurred in 2023 and is likely the result of Canadian wildfires (MPCA, 2025a). In that year, 160 days were classified as moderate, 14 days were classified as unhealthy for sensitive groups, 1 day was classified as unhealthy, and no days were classified as very unhealthy.

4.5.1.2 Impacts

Impacts on air quality from construction and operation of the Project will be minimal and limited to the period of construction. Air emissions during construction will primarily consist of combustion emissions from construction equipment and will include carbon dioxide, nitrogen oxides, and particulate matter. A summary of construction and operating emissions is found in Appendix I: Project Emissions Estimate. Dust from earthmoving activities will also contribute to particulate matter emissions. Impacts from the Project are expected to be negligible due to the temporary nature of the emissions and dust-producing construction phases. Overall, dust emissions currently experienced annually in the area through farming activities will be reduced for the life of the Project through the establishment of perennial vegetative cover within the fenced areas. A summary of construction and operating emissions is found in Appendix I: Project Emissions Estimate.

4.5.1.3 Mitigation

Soils at the Project are not susceptible to wind erosion. Therefore, construction-specific mitigation measures and BMPs related to dust control have not been identified. If wind erosion or dust from equipment becomes an issue during construction, standard industry practices may be implemented, including mulching exposed soils, wetting exposed soils, maintaining vegetative cover (both cover crops and permanent vegetation), and reduced vehicle speeds. Emissions from construction vehicles will be minimized by keeping construction equipment in good working order.

4.5.2 Soils, Geology, and Groundwater

Soils, underlying geologic bedrock formations, groundwater, and other hydrogeologic resource features of the Site were identified using desktop evaluations and included use of:

- Geographical information system (GIS) layers - NRCS Web Soil Survey (USDA NRCS, 2024), Minnesota Well Index (Minnesota Department of Health [MDH], 2023a), Olmsted County, MN GIS Web Map – Decorah Edge (Olmsted County, 2024a), and Karst Feature Mapping of Minnesota (MNDNR, 2024d); and

- Soil Survey of Olmsted County Minnesota (USDA, 1980), Geologic Map of Minnesota - Bedrock Geology (Jirsa et al., 2011), Geologic Map of Minnesota – Quaternary Geology (Lusardi et al., 2019), Source Water Protection Web Map Viewer Interactive Mapper (MDH, 2023b), Wellhead Protection Vulnerability Fact Sheet (MDH, 2018), Minnesota Stormwater Manual (MPCA, 2022b), Minnesota Groundwater Provinces 2021 (MNDNR, 2021a), The National Map Viewer (USGS, 2024), Soils – Grid – Hydric Rating (MNDNR, 2022a), Solar Energy Production and Prime Farmland (Minnesota DOC, 2020), Water Table – Depth (MNDNR, 2022b), Minnesota Ground Water Association White Paper 03 (Smith et al., 2018), Decorah Edge Features (Rochester-Olmsted Planning Department, 2006) Minnesota Regions Prone to Surface Karst Feature Development (Adams et al., 2016), Sinkholes and Sinkhole Probability (Alexander and Maki, 1988), Depth to Bedrock – State (Minnesota Geological Survey, 2018), and Olmsted County Geologic Atlas – Part A (Minnesota Geological Survey, 2023).

4.5.2.1 Soils

Existing Environment

The Soil Survey of Olmsted County (USDA, 1980) indicates that the soils of Olmsted County are primarily clayey loams, sandy clay loams, and silt loams. Throughout Olmsted County the surface is near level or gently sloping. The surfaces are moderately steeper in upland areas and near rivers and creeks throughout Olmsted County. Olmsted County is covered entirely by Quaternary-aged alluvium and glacial deposits (Lusardi et al., 2019). The glacial deposits consist of till from repeated advances of the Laurentide Ice Sheet (Minnesota Geological Survey, 2023). The different parent materials, topography, native vegetation, and type of glacial deposits account for the variety of soils in the County.

Soils within the Site mainly consist of silt loams and loams (Figure 13) (USDA NRCS, 2024). The topography within the Site is nearly level within current row-crop agriculture production; however, elevation decreases surrounding creek bottoms in the Site (USGS, 2024). Approximately 10 percent of the Site is classified as hydric soil where historic wetlands were present prior to drainage for agriculture (e.g., installation of drain tiles and ditches) or where wetlands are presently located. Approximately 90 percent of the Site is classified as non-hydric soils (Figure 13) (MNDNR, 2022a).

Approximately 61 percent of the Site is prime farmland, 8 percent prime farmland if drained, 19 percent farmland of statewide importance, and 13 percent not prime farmland (Minnesota DOC, 2020).

Impacts

Impacts on soil will occur during both the construction and minimally during operational stages of the Project. Soil impacts will primarily occur from the construction for the Project substation, O&M building, Project gen-tie line, access roads, laydown areas, fencing, PV pile foundation posts, tracker installation, PV solar module installation, collector line system, electrical enclosures/inverters, general grading, and site preparation. Impacts on soil due to construction are most likely to include compaction and rutting. Soil impacts in the solar array areas and in areas not intended for permanent above-ground facilities will be restored following construction. The result of long-term maintenance of native and other beneficial vegetation within the fenced

areas will be an improvement in soil health at the end of the Project's use (Minnesota BWSR, 2019).

Decommissioning, removal of equipment, and restoration will not result in excessive earth disturbance. The areas of the Site that are disturbed will consist of the array areas where construction vehicles travel, the footprint of the access roads, the corridors of the perimeter fencing, equipment pad areas, stormwater management basins, and underground electric lines.

Mitigation

During construction, soil compaction is anticipated for the direct-embedded piles for the solar arrays and inverter skids. Topsoil will be stripped and stored prior to installation of the solar arrays and will be restored to the area after construction. Low impact equipment and methods will be used to prevent soil compaction. During operation of the Project, soil compaction could occur from the use of access roads. Relatively light duty maintenance vehicles will use access roads, which could cause soil compaction to be confined to the roadbed. Installing permanent vegetation adjacent to access roads and dressing access roads with gravel is expected to reduce the potential for soil erosion in the Site.

Construction of the Lemon Hill Solar Project will disturb more than 50 acres of soil. As a result, Lemon Hill Solar will prepare and submit a National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) Construction Stormwater (CSW) Permit application and SWPPP to MPCA for review and approval prior to construction in order to obtain coverage under the General Construction Stormwater Permit Program.

Construction activities may include containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust. In accordance with the MPCA-approved SWPPP, the Project's construction contractor will implement BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent erosion.

Implementing the Project VMP and AIMP will further minimize and mitigate soil impacts. Additionally, in accordance with MPCA requirements, permanent stormwater ponds are included in the Project design. Stormwater ponds are designed to be located completely outside of wetland areas.

The Site will be decompacted pursuant to the AIMP standards by disking and mixing with suitable sub-grade materials selected to support revegetation and to match the existing soil types. Disturbed areas will be seeded with an appropriate local grass seed mix and topsoil per the AIMP and VMP, if not returned to agricultural use.

4.5.2.2 Geology

Existing Environment

Surficial geological features within Olmsted County are generally relatively flat, with moderately steep valleys near creek bottoms and derived from glacial origin. Surface deposits within the Site consist of Quaternary-aged sand, gravel, silt, clay, cobbles, and boulders. These glacial deposits result from till associated with the repeated advances of the Laurentide Ice Sheet (Minnesota Geological Survey, 2023). Glacial deposits are approximately 25 feet thick or greater, overlaying the bedrock within the Site (Minnesota Geological Survey, 2018). Depth to bedrock within most

of Olmsted County is generally within 25 feet of land surface; however, narrow buried bedrock valleys within areas of Olmsted County can have a depth to bedrock up to 276 feet below ground surface. Bedrock within the Site is underlain by the Maquoketa, Stewartville, Prosser, Cummingsville, Platteville, and Glenwood Formations. The bedrock formations consist of Ordovician-aged limestone, shaley limestone, dolostone, dolomitic limestone, sandstone, and St. Peter Sandstone (Jirsa et al., 2011). Additionally, the Decorah Edge is located within the Site (Figure 14). The Decorah Edge occurs where the Decorah, Platteville, or Glenwood is the first encountered bedrock, depth to bedrock is less than 25 feet below ground surface, and where the Decorah abuts the Cummingsville Formation (Rochester-Olmsted Planning Department, 2006).

Karst features include sinkholes, springs, and stream sinks. The Site, along with the majority of Olmsted County, is prone to surface karst feature development (Adams et al., 2016). The Site is in a low to moderate sinkhole probability, which consists of individual sinkholes or clusters of two to three sinkholes. The average sinkhole density is less than one sinkhole per square mile (Alexander and Maki, 1988). A total of one sinkhole is present in the Site. Additionally, 11 unverified location springs, one verified location spring, and two tile drain outlets are present in the Site (MNDNR, 2024d). See Figure 14 for locations of karst features and areas prone to surface karst feature development.

Impacts

Depending on the final design parameters, the Project has the potential to result in significant change in surficial material. A geotechnical analysis will be performed prior to construction to support the selection of construction materials and methods. Impacts on karst features will be avoided to the extent possible.

Mitigation

A geotechnical evaluation will be completed prior to construction to determine if Lemon Hill Solar requires special construction methods related to soil conditions, bedrock conditions, and karst features.

4.5.2.3 Groundwater

Environmental Impacts

Minnesota Groundwater Provinces exist throughout the state based on bedrock and glacial geology. The Lemon Hill Solar Project is in Minnesota Groundwater Karst Province 3, described as having thin (less than 50 feet) glacial sediment overlying thick and extensive bedrock (carbonate and sandstone) prone to karst features such as solution, conduits, sinkholes, and caves (MNDNR, 2021a).

According to the Minnesota Well Index Database, wells surrounding the Site are set in limestone, sandstone, and dolomite bedrock aquifers. Groundwater use in Olmsted County is primarily from bedrock aquifers, with lesser amounts coming from Quaternary surficial and buried sand aquifers (MNDNR, 2021a).

According to the MNDNR Water Table – Depth database, the Site depth to groundwater is between 0 and 20 feet below ground surface (MNDNR, 2022b). Given that the Project is located within an area heavily used for agricultural purposes, the installation of subsurface drainage

systems (tile lines) is common to manage soil moisture. Subsurface drainage systems can alter the depth to groundwater (Smith et al., 2018).

Public and non-public community water supply source-water protection in Minnesota is administered by MDH through the Wellhead Protection Program. Wellhead Protection Areas (WHPA) for public and community water-supply wells are delineated on the basis of a zone of capture for 10-year groundwater time-of-travel to the well. A Drinking Water Supply Management Area (DWSMA) is delineated around the WHPAs using geographically definable boundaries, such as roads, section lines, etc. Within the DWSMA, the water-supply provider conducts an inventory of potential contamination sources and develops management practices and monitoring strategies to mitigate well contamination. There are no WHPAs or DWSMAs within the Site.

The 4,550-acre Elgin DWSMA surrounding the 3,334-acre WHPA is located approximately 2.6 miles northeast of the Site. Additionally, the 20,840-acre Rochester Central DWSMA surrounding the 18,648-acre WHPA is located approximately 3.2 miles west of the Site. DWSMAs are assigned vulnerability assessments, which refers to the likelihood that activities at the land surface may degrade drinking water quality at a public water supply well (MDH, 2018; MDH, 2023b).

The MDH Well Index identifies 82 locatable wells and six unlocatable wells within 1 mile of the Site, with depth to groundwater ranging from 2 to 250 feet below ground surface. The wells are for domestic use; however, one well is listed with an unknown use status. Five locatable wells are within the Site (MDH, 2023a). The wells within the Site are within farmsteads.

Impacts

Project construction depth is unknown currently and therefore impacts on groundwater resources both at the site and in surrounding areas are unknown. Lemon Hill Solar will be completing a geotechnical study closer to the construction date to further inform the Project's design, engineering, and construction techniques. As previously mentioned, there are no DWSMAs or WHPAs within or adjacent to the Site.

Project construction is not likely to affect the use of existing water wells. The five wells within the Site are associated with farmsteads, and project construction will involve setbacks from farmsteads. If an unknown or unregistered well is discovered during construction, Lemon Hill Solar will coordinate with the landowner to ensure that MDH requirements for registering or capping the well are followed.

Impacts on groundwater resources are not anticipated during facility operation of the Project as water supply needs will be limited. A water well has the potential to be constructed to aid in the water usage for dust control during construction. Additionally, an O&M building will be constructed as part of the Lemon Hill Solar Project. If potable water is required for construction dust control purposes or the O&M building, Lemon Hill Solar will acquire appropriate water well permits and will hire an approved well drilling contractor prior to construction. Water use at the O&M building will be limited to restroom and vehicle wash services. Once the design and dimensions of the O&M building are finalized, the water use will be estimated by appropriate water usage calculations and permitted as necessary.

Subsurface blasting is not likely during construction; therefore, disturbances to groundwater from newly fractured bedrock are not anticipated.

Solar panels, buildings, roads, and gravel surfaces are considered impervious surfaces by the MPCA (MPCA, 2022b). In general, an increase in impervious surfaces has the potential to impact groundwater recharge. Except for the solar panels, the Project will have minimal increase in impervious surfaces within the Site. Additionally, the increased amount of perennial vegetation that will be established within the Site and stormwater treatment basins will facilitate groundwater infiltration. The steel pile rack foundations will likely be driven and will not require concrete foundations; however, some concrete foundations may be required. Final depths of the pile rack foundations will be determined following the geotechnical analysis of the Site. Impacts on the aquifer resources are not anticipated.

Large quantities of hazardous material have the potential to spill or leak into the soil and groundwater. The only hazardous materials will be fuel for trucks and machinery as well as other standard construction oils and they will be labelled, stored, and disposed of in accordance with applicable requirements. Additionally, all hazardous materials stored, including portable and permanent aboveground storage tanks, will have the appropriate containment required by regulations. PV solar module washing activities will use ionized water. All herbicide applications for vegetation management will follow applicable regulatory use and management requirements.

Mitigation

Dewatering required during project construction will be managed in accordance with the SWPPP and MNDNR temporary dewatering permit by discharging to the surrounding surface. If applicable MNDNR permit thresholds are expected to be exceeded during construction, Lemon Hill Solar will obtain a Water Appropriation Permit from MNDNR. The geotechnical report will allow for Lemon Hill Solar to follow the appropriate MPCA general stormwater management guidelines for karst areas. The CSW Permit prohibits infiltration of stormwater runoff within 1,000 feet up-gradient or 100 feet down-gradient of active karst features.

4.5.3 Surface Waters

Hydraulic features within the Site include wetlands, waterways, waterbodies, and floodplains (Figure 15). The Project is within the Upper North Fork Whitewater River, Silver Creek, and Dry Creek Hydrologic Unit Code 12 Watersheds (USGS, 2024).

Merjent conducted a wetland and waterbody field delineation in support of the Project in May and June 2024 (Merjent, 2024b). Prior to field surveys, a desktop assessment was completed to identify potential wetland and waterbody areas within the Site. USFWS National Wetlands Inventory (NWI) data, USGS National Hydrography Dataset (NHD), and the MNDNR Public Waters Inventory data set were used to identify aquatic resources within approximately 1,907 acres (Survey Area) that includes the Site. The Survey Area encompassed a buffer to allow for minor adjustments to Project design, both for avoidance and minimization of impacts on resources and for constructability. The data were used as a precursor for field delineations. Field surveys were conducted to confirm desktop boundaries and to update wetland/upland vegetation breaks, slope, and hydrology indicators. A total of 33 wetlands, 29 streams, and one open waterbody were delineated through the desktop and field survey efforts within the Survey Area (Merjent, 2024b; Figure 15).

After the wetland delineations were completed, two additional parcels were added to the Site. Based on NWI data, wetlands are present in the northwestern parcel (Figure 15). These parcels will be field delineated in spring 2025 and an updated wetland delineation report will be prepared. The results will be submitted to the Commission as soon as they are available.

4.5.3.1 Floodplains

Existing Environment

A floodplain is any land area susceptible to being inundated by floodwaters from any source, and is usually flat, or nearly flat land adjacent to a river or stream that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which includes areas covered by the flood but that do not experience strong current. The Federal Emergency Management Agency (FEMA) delineates floodplains and determines flood risks in areas susceptible to flooding. FEMA designates floodplain areas based on the percent chance of a flood occurring in that area every year. These designations include the 100-year floodplain, which has a 1 percent chance of flooding each year, and the 500-year floodplain, which has a 0.2 percent chance of flooding each year.

At the state level, the MNDNR oversees the administration of the state floodplain management program by promoting and ensuring sound land use development in areas to promote the health and safety of the public, minimize loss of life, and reduce economic losses caused by flood damages. The MNDNR also oversees the national flood insurance program for the State of Minnesota. Floodplains are also regulated at the local level by each county.

Chapter 3750 – Floodplain and Shoreland of the Olmsted County Ordinance (No. 23-5) applies to “all lands within the unincorporated townships of the county shown on the official zoning map and/or the attachments thereto as being located within the boundaries of the Floodway, FFA and FFB Flood Fringe, or General Floodplain Districts” (Olmsted County, 2023). According to Olmsted County Floodplain GIS data, there are no lands within the Site that are within the boundaries of Floodway, FFA, FFB Flood Fringe, or General Floodplain Districts (Olmsted County, 2024a).

Upon review of FEMA mapping tools, although preliminary maps (December 2023) are available for some areas within Olmsted County west of the Site, FEMA has not completed studies within the Site to determine flood hazards; therefore, FEMA flood maps are not available for the Site (Olmsted County, 2021; FEMA, 2024).

Impacts on Floodplains

Since there are no lands within the Site that are within the boundaries of Floodway, FFA, FFB Flood Fringe, or General Floodplain Districts designated by Olmsted County, impacts are not anticipated.

Mitigation

No impacts on floodplains are anticipated; therefore, no mitigation is proposed.

4.5.3.2 Impaired Waters

Existing Environment

Under Section 303(d) of the Clean Water Act (CWA), the MPCA assesses all waters of the state and creates a list of impaired waters every two years. The listings are based on water quality monitoring of lakes and major streams and are used to set pollutant reduction goals needed to restore waters to the extent that they meet water quality standards for designated uses, which are

referred to as total maximum daily loads. The list, known as the 303(d) list, is based on violations of water quality standards. In Minnesota, the MPCA has jurisdiction for determining 303(d) waters. These waters are described as “impaired.” The 303(d) list was approved by the EPA on April 29, 2022.

There are no impaired waterbodies within the Site (MPCA, 2024c).

Impacts on Impaired Waters

Since there are no impaired waters within the Project site, impacts are not anticipated.

Mitigation

No Impacts on impaired waters are anticipated; therefore, no mitigation is proposed.

4.5.3.3 Lakes and Other Waterbodies

Existing Environment

Lakes and other waterbodies are non-linear surface water features. Based on the wetland delineation performed by Merjent, one open waterbody (lakes, ponds, etc.) was identified within the Site (Merjent, 2024b). Open waterbodies are defined as non-linear features that permanently hold water deeper than approximately 6 feet and of enough duration to preclude most aquatic vegetation or other wetland characteristics. These features include those commonly referred to as, but not limited to, ponds, lakes, or reservoirs. The 1.66-acre waterbody is within the southeast section of the Site, west of 100th Avenue NE (Figure 15).

Impacts on Lakes and Other Waterbodies

No Project activity will occur within or across the waterbody; therefore, impacts are not anticipated.

Mitigation

No impacts on waterbodies are anticipated; therefore, no mitigation is proposed.

4.5.3.4 Rivers and Streams (Waterways)

Existing Environment

Waterways include rivers, streams, and other watercourses that move water across the landscape within a defined path. Based on a review of aerial photography and the wetland and waterbody delineation performed in 2024, there are 29 streams within the Site: Dry Creek and unnamed tributaries to Dry Creek, Silver Creek and the North Fork Whitewater River (Figure 15). Based on NHD data, one waterbody is present within the new parcel in the southeast portion of the Site; this will be field-verified in Spring 2025. The results will be submitted to the Commission as soon as they are available.

Public Waters are wetlands, water basins, and watercourses of significant recreational or natural resource value as defined in Minn. Stat. § 103G.005. The MNDNR has regulatory jurisdiction over these waters, which are identified on the MNDNR Public Waters Inventory (PWI) maps. Crossing a Public Water with infrastructure such as bridges or utilities would require a License to Cross

Public Waters from the MNDNR. There are no Public Waters within the Site. There are Public Waters adjacent to sections of northeastern and eastern project boundaries (Unnamed Creek) and southeast of the Project (Unnamed Creek) (MNDNR, 2024c). No Project activity will occur within or across these Public Waters (Figure 15).

Public Ditches are open channels to conduct the flow of water as defined in Minn. Stat. § 103E.005 and drainage authorities include county boards, watershed districts, and water management organizations. There is one Public Ditch, MAJ-070411316 + MAJ-070410726, within the Site (MNDNR, 2024c); (Figure 15). Another Public Ditch is located outside of the Site in the eastern portion of the Project.

Impacts on Rivers and Streams

Lemon Hill Solar will not place solar infrastructure within delineated streams, including Public Waters and Ditches; however, there will be three Public Ditches and eight intermittent stream crossings by Project collector lines. In each case, the collector lines will be bored under the Public Ditches and streams within the Site. Direct impacts on rivers and streams are not anticipated. Lemon Hill Solar will obtain the necessary permits, implement BMPs, and comply with the NPDES, Construction General Permit MNR100001, during construction and will perform construction activities in compliance with local and state permits to prevent erosion and sedimentation near streams and surface waters.

Mitigation

No permanent impacts on rivers and streams (waterways) are anticipated; therefore, no mitigation is proposed.

4.5.3.5 Wetlands

Existing Environment

Wetlands are important resources for flood abatement, wildlife habitat, and water quality. Wetlands that are hydrologically connected to the nation's navigable streams are regulated under Section 404 of the federal CWA. Most wetlands in Minnesota that are not regulated under the CWA are regulated under the State's WCA. NWI data for Minnesota provides information on the potential location, extent, and type of Minnesota wetlands. The NWI for Minnesota is a publicly available GIS database that provides information regarding the potential existence of wetlands. NWI data should be used as a reference only and may be inconsistent with wetland conditions on the ground.

Wetland types within the NWI data are classified using the Cowardin wetland habitat classification system. The Cowardin classification system is hierarchical and defines wetland habitats based on vegetative and sediment class along with water regime.

In May and June 2024, Merjent completed a wetland and other waters field delineation of the 1,907-acre Survey Area, which includes the Site (Merjent, 2024b). The Survey Area represented the maximum anticipated extent of Project disturbance and full site use. The Survey Area encompassed a buffer to allow for minor adjustments to Project design, both for avoidance and minimization of impacts on resources and for constructability. The survey was performed by qualified biologists who covered the entire Survey Area.

Based on field delineations, approximately 80.7 acres of wetlands may be present within the Survey Area (Figure 15). After the wetland delineations were completed, two additional parcels were added to the Site. Based on NWI data, 12.7 acres of wetlands are present in the additional parcels (Figure 15). These parcels will be field delineated in spring 2025 and an updated wetland delineation report will be prepared. Impacts on delineated wetlands will be avoided and the results of the surveys will be submitted to the Commission as soon as they are available. Details on wetland types are included in Table 4.5.3-1.

TABLE 4.5.3-1

Summary of Delineated Wetlands within the Survey Area

Wetland ID	Eggers and Reed Classification [a]	Circular 39 Classification [b]	Size (acres) within Survey Area [c]
	Fresh (wet) Meadow	Type 2	4.1
w01	Floodplain Forest	Type 1	2.43
	Fresh (wet) Meadow (desktop) [d]	Type 2	3.82
w02	Fresh (wet) Meadow	Type 2	0.16
w03	Fresh (wet) Meadow	Type 2	0.02
w04	Sedge Meadow	Type 2	13.21
	Fresh (wet) Meadow	Type 2	3.08
w05	Fresh (wet) Meadow	Type 2	0.04
w06	Fresh (wet) Meadow	Type 2	0.04
w07	Fresh (wet) Meadow	Type 2	0.01
w08	Seasonally Flooded Basin	Type 1	0.11
w09	Fresh (wet) Meadow	Type 2	0.16
	Fresh (wet) Meadow	Type 2	5.87
w10	Floodplain Forest	Type 1	10.76
	Seasonally Flooded Basin	Type 1	0.31
w11	Fresh (wet) Meadow	Type 1	0.42
	Seasonally Flooded Basin	Type 2	1.06
w12	Seasonally Flooded Basin	Type 1	0.23
w13	Fresh (wet) Meadow	Type 2	0.15
w14	Fresh (wet) Meadow	Type 2	0.17
w15	Fresh (wet) Meadow	Type 2	0.68
w16	Fresh (wet) Meadow	Type 2	0.73
w17	Fresh (wet) Meadow	Type 2	1.52
	Seasonally Flooded Basin	Type 1	3.5
w18	Fresh (wet) Meadow	Type 2	2.04
	Shrub-Carr	Type 6	0.86
	Hardwood Swamp	Type 7	0.6
w19	Fresh (wet) Meadow	Type 2	0.03
w20	Fresh (wet) Meadow	Type 2	0.71
w21	Seasonally Flooded Basin	Type 1	4.43
w22	Fresh (wet) Meadow	Type 2	0.8
	Floodplain Forest	Type 1	1.1
w23	Hardwood Swamp	Type 7	0.05
w24	Floodplain Forest	Type 1	0.01
w25	Floodplain Forest	Type 1	0.01
	Fresh (wet) Meadow	Type 2	6.08
w26	Hardwood Swamp	Type 7	0.72
	Seasonally Flooded Basin	Type 1	1.38
	Shrub-Carr	Type 6	3.12

TABLE 4.5.3-1

Summary of Delineated Wetlands within the Survey Area

Wetland ID	Eggers and Reed Classification [a]	Circular 39 Classification [b]	Size (acres) within Survey Area [c]
w27	Seasonally Flooded Basin	Type 1	1.06
w28	Fresh (wet) Meadow	Type 2	0
	Fresh (wet) Meadow	Type 2	3.45
w29	Shrub-Carr	Type 6	0.74
	Hardwood Swamp	Type 7	0.53
w30	Fresh (wet) Meadow	Type 2	0.07
w31	Seasonally Flooded Basin	Type 1	0.17
w32	Fresh (wet) Meadow	Type 2	0.04
w33	Fresh (wet) Meadow	Type 2	0.05
Total Area			**80.63**

[a] Source: Eggers and Reed, 2015.
[b] Source: Shaw and Fredine, 1956.
[c] Note: delineated wetlands may extend outside of the Survey Area.
[d] Area could not be field delineated due to access restrictions.

Impacts on Wetlands

Based on the preliminary Project design, wetland impacts will be avoided. Collection lines may need to cross wetlands; however, impacts will be avoided by boring the collection line under the delineated wetlands (Table 4.5.3-2). As discussed in Section 3.1.3, collector lines will be buried at least four feet deep. Temporary fill impacts on wetlands may occur in the form of the placement of temporary construction matting along access routes. Solar generation facility infrastructure, including fence posts, will not be placed in wetlands, so permanent impacts are not anticipated. BMPs will be installed to prevent indirect impacts on wetlands within the Site and adjoining the Site. Field-based wetland delineations will be completed within the two additional parcels in spring of 2025; any wetlands identified will be avoided.

TABLE 4.5.3-2

Potential Impacts on Wetlands and Other Waters

Wetland ID	Project Design Feature	Size (acres) within Site	Impacts
Desktop Wetland [a]	Collection Line	0.01	0.00
w10	Collection Line	0.01	0.00
w10	Collection Line	0.04	0.00
w20	Collection Line	0.00	0.00
w22	Collection Line	0.01	0.00
w18	Collection Line	0.04	0.00
w18	Collection Line	0.02	0.00
w15	Collection Line	0.05	0.00
w16	Collection Line	0.13	0.00
w11	Collection Line	0.00	0.00
w11	Collection Line	0.02	0.00
w12	Collection Line	0.00	0.00
w10	Collection Line	0.01	0.00
w22	Collection Line	0.01	0.00
TOTAL		**0.35**	**0.00**

[a] Area could not be field delineated due to access restrictions.

Lemon Hill Solar will continue to minimize wetland impacts to the extent possible and will coordinate with the USACE and/or Local Governmental Unit to apply for a permit, if applicable, and confirm compliance with the WCA.

Mitigation

Lemon Hill Solar anticipates being eligible for the Exemption for Utilities in accordance with Minn. Stat. § 103G.2241, subd. 6, which states new placement or maintenance, repair, enhancement, realignment, or replacement of existing utility or utility-type service, including collector lines, when wetland impacts are authorized under and conducted in accordance with a permit issued by the United States Army Corps of Engineers (USACE) under section 404 of the federal Clean Water Act, United States Code, title 33, section 1344, and the direct and indirect impacts of the proposed project have been avoided and minimized to the extent possible; and Minn. R. 8420.0420, Subp. 6, which states that a replacement plan is not required for impacts resulting from the installation, maintenance, repair, or replacement of utility lines (including collector lines) if the impacts have been avoided and minimized to the extent possible and the proposed project significantly modifies or alters less than one-half acre of wetlands. Based on the potential wetland impacts, mitigation pursuant to a USACE Section 404 permit is not anticipated.

4.5.4 Vegetation

4.5.4.1 Existing Environment

The Site is located within the Rochester Plateau subsection of the Paleozoic Plateau Section of the Eastern Broadleaf Forest Province (MNDNR, 2025a). Within the Rochester Plateau subsection, agriculture is the dominant land use with some remaining oak openings and barrens interspersed (MNDNR, 2025a). The Eastern Broadleaf Forest Province is characterized by roughly equal amounts of precipitation and evapotranspiration; this aspect of climate may play a role in dictating the western range limits of forest plant species and eastern range limits of several prairie species within the province (MNDNR, 2025a).

The USGS NLCD provides nationwide data on land cover at a 30-meter resolution based on 16 classifications of land use. Within the Site, approximately 90 percent of land cover consists of cultivated crops or hay/pasture. Other land classification types include herbaceous (4.7 percent) and deciduous forest (6 percent) with all other land cover categories comprising 1 percent or less of the Site (Table 4.5.4-1). See Figure 16 for a full list and depiction of land cover types within the Site (USGS, 2021).

TABLE 4.5.4-1
Land Cover within the Site

Land Cover Type	Acres	Percent of Site
Cultivated Crops	1522.7	78.3
Hay/Pasture	217.4	11.2
Herbaceous	90.7	4.7
Deciduous Forest	70.0	3.6
Emergent Herbaceous Wetlands	18.6	1.0
Developed, Low Intensity	11.1	0.6
Developed, Open Space	10.2	0.5
Developed, Medium Intensity	1.8	0.1
Open Water	1.6	0.1
Developed, High Intensity	0.5	<0.1

Woody Wetlands	0.4	<0.1
TOTAL	**1945.0**	**100**

Source: USGS, 2021.

Based on a review of aerial photography and field-based observations, a majority of the Site is pastureland, agricultural land, or forest. In the pastureland the herbaceous stratum was dense with smooth brome (*Bromus inermis*) and Kentucky blue grass (*Poa pratensis*).

In the agricultural land the herbaceous stratum was moderately dense with planted row crops including soybeans (*Glycine max*) and corn (*Zea mays*). In 2025, the survey was conducted before the planted crops sprouted.

In the forested areas the herbaceous stratum was dense with Missouri gooseberry (*Ribes missouriense*), clustered black-snakeroot (*Sanicula odorata*), spotted touch-me-not (*Impatiens capensis*), reed canary grass (*Phalaris arundinacea*), white avens (*Geum canadense*), common red raspberry (*Rubus idaeus*), Virginia-creeper (*Parthenocissus quinquefolia*), Canadian clearweed (*Pilea pumila*), and groundivy (*Glechoma hederacea*). The sapling/shrub stratum was moderately dense with black walnut (*Juglans nigra*), European buckthorn (*Rhamnus cathartica*), Missouri gooseberry, and ash-leaf maple (*Acer negundo*). The tree stratum was dense with burr oak (*Quercus macrocarpa*), ash-leaf maple, black walnut, eastern cottonwood (*Populus deltoides*), and American elm (*Ulmus americana*). The forested areas are largely limited to wind breaks, riparian areas, and shelterbelts near rural farmsteads.

4.5.4.2 Impacts on Vegetation

No impacts on native vegetation communities are expected to occur as a result of construction, operation, restoration, or decommissioning of the Project. Most of the land use within the Site (78 percent) is cultivated agricultural land (Table 4.5.4-1) and approximately 937 acres of agricultural land (97 percent of the Preliminary Development Area) will be taken out of row crop production or hay/pasture use for the operational life of the Project, including restoration and decommissioning. The Preliminary Development Area will be graded during construction and restored in accordance with the VMP (Attachment E). Approximately 70 acres of deciduous forest are present within the Site primarily along riparian corridors and as wind breaks for residences. Throughout construction, operation, restoration, and decommissioning, Lemon Hill Solar plans to avoid forested areas, and no tree clearing is anticipated. Overall, minimal impacts on vegetation are anticipated. No SOBs, NPCs, railroad prairies, or RIM or CREP easements are located within the Site (Figure 17; Figure 18). No sites were identified as native prairie based on Merjent's desktop review and field reconnaissance. Thus, impacts on special designations of vegetation (e.g., SOBS, NPC, railroad prairies, native prairies, and RIM/CREP lands) are not anticipated.

To minimize potential impacts on vegetation, Lemon Hill Solar will implement site restoration, revegetation, and seeding, and will monitor results of these efforts per the VMP and AIMP. In addition, throughout Project operation, less pesticide and herbicide use typical of traditional agricultural practices will be employed through implementation of the Project VMP, AIMP, and SWPPP. Project equipment will be washed to remove noxious and invasive plants and seeds before entering the Site. Overall, the Project will result in a shift from primarily cultivated agricultural use to perennial vegetative cover through reseeding and active vegetation management within the Site.

All possible native prairie has been avoided during the preliminary design.

4.5.4.3 Mitigation

Lemon Hill Solar has developed a VMP (Appendix E) that describes how vegetation will be restored at the Site to provide diverse, native prairie within and surrounding the Site to protect soil and provide habitat for native pollinators. No additional mitigation is proposed.

4.5.5 Wildlife

4.5.5.1 Existing Environment

Wildlife species with the potential to occur within or near the Project were researched using information from the USFWS, MNDNR, and other publicly available sources. These species include fish, reptiles and amphibians, birds, and mammals described below. In addition, pollinator insects may be present in the Site including native bees, butterflies, and moths. The following section includes a discussion of general wildlife resources within the Site with a focus on species that commonly occur in cultivated agricultural lands. Additional details regarding protected species that may be present in the Site are provided in Section 4.5.6.

Twenty-nine streams were identified within the Site (Section 4.5.3.4) that may provide habitat for fish. Species that may be present in small streams through agricultural lands include the creek chub (*Semotilus atromaculatus*), fathead minnow (*Pimephales promelas*), white sucker (*Catostomus commersoni*), and common carp (*Cyprinus carpio*) (Zimmerman et al., 2003).

Reptile and amphibian species that may occur in agricultural lands, pastures, and grasslands within the Site include western chorus frog (*Pseudacris maculata*), American toad (*Anaxyrus americanus*), pickerel frog (*Lithobates palustris*), painted turtle (*Chrysemys picta*), wood turtle (*Glyptemys insculpta*), North American racer (*Coluber constrictor*), western fox snake (*Pantheropsis ramspotti*), red-bellied snake (*Storeria occipitomaculata*), plains garter snake (*Thamnophis radix*), and common gartersnake (*Thamnophis sirtalis*) (MNDNR, 2018; MNDNR, 2021b; MNDNR, 2025d). Due to the temporary nature of vegetative cover and lack of diversity in plant assemblages and habitat structure in cultivated agricultural areas and hayed pastures, occurrence and habitat quality for these species in the majority of the Site is limited.

The Site is located within the Mississippi Flyway, one of the primary north-south migration routes between migratory bird nesting and wintering habitat, and in the Eastern Tallgrass Prairie and Prairie Hardwood Transition Bird Conservation Regions (BCR) (USFWS, 2021). The USFWS identified 14 species of birds that breed within Eastern Tallgrass Prairie BCR and 20 species of birds that breed within the Prairie Hardwood Transition BCR as Birds of Conservation Concern (BCC); BCC are avian species that represent the agency's highest conservation priorities. BCC species that breed in the Eastern Tallgrass Prairie and Prairie Hardwood Transition BCRs and that may nest or forage around agricultural lands or grasslands include the bobolink (*Dolichonyx oryzivorus*), Henslow's sparrow (*Ammodramus henslowii*), and grasshopper sparrow (*Ammodramus savannarum*) (USFWS, 2021). Other avian species that may occur within the Site include red-tailed hawk (*Buteo jamaicensis*), wild turkey (*Meleagris gallopavo*), common snipe (*Gallinago gallinago*), mourning dove (*Zenaida macroura*), red-headed woodpecker (*Melanerpes erythrocephalus*), northern cardinal (*Cardinalis cardinalis*), and eastern bluebird (*Sialia sialis*) (MNDNR, 2025d).

Species of mammals that may use agricultural and grassland areas within the Site include white-tailed deer (*Odocoileus virginianus*), striped skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), Virginia opossum (*Didelphis virginiana*), eastern cottontail

(*Sylvilagus floridanus*), raccoon (*Procyon lotor*), and thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*) (MNDNR, 2025e).

There are no Migratory Waterfowl Feeding or Resting Areas within the Site; the nearest area is 63 miles from the Site.

There are no Important Bird Areas (IBA) within the Site; the nearest IBA is 6 miles from the Site.

4.5.5.2 Impacts on Wildlife

As outlined in Section 4.5.4 and Table 4.5.4-1, land use within the Site is primarily cultivated agricultural lands or hay/pasture (89.6 percent). Lands used for agriculture have temporary non-diverse vegetative cover that is frequently disturbed and may be used by some wildlife species that adapt to frequently disturbed lands with low plant diversity.

Existing land use within the Preliminary Development Area will be converted to developed land or impervious surfaces for the Project substation, O&M facility, access roads, and other project features that most wildlife will not use (Table 3.2.2-1). The majority of the Preliminary Development Area, including under the PV arrays, will be revegetated to perennial grasses and forbs that will result in more consistent permanent vegetative cover throughout the year and more diverse species assemblages for wildlife to use for cover, foraging or hunting, and reproduction. Specifically, the seed mix within the solar arrays will consist of short-statured grasses and forbs that are adapted to full sun and partial shade. Outside of the arrays and adjacent to the fence line, the seed mix will contain greater plant diversity with the goal of benefitting pollinators throughout the spring, summer, and fall. Thus, the construction and operation of the Project is anticipated to result in higher quality habitat for wildlife species, including pollinators. Perennial ground cover and diverse grasses and forbs within the Preliminary Development Area will also reduce the use of herbicides and pesticides, decrease surface run-off into adjacent waterbodies, reduce soil erosion, and restore soil health, all of which will also benefit wildlife.

In addition to implementing the Project's SWPPP, AIMP, and VMP, Lemon Hill Solar will buffer all streams by 16.5 feet per the Minnesota Buffer Law administered by Minnesota's Board of Water and Soil Resources (BWSR); this buffer will manage run-off and erosion and reduce amounts of phosphorus, nitrogen and sediment that enter the stream (Minnesota BWSR, 2023), further benefitting fish, amphibians, and aquatic insects.

Impacts on wildlife species are expected to be minor due to the dominance of agricultural land and limited open water or wetlands within the Site. Few aquatic dependent wildlife species would use the Site for breeding or nesting. Wildlife species associated with grasslands would also be limited or largely absent.

The small number of wildlife species that may use the Site are likely to be habituated to human development activities. Most of these species are also highly mobile and will likely avoid the area during construction. During the operation of the Project, impacts are expected to be minimal as wildlife will become accustomed to operational activities similar to the current agricultural practices in the surrounding area. Species that are less mobile, including ground-nesting birds, may be more prone to impacts; however, impacts resulting from the construction and operation of the Project are not expected to differ from current impacts of annual farming activities.

4.5.5.3 Mitigation

The Project has been designed to avoid adverse impacts on quality habitat to the greatest extent possible. Lemon Hill Solar will use BMPs to stabilize, protect, and mitigate potential impacts on species' habitat. These BMPs will be implemented during construction, post-construction, and operational phases of the Project. In addition, fence posts will not be placed in wetlands and Lemon Hill will use wildlife friendly fencing to minimize impacts on mobile wildlife. No species-specific mitigation is proposed as all potential impacts on wildlife are expected to be minimal and insignificant.

4.5.6 Rare and Unique Natural Resources

4.5.6.1 Existing Environment

Federally Listed Species

The USFWS Information for Planning and Consultation (IPaC) database was reviewed in April 2025 for a list of federally listed threatened and endangered species, proposed species, and designated critical habitat that may be present within the Site.

Based on the official species list provided by USFWS (Appendix K), one experimental, non-essential population of a species and two proposed species may be present in the Site. No federally listed species and no critical habitat are present within the Site (Table 4.5.6-1).

TABLE 4.5.6-1

Federally Listed Species Within the Vicinity of the Project

Common Name	Scientific Name	Federal Status
Whooping Crane	*Grus americana*	Experimental Population, Non-Essential
Monarch Butterfly	*Danaus plexippus*	Proposed Threatened
Western Regal Fritillary	*Argynnis idalia occidentalis*	Proposed Threatened

Whooping Crane

Whooping crane adults are primarily white, standing about 5 feet in height with a wingspan of 7 feet. Whooping cranes breed, migrate, winter, and forage in a variety of habitats, including inland marshes, lakes, open ponds, shallow bays, upland swales, wet meadows and rivers, pastures and agricultural fields. Loss and alteration of wetlands to cropland conversion, urbanization, roads and powerlines, as well as wind farms, have a negative impact on whooping cranes (USFWS, 2025a). Whooping cranes that may occur in the Site are part of the eastern migratory population; this is an experimental population reintroduced from 2001 to 2010 that migrates between Wisconsin and Florida. Individuals within this population are considered proposed species under the Endangered Species Act (ESA) and are not protected from take under the federal ESA on private lands (USFWS, 2018).

Monarch Butterfly

The monarch butterfly is a large butterfly characterized by bright orange coloring on the wings, with distinctive black borders and veining. The species can be found in a wide variety of habitats including prairies, grasslands, urban gardens, and road ditches, provided a supply of nectaring

plants are available for adult foraging and milkweed plants are present for laying eggs and as a food source for caterpillars (USFWS, 2024a). Native monarchs are separated into two long-distance migratory populations, the eastern and western populations. Individuals that may be present in the Site are in the eastern migratory population, which overwinters in Central Mexico. Threats to the species include degradation and loss of migratory, breeding, and overwintering habitat; effects of climate change; and exposure to insecticides (USFWS, 2024b).

On December 12, 2024, the USFWS published a rule proposing the monarch as a threatened species with a Section 4(d) rule under the federal ESA (USFWS, 2024a). As a proposed species, the monarch butterfly is not currently protected from incidental take under the federal ESA, unless an action will jeopardize the continued existence of the species.

Western Regal Fritillary

The western regal fritillary is a strong-flying, non-migratory butterfly with a wingspan up to four inches. This species is restricted to native tallgrass prairie habitats. Western regal fritillaries can range widely; females disperse searching for three main habitat components: violet (*Viola* spp.) host plants for larvae, nectar plants for adults, and native grasses to provide protection throughout the life cycle. Adults can be found foraging in both upland and wet prairie habitats; however, habitat can only be considered suitable for all life stages if violet species are present to provide forage for larvae. Habitat alteration has reduced the species' range and abundance (USFWS, 2023). As a proposed species, the western regal fritillary is not currently protected from take under the federal ESA, unless an action will jeopardize the continued existence of the species.

State-Listed Species

In addition, Merjent on behalf of Lemon Hill Solar, submitted a formal Natural Heritage Request through the MNDNR's Minnesota Conservation Explorer (MCE; 2023-00340), which is included in Appendix K. In a response dated July 10, 2023, the MNDNR indicated that one state-listed endangered bird species has been documented in the vicinity of the Site, the loggerhead shrike (*Lanius ludovicianus*). Loggerhead shrike occur in pastures, shelterbelts, native prairies, old fields, grassy roadsides and farmyards with short grasses and perching sites, such as shrubs, small trees, and hedgerows. Merjent submitted an updated request to the MNDNR's MCE on January 14, 2025, and a response was received on April 1, 2025. The MNDNR indicated that the loggerhead shrike has been documented within the vicinity of the Site.

Bald Eagles

Bald eagles (*Haliaeetus leucocephalu*s) are neither rare nor unique and are not legally protected under the ESA or in the state of Minnesota; however, they are protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Bald eagles are widespread throughout Minnesota and their population has increased, their range has increased, and they have adapted to human activity (MNDNR, 2025i). Bald eagles are typically found near rivers, lakes, and marshes; however, since their populations are increasing, they are also being found in drier areas that are farther from water sources (USFWS, 2025b).

It is likely that bald eagles are present in the general vicinity of the Site; however, suitable nesting habitat is not present within the Site.

Native Plant Communities

The Minnesota Biological Survey documents sites of biodiversity significance that are ranked based on several factors, including the quality (e.g., size and condition) of Native Plant Communities (NPC) within the site, the presence and numbers of rare species populations, and the site's context within the landscape (e.g., whether the site is isolated in a landscape dominated by cropland or developed land, or whether it is contiguous with or close to other areas with intact NPCs) (MNDNR, 2025b). These sites are ranked by grouping and rated within each of the state's ecological classification system subsections. A rank of outstanding is assigned to those sites that contain the largest, most intact functional landscapes, and the best occurrences of the rarest plant and animal species (MNDNR, 2025b). No sites of biodiversity significance are located within the Site. The nearest site of biodiversity significance to the Site is the Viola 28 SW site, which is 0.5 mile east of the Site.

NPCs are referred to as native habitats or natural communities and are named for the characteristic plant species within them or for characteristic environmental features (MNDNR, 2025c). No NPCs are located within the Site. The nearest NPC to the Site is 3 miles southwest of the Site.

Merjent conducted a desktop assessment and preliminary field review of a majority of the Site to identify potentially undisturbed grasslands within the Site that may contain native prairie. Merjent also conducted a follow-up field survey to confirm if native prairie is present within the Site. After the initial review and field verification, two additional parcels were added to the Site. Merjent conducted a desktop assessment and identified possible native prairie in one of the parcels (Figure 18). Merjent will field verify the possible native prairie in summer 2025.

In the State of Minnesota, native prairie has been defined as (1) land that has never been plowed where native prairie vegetation originating from the site currently predominates, or (2) if disturbed, is predominantly covered with native prairie vegetation that originated from the site. Unbroken pastureland used for livestock grazing can be considered native prairie if it has predominantly native vegetation originating from the site and conservation practices have maintained biological diversity (Minn. Stat. § 84.02, Subd. 5). The desktop review used publicly available sources including aerial imagery, MNDNR NPC, and MNDNR sites of biodiversity significance (SOBS). Based on the field survey, no native prairie was observed; however, additional parcels with possible native prairie will be field verified in summer 2025. It is anticipated that any field verified native prairie can be avoided.

The MNDNR surveyed active railroad rights-of-way for native prairie remnants. Many native or sensitive plants in Minnesota can be found in native prairie remnants along railroads (MNDNR 1999). No MNDNR-designated railroad right-of-way prairies are located within the Site. The nearest railroad right-of-way prairie is 2.92 miles to the south.

Lemon Hill Solar has secured 100 percent land control on private property, within the Site as either a lease or easement, but will still need permission for collector lines to be installed within the public ROW. The Minnesota Conservation Reserve Enhancement Program (CREP) is a voluntary, federal-state funded natural resource conservation program that places land into conservation easements. Minnesota's Reinvest in Minnesota (RIM) conservation reserve program accomplishes conservation goals by placing lands in perpetual conservation easements. Both programs are administered by BWSR. No RIM or CREP easements are within the Project Boundary; two RIM easements are adjacent to the Site (Figure 17).

4.5.6.2 Impacts

Federally Listed Species

Whooping Crane

Potential impacts on whooping cranes are unlikely given the low population numbers and population center of the eastern migratory flock, which totaled 70 individuals in 2024 and is located primarily in Wisconsin in the summer months (International Crane Foundation, 2025). Impacts are also unlikely due to the large proportion of the Site that is agricultural (89.6 percent). Although whooping cranes may forage in agricultural fields, foraging individuals would flush and divert from human activity associated with Project construction. No impacts are anticipated on nesting individuals given the proportion of the Site that is wetlands (0.7 percent), and the wetlands will not be impacted by Project activities.

Whooping crane individuals that may be present in the Site are not protected from take under the federal ESA on private lands (USFWS, 2018). Thus, no effects under the federal ESA are expected and coordination and/or consultation with USFWS will not be required.

Monarch Butterfly

Suitable habitat for monarchs may be present within the Site. Impacts on monarch eggs, larvae, and pupae may occur during Project construction, vegetation management, or other activities in areas with milkweed, which is the species larval hostplant. Adult monarchs may be affected through vehicle collision or loss of nectaring plants. These impacts are anticipated to be minor given that a large majority of the Site currently consists of cultivated crops (75.5 percent), which does not support monarch habitat, and given Lemon Hill Solar's plans to revegetate with native species.

If the USFWS determines the species should be listed and protections for the species coincide with Project planning, permitting, and/or construction, Lemon Hill Solar will coordinate with the USFWS to avoid and minimize impacts to the extent possible.

The following general measures will be used to help avoid or minimize impacts on area wildlife and rare natural resources during and after the completion of the proposed Project:

- BMPs will be used to prevent erosion of the soils in the areas of impact.
- Sound water and soil conservation practices will be implemented during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil.
- Disturbed areas will be revegetated with native species where applicable if the landowner agrees.

Western Regal Fritillary

Suitable habitat for western regal fritillary may be present within the Site. Impacts on western regal fritillary eggs, larvae, and pupae may occur through Project construction, vegetation management, or other activities in areas with violets, which is the species obligate larval hostplant.

Adult western regal fritillary may be affected through vehicle collision or loss of nectaring plants. These impacts are anticipated to be minor given the large proportion of the Site that consists of cultivated crops (75.5 percent), which does not support habitat for the species, and given Lemon Hill Solar's plans to revegetate with native species.

If the USFWS determines the species should be listed and protections for the species coincide with Project planning, permitting, and/or construction, Lemon Hill Solar will coordinate with the USFWS to avoid and minimize impacts to the extent possible.

The following general measures will be used to help avoid or minimize impacts on area wildlife and rare natural resources during and after the completion of the proposed Project:

- BMPs will be used to prevent erosion of the soils in the areas of impact.
- Sound water and soil conservation practices will be implemented during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil.
- Disturbed areas will be revegetated with native species, where applicable if the landowner agrees.

State-Listed Species

In the MNDNR's April 2025 response to Merjent's Natural Heritage Request through the MNDNR's MCE (2023-00340-02) (Appendix K), the MNDNR indicated that presence of loggerhead shrikes is unlikely, and they do not anticipate any impacts. The MNDNR recommended that tree removal be avoided from June 1 to August 15 to avoid impacts on roosting bats. No tree clearing is anticipated; however, should that change, Lemon Hill Solar will implement this timing restriction.

Bald Eagles

Suitable nesting habitat for bald eagles is not present within the Site and nesting habitat adjacent to the Site is limited. Lemon Hill Solar will comply with BGEPA and ensure that unauthorized take of eagles does not occur.

4.5.6.3 Mitigation

Federally Listed Species

Impacts on federally listed species are not anticipated; therefore, no mitigation is proposed.

State-Listed Species

Impacts on state-listed species are not anticipated; therefore, no mitigation is proposed.

4.6 CLIMATE CHANGE

The effects of climate change have been tied to an increase in greenhouse gas (GHG) emissions from human-related activity, including transportation, energy production, and industry (USEPA,

2024b). A key element in addressing climate change is the reduction of GHG emissions produced each year. Minnesota Governor Tim Walz signed an Executive Order (19-37) in December of 2019 to take action against climate change. The order created the Governor's Advisory Council that coordinates mitigation and strategies related to fighting climate change for the State of Minnesota. Data suggests trends showing warmer and wetter climates across the globe, and the State of Minnesota is actively working to fight climate change with this Executive Order. According to the Order, climate change is a threat that impacts all Minnesotans and our ability to thrive.

In February 2023, Governor Walz signed the "100 Percent by 2040" legislation, a carbon-free energy standard, which is likely to increase Minnesota's renewable energy needs by compelling utilities to obtain additional electricity from renewable sources beyond that currently required by the Renewable Energy Standards set forth in Minn. Stat. § 216B.1691 and further reduce carbon from energy sources. The "100 Percent by 2040" standard requires utilities to generate or procure sufficient electricity generated from a carbon-free technology, such as solar, equivalent to at least the percentages of the electric utility's total retail sales to retail customers in Minnesota by the end of the year indicated in Table 4.6-1.

TABLE 4.6-1

Carbon-Free Standard Milestones

Year	Percent of Retail Electric Sales as Carbon-Free Energy
2030	80% for public utilities; 60 % for other electric utilities
2035	90% for all electric utilities
2040	100% for all electric utilities

The Project will contribute to Minnesota's goal to reduce GHG emissions by providing a renewable source of energy as an alternative to more carbon-intensive sources of energy, such as coal and natural gas.

Impact of Project on Climate Change

Construction and operation of the Project will release GHG, contributing to global warming. Approximately 20 to 50 grams per kilowatt of carbon dioxide equivalent (CO_2e) is produced during the lifespan of a solar project (National Renewable Energy Laboratory, 2012). Approximately 60-70 percent of that is due to the manufacturing of the panels and project construction. Approximately 20 percent of the CO_2e is from the operational activities including operation of the O&M building, lighting, monitoring equipment, and emergency generators. The remainder of the CO_2e is due to decommissioning and disposal.

Activities associated with the construction of the Project will result in GHG emissions from the combustion of diesel and gasoline in heavy construction equipment, delivery vehicles, and worker passenger vehicles. Emissions from construction activities were calculated by estimating the volume of fuel expected to be consumed by each piece of equipment and determining the GHG emissions released upon combustion of those fuel volumes. Construction activities are expected to produce a total of 3,635 tons CO_2e. GHG emissions from construction vehicles will be minimized by keeping construction equipment in good working order. Upon completion of the construction activities, emissions from heavy equipment, delivery vehicles, and construction personnel will cease.

The Project supports Minnesota's Renewable Energy Standards and the "100 Percent by 2040" legislation, and the Project will contribute to this need for carbon free energy. The Project will

beneficially impact climate change because it will reduce the need for more carbon-intensive sources of energy and temporarily reduce emissions from agricultural activities (e.g., use of tractors and other farm implementation, decreased use of agricultural chemicals).

Once the Project is operational, it will generate clean, renewable energy for Minnesotans and will work to reduce fossil fuel use and combat climate change. The Project will offset a large quantity of GHG emissions by providing renewable electricity and will increase carbon sequestration of the soil by converting predominately agricultural land to herbaceous land. Agricultural lands and herbaceous lands can both act as carbon sinks. The carbon storage capacity of herbaceous lands is about 65 percent higher than that of agricultural lands (Walston et al, 2021). The land conversion from the Project will result in an additional carbon storage capacity of 77,362 tons CO_2e.

During the operational stage, up to six permanent full-time workers will staff the solar farm and maintenance activities will require the use of up to two maintenance trucks per day. The commuter vehicles and maintenance trucks will generate a minor amount of GHG emissions. Utilities required to support operation of the solar farm include electricity, water, and sanitation. Approximately 1,358 kWh per month of electricity may be purchased from the grid if needed to meet operational needs such as lighting, cameras, and comfort heating. Approximately 16 tons per year CO_2e will be generated during the operating phase of the Project. A summary of construction and operating emissions is found in Appendix I: Project Emissions Estimate.

Impact of Climate Change on Project

Future climate change, including average, minimum, and maximum annual temperatures, precipitation, and drought severity was modeled on the MNDNR Climate Trends website using climate data from the years 1895 to 2024 (MNDNR, 2025g). This data shows that the average temperature of Olmsted County has been increasing at a rate of 0.19 degrees Fahrenheit (F) per decade. Over the 30-year lifespan of the Project, the annual average temperature could increase by 0.57 degrees F, the annual maximum temperature could increase by 0.24 degrees F, and the annual minimum temperature could increase by 0.93 degrees F. The annual precipitation has increased at a rate of 0.55 inches per decade. Over the lifespan of the Project, precipitation could increase an additional 1.65 inches per year. The Self-Calibrated Palmer Drought Severity Index (SCPDSI) has increased by 0.29 per decade. Over the lifespan of the Project, the SCPDSI could increase by 0.87. Additionally, the frequency and intensity of heavy rainfall is increasing across the state (MNDNR, 2025h).

These warmer and wetter climate trends are not anticipated to cause a major impact on project operations. The Site is not located within a 100- or 500-year floodplain. However, an overall wetter climate may impact flood size and frequency in the area. Flooding events due to climate change could have the potential to impact project operations during heavy rainfall events.

These heavier rainfall events due to climate change could also have an effect on stormwater management for the project.

Mitigative Measures

The Project has been sited and designed with resiliency in mind as climate continues to change in Minnesota. The Project is not expected to have any negative effects or increase flood depths in the surrounding areas. Storm ponding onsite will be sized appropriately to account for the expected increase in precipitation and will store and treat any runoff before discharging offsite.

The existing drainage patterns will be maintained and the increase in perennial vegetation onsite under the panels is expected to both increase the uptake of water onsite and slow and reduce runoff when compared to the current, cropped nature of the Site.

Solar modules and related facilities of the Project will be designed to withstand the weather events typically experienced in the Site, as well as potentially more severe storms and periods of drought due to climate change discussed above. The PV solar modules will, however, be stowed during severe weather events including hailstorms. Lemon Hill Solar will procure equipment designed to ensure operational reliability across the range of anticipated environmental conditions for the lifetime of the Project, (e.g., temperature, precipitation, wind, mechanical loading).

The Project will be designed to comply with all applicable state and local building codes and industry standards. The civil and structural design will include safety factors for increased snow and wind loads.

The potential for increased precipitation has been taken into account in designing and sizing applicable stormwater management ponds for operation of the Project. Establishing perennial, native vegetation plantings will replace current row crop agriculture in the Site, increasing water uptake and slowing runoff. This will also lower the amount of nutrients leaving the site compared to row crop agriculture, from the reduction in fertilizer and pesticide application and the slowing of runoff brought about by the perennial vegetation.

4.7 POTENTIAL CUMULATIVE IMPACTS

Cumulative impacts are the combined, incremental effects of human activity on the human and natural environment. While an individual activity may be insignificant by itself, minor impacts in combination with other actions may cause a larger result in a region or to an important resource. A review of the Olmsted County website, known MnDOT District projects, and the Minnesota EQB's website listing active projects subject to environmental review did not reveal any projects proposed with similar timing and within close proximity to the Site that would be expected to interact negatively or create significant cumulative impacts with the proposed Project (Olmsted County, 2025: MnDOT, 2025: EQB, 2025). Olmsted County is planning to conduct pavement preservation and "safety" projects along County State Aid Highway 2 in 2025. This county road is located within the Site. No specific details are publicly available; however, it is anticipated this project will occur in 2025 and will not overlap with construction of the Lemon Hill Solar Project. Additionally, Lemon Hill Solar's communications with state agencies, Olmsted County officials, township officials, and local landowners have not identified other proposed or ongoing projects or activities in the area.

Lemon Hill Solar is aware of Dairyland's proposed Wabasha 161 kV Relocation Project (Docket No. TL-23-388), which involves the relocation of approximately 13.3 miles of the Wabaco-Alma 161 kV transmission line in Wabasha County. Dairyland's Wabaco-Alma transmission line is the same transmission system to which the Lemon Hill Solar Project will connect via a line tap. The Wabasha 161 kV Relocation Project is approximately 10 miles from the Lemon Hill Solar Project at the nearest location. Given the distance, the two projects are not anticipated to have cumulative environmental impacts from construction or operation. The Wabasha 161 kV Relocation Project is proposed to initiate site preparation in June 2026, followed by substation construction and transmission line installation between June 2027 and July 2028.Due to the potential for the two projects to have overlapping timelines, Dairyland will closely coordinate any planned outages following internal requirements and the procedures established and followed by all utilities as

Good Utility Practice, and in accordance with NESC transmission requirements to maintain grid reliability.

Impacts and Mitigative Measures

Other planned projects in the Project vicinity have not been identified by Lemon Hill Solar that would contribute to potential cumulative impacts with the Project; therefore, no mitigative measures are proposed.

4.8 UNAVOIDABLE IMPACTS

Lemon Hill Solar has carefully sited and designed the Project to avoid impacts on human health and the environment to the extent practicable. Some temporary impacts are anticipated; however, they are anticipated to be minor. In addition, Lemon Hill Solar has taken steps to minimize the long-term effects of these impacts by implementing mitigation measures where warranted.

Impacts and Mitigative Measures

Negative environmental effects related to the Project and efforts to avoid, minimize, and mitigate these effects are discussed in detail within this Application. Positive impacts resulting from the Project are also discussed. Negative environmental impacts that are not entirely avoidable, but will be minimized and mitigated, are summarized by topic above and listed below. The majority of these unavoidable impacts will be temporary in nature, will occur during Project construction, and will be rectified through implementation of the SWPPP, VMP and AIMP plans, which include BMPs, revegetation and site restoration activities.

The primary unavoidable impacts that will resolve during Project construction include the following:

- Construction-related noise;
- Dust and/or soil tracking related to construction traffic;
- Construction-related traffic;
- Temporary wetland impacts;
- Temporary and limited wildlife displacement within construction areas; and
- Exposed soils from grading activities and potential for soil erosion and sedimentation.

While temporary, the primary unavoidable impacts that are anticipated during the operational life of the Project include the following:

- Aesthetic changes to the landscape (agricultural landscape to solar facilities);
- Land use change from predominately row crop agriculture to solar panels, transmission facilities, and perennial vegetation; and

- Infrequent vehicle trips from maintenance vehicles traveling to and from the site.

Beyond the above-described mitigative measures that will be implemented for the Project, no other mitigation is proposed.

4.9 IRRETRIEVABLE AND IRREVERSIBLE IMPACTS

An irretrievable commitment of resources refers to the use or consumption of resources that cannot be renewed or recovered for future generations. This primarily involves nonrenewable resources such as fossil fuels, water, and construction materials (e.g., aggregate minerals, steel, and metals).

Construction of the Project would require fossil fuels to generate electricity (via portable generators) and to power construction equipment, vehicles, and personnel transport. The use of raw materials would also represent an irretrievable commitment of those resources, except for those that may be recycled at the end of the Project's life. Water used for dust suppression during construction would be irretrievable.

Additionally, the labor and financial resources dedicated to planning and constructing the Project are considered irretrievable commitments.

5.0 AGENCY AND PUBLIC OUTREACH

Prior to filing this Application, Lemon Hill Solar completed extensive and comprehensive engagement with local, state, and federal regulatory stakeholders and Tribal Nations to introduce the Project, request comments and receive feedback.

On April 16, 2024, Lemon Hill Solar sent an informal Project introduction letter and map to federal and state agencies, Minnesota Tribal Nations, and Olmsted County and township officials. The agencies and Tribal contacts are listed in Tables 5.0-1 and 5.0-2 along with responses received as of May 18, 2025.

A representative letter and responses received as of May 18, 2025, are provided in Appendix G. Lemon Hill Solar will continue to work with local, state, and federal agencies, Tribal Nations, and other stakeholders as the Project advances.

TABLE 5.0-1

Summary of Agency Communications

Agency	Response Date and Summary
Federal	
USACE, St. Paul District	No response received
USFWS – MM-WI Ecological Field Office	No response received
State	
Public Utilities Commission	No response received
Department of Commerce – Energy and Environmental Review	Pre-application meeting held May 13, 2025

TABLE 5.0-1

Summary of Agency Communications

Agency	Response Date and Summary
MNDNR Ecological Resources	Response received 4/22/24 – MNDNR asked Lemon Hill Solar to coordinate with Melissa Collins during early coordination. Ranger Power emailed Melissa on 4/24/24 providing project maps. Melissa responded on 4/30/24 and 5/13/24 providing early comments on siting, rare features, wildlife movement, vegetation management, hydric soils and wetlands, geology, and MNDNR permits. Ranger Power responded on 5/24/24 addressing the MNDNR's initial comments.
Minnesota Pollution Control Agency	No response received
Minnesota Department of Agriculture	No response received
USDA NRCS – MN State Office	No response received
Minnesota State Historic Preservation Office	Merjent submitted the Phase Ia Literature Review Report and Survey Plan on 5/28/24. Kelly Gragg-Johnson concurred with the recommendations within the Survey Plan on 7/19/24. Merjent submitted the Phase I Survey Report to SHPO on 1/8/25.
MN State Archaeologist	Merjent submitted a Phase I Survey License Application on 4/30/24. Phase I Survey License #24-237 was provided on 7/1/24.
MNDNR Lands and Minerals	No response received
MNDNR Parks and Trails	No response received
MnDOT Right-of-Way Permits	No response received
MnDOT District 6	No response received
MnDOT District Engineer	No response received
NRCS – Rochester Service Center	No response received
Local	
Olmsted County Soil and Water Conservation District	No response received
Olmsted County Planning and Zoning	No response received
Olmsted County – County Commissioner District 7	No response received
Olmsted County Public Works	Response received 4/30/24 – Olmsted County provided details on their zoning regulations and floodplain ordinance. The letter indicated that the county also protects the Decorah Edge and if the project falls within the Decorah Edge, a Decorah Study should be completed

TABLE 5.0-2

Summary of Communications with Tribal Nations

Tribal Nation	Response Date and Summary
Red Lake Nation	
Fond du Lac Band of Lake Superior Chippewa	
Leech Lake Band of Ojibwe	
Shakopee Mdewakanton Sioux Community	Response received 4/25/24 requesting the results of the desktop/literature search. On 12/11/24, Ranger Power provided the cultural resources desktop report and Mr. Wabasha responded with a thank you, a request to keep him informed or progress, and requested an inadvertent discovery plan be in place for the project.
Lower Sioux Indian Community	
Mille Lacs Band of Ojibwe	
Bois Forte Band of Chippewa	
Prairie Island Indian Community	
Upper Sioux Community	

TABLE 5.0-2

Summary of Communications with Tribal Nations

Tribal Nation	Response Date and Summary
White Earth Nation	
Grand Portage Band of Lake Superior Chippewa	

Per the standard guidance regarding Tribal Engagement the DOC provides to applicants for Site and Route Permits in Minnesota, Lemon Hill Solar sent Project introduction letters to two service lists maintained by the Commission: “Tribal Government Contacts” and “Tribal Historic Preservation Offices.” In addition to introducing the Project, the letters offered to hold meetings with any interested party, and to continue ongoing communications when requested. The date of the initial communication and the specific recipients of these communications are listed in Table 5.0-3.

TABLE 5.0-3

Tribal Engagement Contacts

Date	Outreach Type	Attendees/Contacts
04/16/2024	Email Correspondence	Red Lake Nation: Darrell Seki, Sr., Jason Defoe, Kade Ferris, Joe Plumer, Samuel Strong, and Vernelle Lussier
04/16/2024	Email Correspondence	Fond du Lac Band of Lake Superior Chippewa: Brad Blacketter, Robert Abramowski, Ian Young, Evan Schroeder, Miyah Danielson, Roger Smith, Sr., Scott Buchanan, Sean Copeland, and Wally Dupuis
04/16/2024	Email Correspondence	Fond du Lac Development Corp. : Kevin Dupuis, Sr.
04/16/2024	Email Correspondence	Leech Lake Band of Ojibwe: Kyle Fairbanks, Ashley Harrison, Amy Burnette, Christopher Murray, Faron Jackson, Sr., LeRoy Staples Fairbanks III, Bill Burunelle, Terri Finn, Steve White, and Government Relations (general email address)
04/16/2024	Email Correspondence	Shakopee Mdewakanton Sioux Community: Leonard Wabasha, Bill Rudnicki, Cole W. Miller, Keith Anderson, Rebecca Crooks Stratton, and Steve Albrecht
04/16/2024	Email Correspondence	White Earth Nation: Annie Jackson, Eugine Sommers, Henry Fox, Jaime Arsenault, Christie Haverkamp, Jacob McArthur, Mike Smith, Joe Tonihka, Laura Erickson, Michael Fairbanks, Laurie York, and Mike Laroque
04/16/2024	Email Correspondence	Lower Sioux Indian Community: Joseph Obrien, Robert Prescott, Mirande Sam, Kristi Schoen, Nizhoni Smith, Robert L Larsen, and Cheyanne St. John
04/16/2024	Email Correspondence	Mille Lacs Band of Ojibwe: Jamie Edwards, Melanie Benjamin, Sheldon Boyd, Shena Matrious, Mike Wilson, Harry Davis, Wendy Merrill, and Virgil Wind
04/16/2024	Email Correspondence	1854 Treaty Authority: Sonny Myers
04/16/2024	Email Correspondence	Bois Forte Band of Chippewa: Cathy Chavers, Shane Drift, Luke Warnsholz, and Travis Morrison.
04/16/2024	Email Correspondence	Bois Forte Band of Chippewa Tribal Government: Robert Moyer, Jr. and Jaylen Strong
04/16/2024	Email Correspondence	Bois Forte Reservation Tribal Council: Tara Geshick
04/16/2024	Email Correspondence	Prairie Island Indian Community: Cody Whitebear, Heather Westra, Jessie Seim, Jody Johnson, Johnny Johnson, Michael Childs, Jr., Noah White, Shelley Buck, and Valentina Mgeni
04/16/2024	Email Correspondence	Upper Sioux Community: Adam Savariego, Camille Tanhoff, Jeremy McLaughlin, Caralyn Trutna, Jeremy Hamilton, Kevin Jensvold, and Samantha J Odegard.
04/16/2024	Email Correspondence	Minnesota Chippewa Tribe: Joel Smith
04/16/2024	Email Correspondence	Grand Portage Band of Lake Superior Chippewa: Agatha Armstrong, Rob Hull, April McCormick, Bobby Deschampe, Marie Spry, and Toby Stephens
04/16/2024	Email Correspondence	Grand Portage Band of Ojibwe: Mary Ann Gagnon

Throughout development of the Project, Lemon Hill Solar has regularly met with neighboring landowners, and they have conducted the following outreach efforts with Olmsted County, and Haverhill, Viola, and Eyota Townships:

1/5/23: Olmsted County: presented to the Olmsted County Board of Commissioners to introduce Ranger Power and talk about the Project and solar development.

3/15/23: Haverhill Township. Introduced Ranger Power, provided a presentation on the Project, and answered questions about utility scale solar.

3/27/23: Viola Township. Introduced Ranger Power, provided a presentation on the Project, and answered questions about utility scale solar.

4/12/23: Eyota Township. Introduced Ranger Power, provided a presentation on the Project, and answered questions about utility scale solar.

1/27/25: Viola Township. Provided an update on the Project and explained the Commission permitting process and the projected timeline. Answered questions about utility scale solar.

2/19/25: Haverhill Township. Provided an update on the Project and explained the Commission permitting process and the projected timeline. Answered questions about utility scale solar.

2/11/25: Olmsted County Planning Department. Met with two staff members to give them a Project update and answer any questions they may have.

2/20/25: Held a public open house for the Project. Knocked on doors of neighbors to the Project and sent letters in the mail to anyone who Ranger Power was not able to connect with in person. Project posters and maps of the Project were presented to educate the public about the Project. We were present to answer any questions they may have had. Attended by 30+ members of the public.

4/15/25: Olmsted County Department of Soil and Water. Met with staff and discussed their thoughts on the Project.

5/6/25: Presented to the Olmsted County Physical Development committee on the Project, its timeline, and how they can participate in the Commission process.

Between April and June 2025, Lemon Hill has been meeting with landowners and neighbors to the Project on an almost weekly basis.

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