Sunstone Solar Project: Draft Proposed Order on Application for Site Certificate

To:	Oregon Energy Facility Siting Council
From:	Christopher M. Clark, Senior Siting Analyst
Date:	July 12, 2024
Re:	Draft Proposed Order on Application for Site Certificate for the Sunstone Solar Project

Applicant:	Sunstone Solar, LLC, a wholly owned subsidiary of Pine Gate Renewables, LLC
Proposed Facility:	1,200 megawatt (MW) solar photovoltaic power generation facility and related or supporting facilities that would permanently occupy up to approximately 9,442 acres (14.8 sq. miles)
Location:	Morrow County
Staff Recommendation:	Applicant has demonstrated, based on a preponderance of evidence in the application for site certificate, that, with mitigation as applicable, it has the ability to comply with applicable requirements.

On May 16, 2024, Sunstone Solar, LLC (applicant) submitted its Application for Site Certificate (ASC) for the Sunstone Solar Project. To issue a site certificate, the Energy Facility Siting Council (Council) must find that the preponderance of the evidence on the record demonstrates that the applicant can satisfy, or based on compliance with conditions can satisfy, each of the applicable standards set forth in Oregon Administrative Rule (OAR) 345 Divisions 22 through 24 as well as all other Oregon statutes and administrative rules identified in the Project Order as applicable to the siting of the proposed facility.

As staff to the Council, the Oregon Department of Energy (Department) reviewed the ASC, in consultation with state, local and tribal governments. This Draft Proposed Order (DPO) contains the Department's initial analysis of the ASC and includes recommended site certificate conditions necessary to ensure compliance with applicable Council standards and other rules and statutes. The analysis and recommendations contained in this DPO are not a final determination.

A public comment period on the DPO and ASC is now open. A public hearing will be held before the Council at 5:30 p.m. on August 22, 2024, at the Maxwell Event Center in Hermiston, Oregon. Opportunities will be provided for the public to provide comments in person and via teleconference at the hearing. The Council will not consider any comments received after that deadline, unless extended by Council. Please note, interested persons must comment on the record, either at the public hearing or in writing during the comment period, in order to preserve their right to participate in the contested case hearing in this proceeding.

BEFORE THE
ENERGY FACILITY SITING COUNCIL
OF THE STATE OF OREGON

In the Matter of the Application for Site Certificate for the Sunstone Solar Project	))))	DRAFT PROPOSED ORDER ON APPLICATION FOR SITE CERTIFICATE

July 12, 2024

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ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern (BLM)
ADT	Average Daily Trip
Applicant	Sunstone Solar, LLC
AR	antireflective
ASC	Application for Site Certificate
BESS	Battery energy storage system
BLM	Bureau of Land Management
BLA	Big Lead Assembly
BMP	Best Management Practice
CadnaA	Computer Aided Noise Abatement
CAFE	Corona and Fields Effect Program Model (BPA)
CGWA	Critical Ground Water Area
CFR	Code of Federal Regulations
Council	Oregon Energy Facility Siting Council
CSZ	Cascadia Subduction Zone
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CTWSRO	Confedered Tribes of the Warm Springs Reservation of Oregon
dBA	A-weighted decibel
Department	Oregon Department of Energy
DEQ	Oregon Department of Environmental Quality
DC	Direct current
DOGAMI	Oregon Department of Geology and Mineral Industries
DPO	Draft Proposed Order
DSL	Oregon Department of State Lands
EFSC	Oregon Energy Facility Siting Council
EFU	Exclusive Farm Use
EPA	United States Environmental Protection Agency
ESCP	Erosion and Sediment Control Plan
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GW	Gigawatt
GWh	Gigawatt hours
GSU	Generator-step up (transformer)
HMA	Habitat Mitigation Area
HMP	Habitat Mitigation Plan
HPRCSITs	Historic Properties of Religions and Cultural Significance to Indian Tribes
HRA	Historic Research Associates
HVAC	Heating, ventilation, and air conditioning
HVF	High value farmland

ACRONYMS AND ABBREVIATIONS

ISO	International Organization for Standardization
ISU	Inverter step-up (transformer)
km	kilometers
kV	kilovolts
LCDC	Land Conservation and Development Commission
Li-ion	Lithium-Ion
LLC	Limited liability company
LOS	Level of Service
MCCEO	Morrow County Code Enforcement Ordinance
MCCP	Morrow County Comprehensive Plan
MCCWMPP	Morrow County Community Wildfire Protection Plan
MCGG	Morrow County Grain Growers
MCZO	Morrow County Zoning Ordinance
MGD	Million gallons per day
MW	Megawatt
MWh	Megawatt hours
NB	Nonburnable
NIFC	National Interagency Fire Center
NOI	Notice of Intent
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPS CMP	National Park Service's Comprehensive Management
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSR	Noise Sensitive Receptor
NWCG	National Wildfire Coordinating Group
O&M	Operations and Maintenance
OAR	Oregon Administrative Rule
ODAg	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
ONHT	Oregon National Historic Trail
OPRD	Oregon Parks and Recreation Department
ORBIC	Oregon Biodiversity Information Center
Oregon CWPP	Oregon Community Wildfire Protection Planning Tool
ORS	Oregon Revised Statutes
OWRD	Oregon Water Resources Department
Parent Company	Pine Gate Renewables, LLC

ACRONYMS AND ABBREVIATIONS

pASC	Preliminary Application for Site Certificate
PILOT	Payment in-lieu of Taxes
Proposed facility	Sunstone Solar Project
RAI	Request for Additional Information
RNA	Research Natural Area
ROW	Right of way
RPS	Renewable Portfolio Standard
RV	Recreational vehicle
SAG	Special Advisory Group
SCADA	Supervisory Control and Data Acquisition system
SHPO	State Historic Preservation Office
SLIDO	Oregon Statewide Landslide Data Layer
SPCC	Spill Prevention Control and Countermeasure Plan
TCP	Traditional Cultural Property
T&E	Threatened and Endangered
TIA	Traffic Impact Analysis
TNC	The Nature Conservancy
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
U.S.	United States
WAGS	Washington Ground Squirrel
WEGS	Wind Erodibility Groups
WUI	Wildland-urban interface
ZVI	Zone of Visual Influence

I. INTRODUCTION

In accordance with Oregon Revised Statutes (ORS) 469.370(1), the Oregon Department of Energy (Department) issues this Draft Proposed Order (DPO) regarding the Sunstone Solar Project (proposed facility) Application for Site Certificate (ASC).

Sunstone Solar, LLC (applicant), a subsidiary of Pine Gate Renewables, LLC (parent company), seeks authorization from the Energy Facility Siting Council (Council) to construct and operate a 1,200 megawatt (MW) solar photovoltaic power generation facility and related or supporting facilities, collectively called the Sunstone Solar Project (proposed facility).

The proposed facility would permanently occupy up to approximately 9,442 acres (14.8 sq. miles) of private, Exclusive Farm Use (EFU) zoned land, located within a site boundary of 10,960 acres. Within the proposed site boundary, approximately 4,414 acres are high-value farmland (HVF) under ORS 195.300(10)(c) and (f) because they are within the place of use of a water right or irrigation district and/or meet the criteria for elevation, slope, and aspect within the designated Columbia Valley American Viticultural Area. The proposed facility site would be located entirely in north-central Morrow County, near Lexington, Oregon.

The Department's role is to review an ASC (and requests to amend a site certificate) and assess whether the ASC meets the criteria established in statutes and rule for Council to approve the ASC and issue a site certificate. In a DPO, the Department provides a preliminary assessment and recommendations to Council. The Department accepts comments on the DPO, followed by an analysis of issues raised, presented in a Proposed Order. Ultimately, Council decides whether to approve an ASC and grant issuance of a site certificate. The Department bases this DPO on its review of the ASC and comments and recommendations received during review of the preliminary and complete ASC from state agencies, local governments, and tribal governments. This DPO includes recommended conditions of approval for inclusion in the site certificate to ensure or maintain compliance with applicable rules and standards during proposed facility construction, operation and retirement. Based upon its review of the ASC, as presented in recommended findings of fact, conditions and conclusions of law, the Department recommends Council approve the ASC and issue a site certificate for the proposed facility.

Under ORS 469.310, the Council is charged with ensuring that the siting, construction, and operation of energy facilities is accomplished "in a manner consistent with protection of the public health and safety."[1] The applicant is subject to the applicable substantive criteria in

[1] ORS 469.401(2) provides that in issuing a site certificate for an energy facility, the Council must establish conditions for the protection of the public health and safety, for the time for completion of construction, and to ensure compliance with the standards, statutes and rules described in ORS 469.501 and ORS 469.503. The site certificate or amended site certificate shall require both parties to abide by local ordinances and state law and the rules of the council in effect on the date the site certificate or amended site certificate is executed, except that upon a clear showing of a significant threat to the public health, safety or the environment that requires application of later-adopted laws or rules, the council may require compliance with such later-adopted laws or rules.

effect on the date the preliminary Application for Site Certificate (pASC) was submitted, and the rules and standards of the Council and state laws in effect on the date the site certificate is executed. A site certificate is a binding agreement between the State of Oregon and an applicant, authorizing an applicant to design, construct, operate, and retire a facility within an approved site, incorporating all conditions imposed by the Council in the site certificate.[2] The Council has continued authority over the site for which a site certificate is issued and may inspect, or direct Department staff to inspect, or request another state agency or local government to inspect, the site at any time in order to ensure that the facility is being operated consistently with the terms and conditions of the site certificate.[3]

The Council does not have jurisdiction over matters that are not included in and governed by the site certificate, including design-specific construction or operating standards and practices that do not relate to siting, as well as matters relating to employee health and safety, building code compliance, wage and hour or other labor regulations, or local government fees and charges.[4] Matters of land-acquisition, land purchases, land leases and right-of-way easements are also outside of the Council's jurisdiction. Nothing in this Order or ORS chapter 469 shall be construed to preempt the jurisdiction of any state agency or local government over matters that are not included in and governed by the site certificate.[5]

II. PROCEDURAL HISTORY

II.A. Notice of Intent

The applicant submitted a Notice of Intent to File an Application for Site Certificate (NOI) on May 6, 2022, and submitted the fee required under OAR 345-020-0006 on May 10, 2022. On June 10, 2022, the Department sent notice of the NOI to persons on the Council's general mailing list and to the owners of record for all tax lots located within 500 feet of properties that contain the site boundary.[6] The Public Notice also appeared in the East Oregonian, a newspaper of general circulation for Umatilla and Morrow counties, on July 9, 2022. The Public Notice provided information regarding the proposed facility and the EFSC review process and announced that a public informational meeting on the NOI would be held in Boardman, Oregon on July 27, 2022. The Public Notice requested public comment on the NOI and established

[2] ORS 469.401(3) Subject to the conditions set forth in the site certificate or amended site certificate, any certificate or amended certificate signed by the chairperson of the council shall bind the state and all counties and cities and political subdivisions in this state as to the approval of the site and the construction and operation of the facility. After issuance of the site certificate or amended site certificate, any affected state agency, county, city and political subdivision shall, upon submission by the applicant of the proper applications and payment of the proper fees, but without hearings or other proceedings, promptly issue the permits, licenses and certificates addressed in the site certificate or amended site certificate, subject only to conditions set forth in the site certificate or amended site certificate.

[3] ORS 469.430.

[4] ORS 469.401(4).

[5] Id.

[6] ESPNOIDoc2 NOI Public Notice 2022-06-10.

August 5, 2022, as the public comment deadline (55 days).

The Department held the public informational meeting on the NOI on July 27, 2022. The Department and the applicant appeared at the informational meeting and provided information about the siting process and the proposed facility and responded to questions from the public.

During the NOI comment period, three participating or neighboring landowners provided public comments in support of the proposed facility; three additional persons provided written comments including two letters of support and one comment from the Department of the Navy confirming that the proposed facility is located outside of military utilized airspace.

ORS 469.480(1) requires the Council to designate the governing body of any local government within whose jurisdiction a facility is proposed to be located as a Special Advisory Group (SAG). The Council appointed the Morrow County Board of Commissioners as the SAG for the proposed facility on June 28, 2022.[7] The Morrow County Board of Commissioners provided comments on the NOI on July 27, 2022.[8]

In accordance with OAR 345-021-0050(1), the Department prepared a memorandum requesting comments from the reviewing agencies identified under OAR 345-001-0010. The Department sent the memorandum to reviewing agencies on June 9, 2022. The Department requested comments from reviewing agencies on or before August 5, 2022. The Department followed up with individual reviewing agencies between June 9, 2022, and September 16, 2022.

The Department separately requested comments from the Tribal Councils of the Confederated Tribes of Warm Springs, Confederated Tribes of the Umatilla Indian Reservation, and the Burns Paiute Tribe in letters issued on June 27, 2022. The Department received comments from the Confederated Tribes of the Umatilla Indian Reservation on August 5, 2022.[9]

II.B. Project Order

On September 26, 2022, the Department issued a Project Order establishing the state statutes and administrative rules, and local and state regulations, ordinances and other requirements applicable to the siting of the facility as required by ORS 469.330(4) and OAR 345-015-0180.[10] The Project Order also describes what information under OAR 345-021-0010 must be included in the ASC and establishes the analysis areas for the proposed facility's impacts.[11] The Department or Council may amend the Project Order at any time and the Project Order is not a

[7] ESPNOIDoc4 SAG Appointment Order 2022-06-28.
[8] ESPNOIDoc5-4 SAG Comment MCBOC 2022-07-27.
[9] ESPNOIDoc5-5 Reviewing Agency Comment Engum CTUIR 2022-08-05.
[10] ESPNOIDoc7 Project Order 2022-09-26.
[11] OAR 345-015-0160(1)(f) and OAR 345-001-0010(2).

final order.[12] As indicated in the Project Order, if significant impacts associated with the applicable Council standards could occur beyond the analysis areas described in the Project Order, then the applicant must assess those impacts in the ASC and show how the facility would comply with the applicable standard with regard to the larger area where impacts could occur.

II.C. Application for Site Certificate

The Department received the preliminary application for site certificate (pASC) on June 30, 2023, and received the payment required under ORS 469.350 and 469.421 on August 8, 2023. On June 30, 2023, the Department posted an announcement on its project website notifying the public that the pASC had been received.

On August 28, 2023, the Department distributed the pASC to reviewing agencies, Morrow County Board of Commissioners, as the appointed Special Advisory Group (SAG), and tribal governments, and requested pASC review and comment by September 28, 2023. The Department received responses from the Department of State Lands, the Oregon Department of Forestry, the Oregon Department of Fish and Wildlife, and the US Department of Navy. The Department also received comments from the SAG.

On October 6, 2023, the Department issued a determination that the pASC was incomplete and provided Requests for Additional Information (RAIs). The applicant provided initial responses to the RAIs on December 6 and 15, 2023. On December 15, 2023, the Department issued a second set of RAIs. The applicant provided responses to the second set of RAIs, and responses to outstanding requests from the first set on March 6, March 29, April 16, April 19, and April 24, 2024.

On May 10, 2024, the Department determined that the pASC, with the revisions to exhibits included in the RAI responses, was complete.[13] The applicant filed the complete ASC May 15, 2024.[14]

On May 21, 2024, Public Notice of the Complete ASC was mailed to property owners within 500-feet of the property on which the proposed facility site boundary would be located and sent via email to all individuals signed up to receive email notices from the Department regarding the proposed facility or all EFSC facilities. The Public Notice was also published in the Heppner Gazette and in the East Oregonian. The Department held an in-person and remote public informational meeting on the complete ASC on June 5, 2024. Pursuant to OAR 345-015-0200, the Department distributed electronic copies of the complete ASC to reviewing agencies, along with a request for agency reports on the complete ASC by May 22, 2024.

[12] ORS 469.330(3,) ORS 469.330(4) and OAR 345-015-0160(3).

[13] Pursuant to OAR 345-015-0190(5), an ASC is complete when the Department finds that the applicant has submitted information adequate for the Council to make findings or impose conditions on all applicable Council standards.

[14] SSPAPPDoc25-00 ASC Cover Letter and Exhibits A through DD 2024-05-15.

Reviewing agency comments received on the pASC and ASC that are referenced or relied upon in this order are included as Attachment B.

II.D. Council Review Process

The Department issued the DPO on July 12, 2024 initiating a 41-day comment period. The Council will conduct a public hearing on the DPO starting at 5:30 P.M. on August 22, 2024, at the Maxwell Event Center in Hermiston, Oregon. In addition to accepting oral comments at the public hearing, the Council will also accept written comments until the close of the August 22, 2024 public hearing on the DPO, unless extended by Council upon request.[15] Following the close of the record of the public hearing and Council review of the DPO, the Department will issue a Proposed Order, taking into consideration Council comments, any timely public comments received and agency consultation.

Concurrent with the issuance of the Proposed Order, the Department will issue a Notice of Proposed Order and Contested Case.[16] Only those persons who comment in person or in writing on the record of the DPO public hearing may request to participate as a party or limited party in the contested case proceeding. Additionally, to raise an issue in a contested case, the issue must be within Council jurisdiction, and the person must have raised the issue on the record of the public hearing with "sufficient specificity to afford the Council, the Department, and the applicant an adequate opportunity to respond."[17] At the conclusion of the contested case proceeding, the Hearing Officer must issue a Proposed Contested Case Order stating the Hearing Officer's findings of fact, conclusions of law and recommended site certificate conditions on the issues in the contested case. The Council may adopt, modify or reject the Hearing Officer's Proposed Contested Case Order. If adopted or modified, the order would then be incorporated into the Proposed Order for Council's review.

Following the contested case proceeding, the Council will take action to ether modify or approve the Proposed Order as the Final Order and issue a site certificate; or, may reject the Proposed Order, denying the Final Order and issuance of a site certificate, based upon the standards adopted under ORS 469.501, and any additional state statutes, rules, or local government regulations or ordinances determined to be applicable to the proposed facility in the Project Order.[18] The Council's Final Order is subject to judicial review by the Oregon Supreme Court. Only a party to the contested case proceeding may request judicial review and the issues on appeal are limited to those raised by parties or limited parties in the contested case proceeding. A petition for judicial review must be filed with the Supreme Court within 60

[15] ORS 469.370(2).
[16] See ORS 469.370(4) and OAR 345-015-0014.
[17] ORS 469.370(3).
[18] ORS 469.370(7) and (10).

days after the date of service of the Council's final order or within 30 days after the date of the petition for rehearing is denied or deemed denied.[19]

III. DESCRIPTION OF THE PROPOSED FACILITY

The proposed facility is a solar photovoltaic energy generation facility with up to 1,200 megawatts (MW) of nominal electric generating capacity and related or supporting facilities. Facility components are described in more detail in Section III.A. The proposed facility would occupy up to 9,442 acres (14.75 sq. mi.) within an approximately 10,960-acre (17.03 sq. mi.) site boundary in Morrow County. The site is located approximately 15 miles northeast of Lexington on State Route 207 and consists entirely of private land zoned for Exclusive Farm Use.

Under the mandatory condition established under OAR 345-025-0006(3) (imposed under General Standard of Review Condition 1), if the applicant is granted a site certificate it must design, construct, operate, and retire the facility: (a) substantially as described in the site certificate; (b) in compliance with the requirements of ORS chapter 469, applicable Council rules, and applicable state and local laws, rules and ordinances in effect at the time the site certificate is issued; and (c) In compliance with all applicable permit requirements of other state agencies. The Department recommends that the Council incorporate the facility description presented below into the site certificate, as presented in Attachment 1 to this Order.

III.A. Proposed Facility Components

Table 1 summarizes major facility components of the energy facility and related or supporting facilities. The values and specifications provided in the table represent the highest-impact design scenario for the facility, as proposed by the applicant. The design scenario, including development exclusion areas, used for the purposes of the evaluation is depicted in Figure 1 below.[20] Additional details regarding specific components, and discussion of alternative designs or technologies under consideration are provided in the sections that follow.

[19] ORS 469.403.

[20] As described in Section I.V.E., *Land Use*, up to 9,442 of land within the site boundary would be occupied by facility components. Approximately 1,518 acres within the site boundary are excluded from development as shown on ASC Exhibit C, Figures C-2, and C-2.1 to C-2.3.

Table 1: Facility Component Summary

Component and Design Standard	No.	Unit
Site Boundary		
Site Boundary	10,960	acres
Maximum Footprint	9,442	acres
Permanent Impacts[1]	9,442	acres
Solar Components		
PV Solar Modules		
Approx. total number	3,937,536	modules
Max Height at full-tilt	15	feet
Posts		
Approx. total number (assumes concrete foundation)	535,056	posts
Cabling		
Combiner Boxes	61,524	each
Inverter Step Up Transformer Units		
Approx. total number	319	each
Noise level	89	dBA
Transformer oil-containing capacity	800	gallons
Related or Supporting Facility Components		
34.5 kV Collection System		
Collector line length, belowground	82	miles
Collector line length, overhead (OH)	4.3	miles
Wood Monopoles (max estimate for OH)	151	each
Collector Substations		
Substations w SCADA; Generator step-up transformers, each	6; 1	each
Site size	1.6	acres
Transformer oil-containing capacity	16,000	gallons/each
Transformer noise level	100	dBA
Max height of structures	45	feet
Switchyards		
Stations; transformers, each	2; 0	each
Site size (northern and/or within solar fence line); with foundations and graveled areas	3	acres
230 kV Transmission Line		
Length (total; northern line; southern line)	9.5; 3.2; 6.3	miles
Structures: Type (Wood or Galvanized Steel); quantity	H-frame; 50	each
Height of structures	70 - 180	feet
Battery Energy Storage System (Lithium-ion/Zinc)		
Zinc		

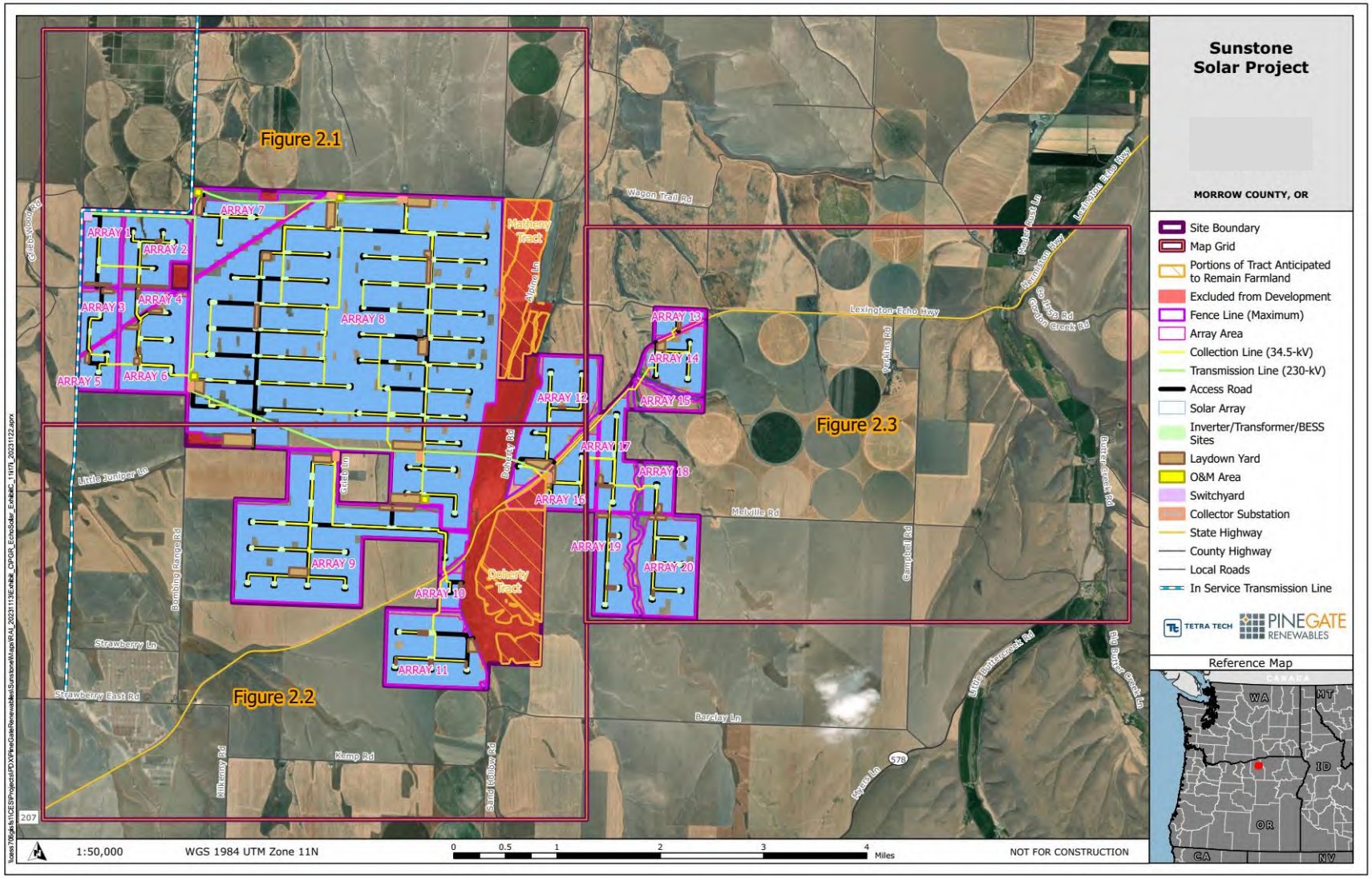
Table 1: Facility Component Summary

Component and Design Standard	No.	Unit
Approx. total batteries/containers on foundations with fans/heating systems; SCADA	14,946	each
Site size	0.2 to 0.4	acres
Approx. container dimensions	9.5 x 8 x 20	H x W x L; feet
Noise level (broadband)	66	dBA
Lithium-ion		
Approx. total batteries/containers on foundations with HVAC and fire suppression systems; SCADA	12,000	each
Site size	0.2 to 0.4	acres
Approx. container dimensions	11.25 x 8.1 x 5.2	H x W x L; feet
Noise level (broadband)	66	dBA
O&M Building		
Quantity	4	each
Site size	2.8	acres
Height	20	feet
Appurtenances	On-site well, septic system, SCADA System	
Storage for Replacement Solar Panels		
Containers	50	each
Approx. container dimensions	8.5 x 8 x 40	H x W x L; feet
Location	Dispersed within fence line if not next to O&M, gravel base	
Facility Roads		
Length	55	miles
Width	10 - 20	feet
Perimeter Fence		
Length	58	miles
Height	7-8	feet
Access/gates	52	each
Temporary Construction Areas		
Quantity	54	each
Site size	5	acres
Description	Gravel base; diesel/gas storage; within fence line	
Acronyms: dBA = A-weighted decibels; HVAC = heating, ventilation and air conditioning; kV = kilovolt; OH = overhead; O&M = operations and maintenance; SCADA = supervisory, control and data acquisition Notes:		

Table 1: Facility Component Summary

Component and Design Standard	No.	Unit
1. The proposed energy facility would occupy approximately 9,442 acres within up to 20 separately fenced areas. Most related or supporting facilities will be located within the energy facility's footprint; however, portions of the overhead 34.5 kV collector and 230-kV transmission lines running between solar array areas would result in additional temporary and permanent disturbance areas. The entire energy facility footprint is considered a permanent disturbance area for the purposes of evaluating impacts to resources such as Fish and Wildlife Habitat; however, facility components would not occupy the entire area.		

Figure 1: Proposed Facility Layout



III.A.1. Energy Facility

As proposed, the facility would include a solar photovoltaic power generation facility with up to 1,200 MW of electric generation capacity. The energy facility would consist of up to 20 separately fenced solar arrays organized into six 200 MW blocks.

III.A.1.1 Photovoltaic Modules

Solar photovoltaic modules, or solar panels, convert sunlight into direct current (DC) electric power. The typical module contains crystalline silicon photovoltaic cells arranged within glass panels equipped with an anti-reflective coating, a metal frame, and wire connectors.

III.A.1.2 Racking System

The photovoltaic modules would be connected in series into strings and then mounted on a racking system. Each rack would contain 2 strings of 32 modules mounted on a single-axis tracking system.[21] Multiple racks would be organized into rows between 200 and 400 feet in length depending on topography.[22] Rows would be spaced at least 10 feet apart and at least 15 feet from perimeter fencing to provide vehicle access.[23]

III.A.1.3 Posts

Each row of tracker mounted modules would be supported by multiple hollow, screw pile, or pile-type steel posts. Posts are typically installed to a depth of 6-8 feet below surface and extend 5 feet above grade. Posts at the end of rows may be installed at greater depths to withstand wind uplift. Posts may be installed directly in the ground or concrete backfill may be required in some soil conditions. For the purposes of evaluating impacts and decommissioning costs, concrete backfill is assumed to be required for all posts.[24]

III.A.1.4 DC Cabling System

Combiner boxes or a Big Lead Assembly (BLA) harness system would be used to aggregate the DC output of the photovoltaic modules for transmission to an inverter by low-voltage DC cables. Using the combiner boxes, strings of modules would be connected to a pad-mounted combiner box installed at each row, which in turn, would be connected to the inverters by low voltage DC cables that are either mounted to the tracking system, installed in trays, or buried

[21] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.4.1, 2.4.2. Utility scale solar facilities typically use fixed-tilt (stationary) or single-axis tracking systems. In a single-axis tracking system, rows are oriented with panels facing towards the south and a drive unit adjusts the tilt of the rows to track the movement of the sun throughout the day. Single-axis tracking systems capture more of the sun's energy but require greater spacing between rows and require more land per MW of nominal capacity as a result.

[22] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.4.2 and 4.1.

[23] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.6.

[24] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.4.3

underground. Using the BLA system, strings would be connected directly to a rack-mounted cabling system.[25]

III.A.1.5 Inverters and Inverter Step Up (ISU) Transformers

Inverters would convert the DC output of the photovoltaic modules to AC power that can be transmitted to the electric grid. A typical inverter in utility scale solar facilities converts the 900 to 1,500 volt DC module output to 660 volt AC output.[26] After conversion, the output would be sent to an inverter step-up (ISU) transformer to increase the voltage to 34.5 kV power for transmission to the collector substation via the electrical collector system. Inverters and ISU transformers will be collocated on concrete slabs near each module block.[27]

III.A.2. Related or Supporting Facilities

Proposed related or supporting facilities include a battery energy storage system, an interconnection substation, up to six collector substations, up to four operations and maintenance building, and other structures.

III.A.2.1 Battery Energy Storage System

The battery energy storage system (BESS) would be designed to provide up to 7.2 gigawatt-hours (GWh) of storage capacity.[28] The BESS would use either Lithium-Ion (Li-ion) or Zinc-based battery technology.[29] Under either technology, batteries would be contained in pre-constructed modular containers, or "segments," placed on concrete slab foundations.[30]

The battery storage system would include, but not be limited to, the following elements:

- Batteries and containers, inverters, isolation transformers, and switchboards;
- Balance of plant equipment, which may include medium-voltage and low-voltage electrical systems, fire suppression and HVAC systems (for Li- ion technology, if selected), building auxiliary electrical systems, and network/SCADA systems;
- Cooling system, which may include a separate chiller plant located outside the battery racks with chillers, pumps, and heat exchangers (Li-ion only, if selected); zinc batteries will have fans and a heating unit for climate control; and

[25] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.4.4.

[26] SSPAPPDoc25-02 ASC Exhibit B Project Description Exhibit B 2024-05-15, Section 2.4.5.

[27] SSPAPPDoc25-02 ASC Exhibit B Project Description Exhibit B 2024-05-15, Section 2.4.6.

[28] SSPAPPDoc25-02 ASC Exhibit B Project Description Exhibit B 2024-05-15, Section 2.0. The applicant notes that final design of the BESS is dependent on several factors, including interconnection requirements, preference of the power purchasers, availability and cost-effectiveness of suitable systems, and ability to mitigate potential noise impacts. SSPAPPDoc25-02 ASC Exhibit B Project Description Exhibit B 2024-05-15, Section 3.1 and SSPAPPDoc25-24 ASC Exhibit X Retirement 2024-05-15, Section 3.1.

[29] SSPAPPDoc25-02 ASC Exhibit B Project Description Exhibit B 2024-05-15, Section 3.1.

[30] SSPAPPDoc25-02 ASC Exhibit B Project Description Exhibit B 2024-05-15, Section 2.4.2.

- High-voltage (HV) equipment, including a step-up transformer, circuit breaker, current transformers and voltage transformers, a packaged control building for the breaker and transformer equipment, towers, structures, and cabling.[31]

The batteries and associated equipment would be oversized or periodically augmented in accordance with the manufacturer's recommendations to ensure a minimum of 7,200 MWh of energy storage capability over the life of the BESS, taking into account natural degradation of the batteries over time.[32]

Li-ion batteries are currently the most common battery type used in utility-scale battery energy storage systems. A variety of Li-ion chemistries, each with varying performance, cost, and safety characteristics, are available on the market.[33] If a Li-ion battery technology is used at the facility, it would use Li-ion phosphate batteries, which are more thermally stable than Li-ion cathode batteries.[34]

Each module would contain approximately 10 hermetically sealed battery cells filled with a gel or liquid electrolyte. The module containers serve as secondary containment for the cells. Each container holds approximately 840 cells with a combined capacity of approximately 740 kilowatt-hour AC, and approximately 12,000 containers would be required to meet the capacity needs of the facility.[35]

The electrolyte used in Li-ion batteries is flammable and susceptible to overheating and vaporization, so Li-ion Battery Systems typically require cooling, ventilation, and fire suppression systems to be included in each container.[36] If Li-ion battery technology is used at the site, it would implement the following design features and fire prevention and control methods to minimize fire and safety risks:

- Batteries would be stored in completely contained, leak-proof modules.
- Ample working space would be provided around the BESS for maintenance and safety purposes.
- An off-site, 24-hour monitoring system with shutdown capabilities would be implemented.
- Batteries would be transported in accordance with Department of Transportation Pipeline and Hazardous Material Administration regulations under 49 CFR 173.185
- Battery systems would be designed in accordance with applicable Underwriters Laboratories, National Electric Code, and National Fire Protection Association Standards, including but not limited to, UL 1642, 1741, 1973, and 9540A, and NFPA 855.

[31] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.1.2.
[32] SSPAPPDoc25-24 Exhibit X Retirement 2024-05-15, Section 3.1.
[33] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.1.1.1.
[34] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.7.1.
[35] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Sections 2.6 and 3.1.1.1.
[36] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.7.1.

- An advanced and proven battery management system would be employed;
- Battery Containers would be equipped with:
  - Heating, ventilation, and air conditioning (HVAC) systems to maintain optimal battery temperatures;
  - Fire control panels with 24-hour battery backup;
  - Fire sensors, smoke and hydrogen detectors, alarms, emergency ventilation systems, cooling systems, and aerosol fire suppression/extinguishing systems;
  - Doors equipped with a contact that will shut down the battery container if opened;
  - Fire extinguishing and thermal insulation sheets between each individual battery cell;
  - Locks and fencing to prevent entry of unauthorized personnel;
  - Remote power disconnect switches with clear and visible signs identifying their location.[37]

As discussed in Section IV.O, *Waste Minimization*, the Li-ion battery modules under consideration for this facility have an expected useful life of 20 years and it is expected that every module at the facility would need to be replaced at least once during the life of the facility. Used Li-ion batteries are generally considered to be hazardous waste by the EPA and must be transported and disposed of according to the most current guidelines at end of life.[38]

A typical zinc-based BESS container includes 144 zinc-hybrid cathode powered batteries with a combined 700 kWh capacity. Zinc batteries are estimated to have a lifespan of at least 20 years.[39] Zinc battery systems can operate across a higher range of temperatures and only require cooling fans rather than a full HVAC system. Zinc batteries have a lower fire-risk than lithium-ion batteries and do not require fire suppression systems to be included in the container design.[40]

The BESS may be designed either as a DC-coupled system, with containers distributed throughout the energy facility site near inverter/transformer station sites, or as an AC-coupled system with containers concentrated in a single area near the switchyards.[41] In either case, the containers and other BESS equipment would be located within the fenced solar array areas and may have their own additional fencing.[42]

III.A.2.2 34.5 kV Electrical Collection System

[37] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.7.1.
[38] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.6.
[39] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.1.1.2.
[40] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.7.1.
[41] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 4.2; SSPAPPDoc25-03 Exhibit C Project Location 2024-05-15, Table C-2, Note 3; SSPAPPDoc25-24 Exhibit X Retirement 2024-05-15, Section 3.1.
[42] SSPAPPDoc25-24 Exhibit X Retirement 2024-05-15, Section 3.1.2.

The proposed facility would include up to 86 miles of 34.5 kV electrical collector lines that would connect energy facility components to the collector substations described below. The majority of the collector lines would be buried underground; however, overhead lines would be installed at long "home run" stretches, stream or canyon crossings, and other areas where burial is infeasible.[43] The collector lines would generally be located within the energy facility footprint except at road crossings and crossings between fenced solar array areas.[44]

III.A.2.3 Communication and SCADA System

The proposed facility would include a system of fiber optic and copper communication lines that would connect the solar arrays, BESS, and substations to Supervisory Control and Data Acquisition (SCADA) system control rooms within each collector substation. The communication lines would be collocated with the 34.5 kV electrical collection system described above. The SCADA system would monitor meteorological conditions, critical operating parameters, and power output, for each solar string, battery energy storage system, and substation. The SCADA system would be monitored by a remote operations center.[45] Smoke and fire detectors placed around the site would also connect to the SCADA system and would contact local emergency responders in the event of a fire at the site.[46]

III.A.2.4 Collector Substations

The proposed facility would include up to six collector substations at the site. Each substation would include a generator-step up (GSU) transformer and control building, and may also include circuit-breakers and fuses, transmission line termination structures, power transformers, bus bars and insulators, disconnect switches, relaying, battery and charger, surge arresters, AC and DC supplies, control systems, metering equipment, grounding, a lightning protection system and associated control wiring.[47]

The GSU transformers would increase the 34.5-kV ISU transformer output to 230-kV power. The GSU transformers would be ground-mounted units constructed on concrete pads. Each of the six GSU transformers would be filled with up to 16,000 gallons of non-toxic oil such as mineral or seed oil.

Each GSU transformer would be equipped with a secondary spill containment catchment system designed to minimize the possibility of accidental leakage. The concrete catchment system is sized to contain approximately 1.25 times the amount of oil inside the transformer.[48]

[43] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Sections 3.2.2, 4.3, and 4.5.
[44] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Sections 3.2.2 and 4.3; SSPAPPDoc25-03 Exhibit C Project Location 2024-05-15, Figure C-2.
[45] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.7.
[46] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.6.
[47] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Sections 3.2.1 and 4.3.
[48] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Sections 2.6 and 3.2.1.

Additional information and recommended conditions related to spill prevention measures is provided in Section IV.D.

All substation structures and components would be surrounded by a graveled area and enclosed by an 8-foot-tall chain-link fence with three strands of barbed wire one foot above the top. Access to substation sites would be limited with a locked gate.[49]

III.A.2.5 230-kV Transmission Line

The proposed facility would include up to two 230-kV overhead transmission lines that would connect the collector substations to the two primary interconnection switchyards located at the point of interconnection.[50] The transmission lines would be supported by steel or wood monopole or H-Frame structures, spaced approximately 1,000 feet between structures, and would have a combined length of approximately 9.5 miles.[51] The northern line would connect two collector substations along the south side of Alpine Lane to the switchyard and would extend approximately 3.2 miles. The southern line would connect four collector substations across the southern portion of the site and would extend approximately 6.3 miles.[52] The two lines would run in parallel for approximately 1-mile between Bombing Range Road and the switchyards.[53]

The proposed transmission lines would be located within the fenced solar array areas except where the lines span roads or corridors between areas and between the switchyards and the point of interconnection.[54] All transmission line components will be sited within the facility lease boundary. No new or expanded right-of-way (ROW) will be required, but some portions of the transmission lines would be located within existing public ROW.[55] A portion of the proposed transmission line that would run along the western boundary of energy facility footprint would be within the public right-of-way on the east side of Bombing Range Road. Additionally, portions of the proposed transmission line that connect solar array areas in the southern portion of the site would cross Doherty Road and the Lexington-Echo Highway.[56]

III.A.2.6 Project Switchyards and Interconnection Facilities

[49] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.2.1; SSPAPPDoc25-03 ASC Exhibit C Project Location 2024-05-15, Table C-2, Note 6.
[50] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.0.
[51] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Sections 3.2.3 and 4.6.
[52] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.2.3. and ASC Exhibit C Project Location 2024-05-15, Figure C-2.
[53] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.2.3 and 5.0.
[54] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.2.3. SSPAPPDoc25-03 ASC Exhibit C Project Location 2024-05-15, Figure C-2.
[55] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 6.0.
[56] *Id*.

The facility would interconnect with the existing Umatilla Electric Cooperative 230 kV Blue Ridge Line at the northwest corner of the proposed site. The applicant proposes to construct and operate two switchyards within a separately fenced site either within or adjacent to the energy facility footprint, each approximately 3 acres.[57] The interconnection switchyards would not contain transformers and would be constructed on foundations with surrounding gravel areas.[58]

III.A.2.7 Operations and Maintenance Buildings

The proposed facility would include up to four operations and maintenance (O&M) buildings, each including a utility room, storage for maintenance supplies and equipment, and a SCADA control room. The buildings would each have an on-site well and septic system. Power would be supplied by a local service provider using overhead and/or underground lines. Each O&M building site would also have graveled parking and storage areas.[59]

Small quantities of chemical materials, including cleaners, insecticides or herbicides, paint, lubricants, degreasers, and solvents, may be stored at the O&M buildings during construction and operation of the facility.[60] No extremely hazardous materials would be stored on site; other chemicals will be handled in accordance with label instructions as well as state and federal standards.[61]

The proposed facility will include an aboveground fuel storage tank with capacity to store up to 500 gallons of diesel fuel or gasoline at each O&M building site.[62] Secondary containment and refueling procedures for above ground fueling tanks are discussed in more detail in Section IV.D., *Soil Protection*.

The O&M buildings would be equipped with basic firefighting equipment for use on-site during maintenance activities, such as shovels, beaters, portable water for hand sprayers, fire extinguishers, and other equipment.[63]

As discussed further in Sections IV.M, IV.O and V.C., the proposed facility also includes up to 4 on-site wells and septic systems, to be located at each of the O&M buildings.[64]

III.A.2.8 Replacement Solar Panel Storage

[57] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.2.1, 4.3.; SSPAPPDoc25-03 ASC Exhibit C Project Location 2024-05-15, Section 3.0, Figure C-2.
[58] SSPAPPDoc25-07 ASC Exhibit G Materials Analysis 2024-05-15, Section 2.4.
[59] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.3, 4.7; SSPAPPDoc25-03 ASC Exhibit C Project Location 2024-05-15, Figure C-2.
[60] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.6.
[61] *Id*.
[62] *Id*
[63] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.7.
[64] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.3.

The applicant proposes to store spare solar panels and associated equipment either at the O&M building sites or within approximately 50 locked Conex storage containers distributed throughout the site. The containers may be placed directly on the ground or on gravel pads. The containers would store up to the approximately 204,720 replacement panels needed over the life of the facility.[65]

III.A.2.9 Access and Service Roads

The proposed facility includes up to 55 miles of new roads (graded and graveled to meet load requirements for all equipment) to provide access to facility components. Corridors between module racking will be at least 10 feet wide and racking will be no closer than 15 feet from perimeter fencing. Some new road construction will be required to access site features. Roads will be 10 to 20 feet in width, with some exceptions, including access to the substations and main travel corridors where two-way traffic is required. In these cases, roads will be 20 feet wide. As discussed further in Section IV.N., *Wildfire Prevention and Risk Mitigation*, 5-foot maintained vegetative surface or noncombustible base, approved by the fire code official, will be maintained along the fenced perimeter of the site boundary.[66] Use of the roads may continue after construction, or new roads may be removed and the land reclaimed to pre-construction conditions.

III.A.2.10 Security Fencing and Gates

The proposed facility includes approximately 58 miles of security fence to enclose each solar array area, substation, and switchyard site. The perimeter fencing would have lockable vehicle and pedestrian access gates to provide access to the site.[67]

III.A.2.11 Temporary Construction Areas

The proposed facility includes up to 54 temporary construction areas within the energy facility footprint to support construction, store supplies and equipment, and facilitate the delivery and assembly of materials and equipment. Each area would consist of a 5-acre site that would be cleared and graveled prior to construction.[68]

Up to five above-ground diesel tanks and one temporary above-ground gasoline tank would be stored in the temporary construction areas. The tanks would each hold up to 1,000 gallons of fuel. Most fuel containers would have self-contained secondary containment (e.g., double-walled containers) that provide capacity for the entire container plus precipitation, but in some

[65] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15., Section 3.4.
[66] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.9.
[67] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.6.; SSPAPPDoc25-03 ASC Exhibit C Project Location 2024-05-15; Table C-2, Note 9.
[68] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.5.; SSPAPPDoc25-03 ASC Exhibit C Project Location 2024-05-15, Figure C-2.

cases may be placed in a constructed secondary containment area that is impervious and is diked or otherwise contained to provide the required fuel and precipitation capacity.[69] Secondary containment and refueling procedures are discussed in more detail in Section IV.D, Soil Protection.

III.B. Proposed Facility Location and Site Boundary

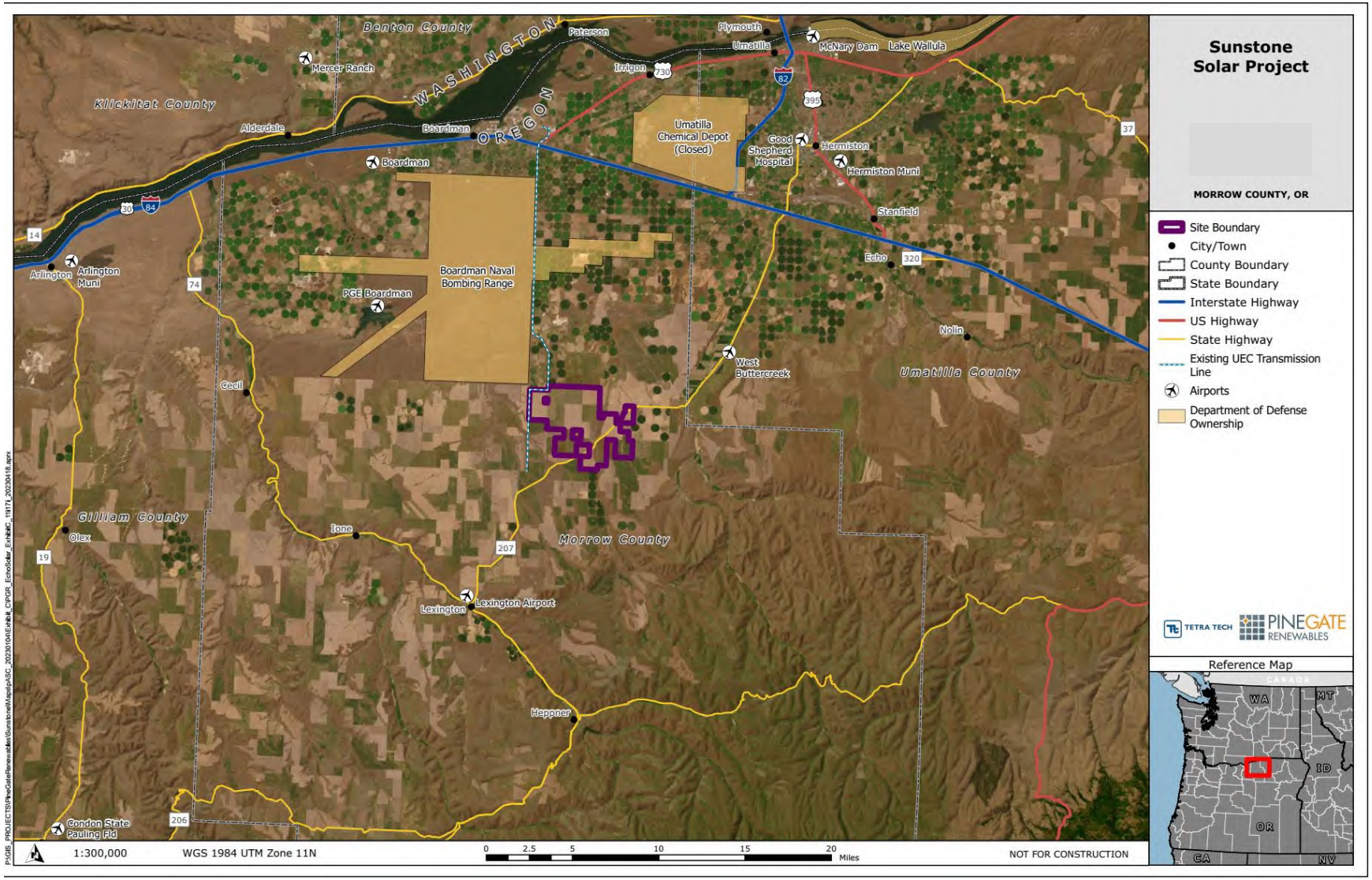
The facility is proposed to be sited within an approximately 10,960-acre (17 sq. mile) site in Morrow County. The proposed site boundary is shown below in Figure 2. The proposed site is located on both sides of State Route 207 and is approximately 15 miles northeast of the Town of Lexington and approximately 4.5 miles west of Butter Creek Junction. The site is approximately 3 miles west of the Umatilla County line at its closest point. Table 2 below provides the Township, Range, and Sections occupied wholly, or in part, by the proposed site.

Table 2: Township, Range, and Section for Areas Occupied by the Site Boundary

Township	Range	Sections
1N	26E	1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 14, 15
2N	26E	27, 28, 29, 30, 31, 32, 33, 34, 35, 36
Reference: SSPAPPDoc25-03 ASC Exhibit C Project Location, Table C-1. 2024-05-15.		

[69] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.5, 2.6, 3.5 and 4.9.

Figure 2: Proposed Facility Regional Location



III.C. Proposed Facility Construction, Operation and Retirement

III.C.1. Proposed Construction Activities

III.C.1.1 Construction Activities

Portions of the site, including substation sites, inverter and battery energy storage system sites, and access roads will be cleared and graded, prior to construction of the applicable facility components.[70] Existing vegetation (e.g., crop stubble, fallow vegetation) and associated root systems in the facility fenceline would be left intact during construction to the maximum extent practicable to minimize soil and erosion impacts, and that grading in solar arrays would be limited to those areas where the slope and gradient are outside of panel and racking tolerances. Typical grading tolerances within the array are 10% maximum on North slopes and 15% maximum in other directions.[71] As discussed in Section IV.D., *Soil Protection*, following construction, operational requirements include long-term site stabilization and revegetation of disturbed areas.

Adherence to the requirements of a Fugitive Dust Control Plan, as presented in Attachment D of this order, will be required (imposed under Condition PRE-SP-02). Measures implemented under this plan include maintaining existing vegetative root systems, applying dust suppressants, and restricting traffic speeds on-site.[72] Typically, water is applied as a dust suppressant on access roads, but the applicant notes that under drought conditions, alternative dust suppressants including synthetic polymer emulsions, chemical suppressants, organic glues, and wood fiber materials may be applied at the site by qualified vendors.[73]

Proposed facility construction is estimated to generate 910 commuting trips and 250 truck trips per day over approximately 1,224 construction workdays. At the peak of construction, the applicant estimates a maximum of approximately 1,266 commuting trips per day and 250 truck trips per day.[74] The assumed primary route to the site would be Bombing Range Road via Interstate Highway 84 (I-84) at the I-84/Irrigon Junction. Alternate routes would be via OR-207 via I-84 south of Hermiston. Traffic

III.C.2. Proposed Operational Activities

Operation and maintenance activities include routine inspections, replacement of solar modules and battery components, panel washing, and vegetation management. Up to 10

[70] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.1, 3.2.1.
[71] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.1, 2.3.
[72] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.3.
[73] SSPAPPDoc25-15 ASC Exhibit O Water Req 2024-05-15, Footnote 1.
[74] SSPAPPDoc25-15 ASC Exhibit O Water Req 2024-05-15, Section 2.2.3.2; 2.4.7.1. All trips are one way (e.g. 910 commuter trips include 455 worker vehicles travelling to and from the site.)

permanent employees would operate and maintain the facility, with occasional delivery truck accessing the site during operations depending on the type of maintenance activity.

Individual batteries associated with the BESS will be inspected according to the manufacturer's recommendations and would need to be replaced approximately every 20 years, and every battery will be replaced during the life of the facility. Each type of electrical facility component would have routine inspections as designated in Section IV.N., *Wildfire Prevention and Riak Mitigation* and the operational Wildfire Mitigation Plan.

The solar panels may require periodic washing during operations, and other incidental water use for sanitation and equipment washing. The applicant estimates that the facility will use approximately 109,200 gallons of water per year in total.[75]

Vegetation will be cleared and maintained along access roads to provide a vegetation clearance area for fire safety. This will include mowing to a height no more than 12 inches. Use of the roads may continue after construction, or new roads may be removed, and the land reclaimed to pre-construction conditions.[76]

An aboveground 500-gallon fuel storage tank sized may be installed at each O&M building. Secondary containment and refueling procedures for on-site fuel storage during will continue to follow the SPCC Plan and requirements for secondary containment. No extremely hazardous materials are anticipated to be produced, used, stored, transported, or disposed of at the facility during operation. [77]

III.C.3. Proposed Retirement Activities

As discussed in Section IV.G., *Retirement and Financial Assurance*, the estimated useful life of the proposed facility is 40 years. Operational jobs would be eliminated after the facility ceased operating; however, some short-term contract jobs to monitor restored areas may be added to facilitate retirement activities. Decommissioning would require similar workforce numbers as required for the construction of the facility and is estimated to require a similar duration of up to 47 months.[78]

Final retirement activities would be designated in a retirement plan but would begin with disconnecting all electrical equipment disassembling equipment and components such as the battery storage units, solar panels and transformers. Larger containers and equipment would be removed, trucked off-site and recycled and disposed of. Solar panels would be disconnected, and piles would be removed including the excavation of any concrete foundations. Gravel and foundations from the inverters and transformers, O&M building, substations, and battery units

[75] SSPAPPDoc25-15 ASC Exhibit O Water Req 2024-05-15, Section 2.2.
[76] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.6.
[77] SSPAPPDoc25-07 ASC Exhibit G Materials Analysis 2024-05-15, Section 4.2.
[78] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.2.1.3.

would be removed by trenching and excavation. The facility site would then be restored through grading, filling, and revegetation with plants or seed mix consistent with applicable plans and conditions discussed in this order or landowner interests.

IV. EVALUATION OF COUNCIL STANDARDS

To issue a site certificate for a proposed facility, the Council must determine that "the facility complies with the applicable standards adopted by the Council under OAR chapter 345 or the overall public benefits of the facility outweigh any adverse effects on a resource or interest protected by the applicable standards that the facility does not meet."[79] The Council must also determine that the proposed facility complies with all other Oregon statutes and administrative rules applicable to the siting of the proposed facility, as identified in the Project Order.

This Draft Proposed Order (DPO) includes the Department's initial analysis of whether the applicant has demonstrated an ability to satisfy each applicable Council Standard based on the information included in the ASC.

The applicant seeks authorization to construct the proposed facility in six phases, each phase inclusive of approximately 200 MWs of energy facility infrastructure. To align with the phased construction approach, recommended conditions requiring applicant actions prior to construction allow for phased compliance. This allows for the preconstruction requirements to apply specifically to the area in which the phased activities would occur, rather than the entirety of the area for which the six phases may occur. Recommended preconstruction conditions contain the following preamble language, "prior to construction of the facility or phase, as applicable."

IV.A. General Standard of Review: OAR 345-022-0000

> *(1) To issue a site certificate for a proposed facility or to amend a site certificate, the Council shall determine that the preponderance of evidence on the record supports the following conclusions:*
>
> *(a) The facility complies with the requirements of the Oregon Energy Facility Siting statutes, ORS 469.300 to 469.570 and 469.590 to 469.619, and the standards adopted by the Council pursuant to 469.501 or the overall public benefits of the facility outweigh any adverse effects on a resource or interest protected by the applicable standards the facility does not meet as described in section (2);*
>
> *(b) Except as provided in OAR 345-022-0030 for land use compliance and except for those statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the*

[79] ORS 469.503(1).

Council, the facility complies with all other Oregon statutes and administrative rules identified in the project order, as amended, as applicable to the issuance of a site certificate for the proposed facility. If the Council finds that applicable Oregon statutes and rules, other than those involving federally delegated programs, would impose conflicting requirements, the Council shall resolve the conflict consistent with the public interest. In resolving the conflict, the Council cannot waive any applicable state statute.

*****

(4) In making determinations regarding compliance with statutes, rules and ordinances normally administered by other agencies or compliance with requirements of the Council statutes if other agencies have special expertise, the Department of Energy shall consult with such other agencies during the notice of intent, site certificate application and site certificate amendment processes. Nothing in these rules is intended to interfere with the state's implementation of programs delegated to it by the federal government.[80]

IV.A.1. Findings of Fact

OAR 345-022-0000 provides the Council's General Standard of Review and requires the Council to find that a preponderance of evidence on the record supports the conclusion that a proposed facility would comply with the requirements of EFSC statutes, and the siting standards adopted by the Council and that a proposed facility would comply with all other Oregon statutes and administrative rules applicable to the issuance of a site certificate for the facility.

The requirements of OAR 345-022-0000 are discussed in the sections that follow. The Department consulted with other state agencies, and the Morrow County Board of Commissioners, as the appointed Special Advisory Group (SAG) for the proposed facility, during review of the preliminary Application for Site Certificate (pASC) and ASC to aid in the evaluation of whether the proposed facility would satisfy the requirements of applicable statutes, rules and ordinances otherwise administered by other agencies. Additionally, in many circumstances the Department relies upon these reviewing agencies' special expertise in evaluating compliance with the requirements of Council standards.

OAR 345-022-0000(2) and (3) apply to ASCs where an applicant has shown that the proposed facility cannot meet Council standards or has shown that there is no reasonable way to meet the Council standards through mitigation or avoidance of the damage to protected resources; and, for those instances, establish criteria for the Council to evaluate in making a balancing determination. The applicant does not assert that the proposed facility would not meet an applicable Council standard. Therefore, OAR 345-022-0000(2) and (3) do not apply to this review.

[80] Administrative Order EFSC 1-2017, effective March 8, 2017.

IV.A.1.1 Council Standards for Siting Facilities: OAR Chapter 345, Division 22

OAR chapter 345, division 22 establishes the standards which apply to all energy facilities. As described in Section IV.B to P, the Department recommends that, subject to compliance with recommended conditions of approval, the Council find that the preponderance of the evidence on the record supports the conclusion that the proposed facility complies with these standards.

IV.A.1.2 Specific Standards for Siting Facilities: OAR Chapter 345, Division 24

OAR Chapter 345, Division 24 established additional standards for specific types of facilities including, as relevant to this facility, standards for transmission lines under OAR 345-024-0090. As described in Section IV.P., *Siting Standards for Transmission Lines*, the Department recommends the Council find that subject to compliance with recommended conditions of approval, the Council find that the preponderance of the evidence on the record supports the conclusion that the proposed facility complies with these standards.

IV.A.1.3 Site Certificate Conditions: OAR chapter 345, division 25

Mandatory Conditions OAR 345-025-0006

OAR 345-025-0006 establishes mandatory conditions that must be included in all site certificates. Accordingly, the Department recommends the Council impose these conditions, as applicable to the proposed facility.

The Department recommends the Council adopt conditions implementing sections (2) to (7) of the rule as recommended General Standard Conditions, as shown below.

OAR 345-025-0006(3) requires the applicant to design, construct, and operate the facility substantially as described in the site certificate and in compliance with all applicable laws, rules, and ordinances. In accordance with these requirements, the Department recommends the Council impose General Standard Condition 1, as presented below. As noted in Section III, *Description of the Proposed Facility,* the project description in this order is the basis for the project description in the draft site certificate (see Attachment A).

> **General Standard Condition 1 (GEN):** The certificate holder must design, construct, operate and retire the facility:
> a. Substantially as described in the site certificate;
> b. In compliance with the requirements of ORS Chapter 469, applicable Council rules, and applicable state and local laws, rules and ordinances in effect at the time the site certificate was issued; and
> c. In compliance with all applicable permit requirements of other state agencies.
> [Mandatory Condition OAR 345-025-0006(3); GEN-GS-01; Final Order on ASC]

OAR 345-025-0006(4) requires the Council to impose a condition requiring the applicant to begin and complete construction of the facility by the dates specified in the site certificate. The applicant seeks authorization to construct the proposed facility in six phases, each phase inclusive of approximately 200 MWs of energy facility infrastructure. Each phase would include a collector substation and up to four phases would include O&M buildings. The distributed battery energy storage system and switchyard would be built in phases with the associated blocks or may be built concurrently along with or following the solar array construction. [81] The duration of each construction phase is estimated at 21 months. Up to two phases may commence per year, with up to four phases under construction at one time. Applicant requests a deadline for construction completion of three years later than the deadline for beginning construction, or six years from issuance of the site certificate.[82]

In previous orders, the Council has established the construction commencement deadline three years from the date of issuance of a site certificate, and three years from the date construction commences to complete construction. However, the Council has also found that, if requested, longer timeframes may be granted after consideration of the size and complexity of the facility, the likelihood of changes in the existing environment and applicable law, and the applicant's ability to begin construction in compliance with all required pre-construction conditions given financial, economic, or technological uncertainty. [83]

The Department recommends Council allot the applicant three years to begin construction of the first phase because it is a reasonable amount of time to comply with applicable site certificate conditions and prepare for construction, similar to other facilities. Given the size of the proposed facility and proposed phased construction approach, combined with preconstruction survey requirements, the Department recommends Council allot four years to begin construction of the last phase. The Department recommends Council establish the completion deadline for all construction as two years from the commencement deadline of the final phase, for a maximum total of 6 years for completion, if construction of the final phase does not start until the fourth year after site certificate approval.

This timeframe is reasonable for the applicant to construct the facility as a whole, or in phases, as proposed. It also does not conflict with survey data relied upon in the ASC and in this order. Therefore, consistent with the requirements of OAR 345-025-0006(4), the Department recommends the Council impose General Standard Conditions 2, as shown below.

> **Recommended General Standard Condition 2 (GEN):** The certificate holder must begin and complete construction of the facility or facility phase by the following dates:
> a. Construction of the facility or first facility phase must begin on or before [ENTER DATE 3 YEARS FROM ISSUE DATE]. Within 7 days of construction commencement,

[81] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.1, 7.0.

[82] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 7.0.

[83] OSCAPPDoc1-4 Final Order on ASC w Attachments 2022-02-25, p. 29, and B2HAPPDoc31 Final Order on ASC and Attachment 2022-09-27.

the certificate holder must provide the Department with written verification that it has met the deadline by satisfying applicable preconstruction conditions and completing at least $250,000 work at the site.

b. Construction of the final facility phase must begin on or before [ENTER DATE 4 YEARS FROM ISSUE DATE]. Within 7 days of construction commencement, the certificate holder must provide the Department with written verification that it has met the deadline by satisfying applicable preconstruction conditions and completing at least $250,000 work at the site.

c. All facility construction must be completed within 2 years after the date construction of the final facility phase (under (b)) begins. Within 7 days after completing construction, the certificate holder shall provide the Department written verification that it has met the deadline.

[General Standard Condition 2; GEN GS-02; Final Order on ASC]

OAR 345-025-0006(6) and (7) require the Council to impose conditions requiring the applicant to report any significant environmental change or impact attributable to the facility and to prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent it can. Accordingly, the Department recommends the Council impose General Standard Conditions 3 and 4, as presented below.

General Standard Condition 3 (GEN): If the certificate holder becomes aware of a significant environmental change or impact attributable to the facility, the certificate holder must, as soon as possible, submit a written report to the Department describing the impact on the facility and any affected site certificate conditions.
[Mandatory Condition OAR 345-025-0006(6); GEN-GS-03; Final Order on ASC]

General Standard Condition 4 (GEN): The certificate holder must prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder.
[Mandatory Condition OAR 345-025-0006(7); GEN-GS-04; Final Order on ASC]

OAR 345-026-0006(5) provides that the Council must impose a condition prohibiting the applicant from conducting construction or ground clearing activities on any part of the site until it has the legal right to engage in construction activities in all parts of the site. The rule also contains exceptions for wind energy facilities, transmission lines, and pipelines which are not relevant to the proposed facility. The Department recommends the Council impose the mandatory condition omitting the exceptions, as General Standard Condition 5:

Recommended General Standard Condition 5 (PRE): Except as necessary for the initial survey, the certificate holder may not begin construction of the facility or phase, or create a clearing on any part of the site of the facility or phase, as applicable, until the certificate holder has the legal right to engage in construction activities on the relevant parts of the site for the facility or phase.

[Mandatory Condition OAR 345-025-0006(5); PRE-GS-01; Final Order on ASC]

OAR 345-025-0006(11) provides that the Council include a condition requiring the certificate holder to restore vegetation to the extent practicable. To satisfy this requirement, the Department recommends the Council impose General Standard Condition 6, as presented below:

> **General Standard Condition 6 (GEN):** Upon completion of construction, the certificate holder must restore vegetation to the extent practicable and must landscape all areas disturbed by construction in a manner compatible with the surroundings and proposed use. Upon completion of construction, the certificate holder must remove all temporary structures not required for facility operation and dispose of all timber, brush, refuse and flammable or combustible material resulting from clearing of land and construction of the facility.
> [Mandatory Condition OAR 345-025-0006(11); GEN-GS-05; Final Order on ASC]

The Department further recommends the Council adopt conditions implementing sections (8), (9), and (16) of the rule as recommended Retirement and Financial Conditions 1 to 3, as described in Section IV.G., *Retirement and Financial Assurance*; adopt conditions implementing section (12) to (14) of the rule as recommended Structural Standard Conditions 1 to 3, as described in Section IV.C., *Structural Standard*, and adopt conditions implementing section (15) of the rule as recommended Organizational Expertise Condition 1, as described in Section IV.B., *Organizational Expertise*.

Site Specific Conditions: OAR 345-025-0010

In addition to mandatory conditions imposed on all facilities, the Council may impose additional "site specific" conditions to address issues specific to certain types of facilities or facility components. Because the proposed facility would include a 230-kV transmission line as a related or supporting facility, the conditions under sections (4) and (5) of the rule apply.

The Department recommends the Council adopt conditions implementing section (4) of the rule as recommended Siting Standards for Transmission Line Condition 1, as described in Section IV.P, *Siting Standards for Transmission Lines.* The Department recommends the Council adopt a condition implementing section (5) of the rule as presented below:

> **Recommended General Standard Condition 7 (GEN):** The certificate holder is authorized to construct the 230 kV transmission lines anywhere within the approved transmission line corridors, subject to the conditions in the site certificate. The approved transmission line corridor includes:
> a. Southern transmission line: Approximately 6.3 miles, extending between the facility switchyard to four collector substations, as further described in ASC Exhibit B and C as presented in Attachment 1 of the site certificate.

b. Northern transmission line: Approximately 3.2 miles, extending between the facility switchyard to two collector substations, as further described in ASC Exhibit B and C as presented in Attachment 1 of the site certificate.

[Site Specific Condition OAR 345-025-0010(5); GEN-GS-06; Final Order on ASC]

IV.A.1.4 Construction and Operation Rules for Facilities: OAR chapter 345, division 26

OAR chapter 345, division 26 includes the ongoing compliance obligations, including requirements for compliance plans, inspections, reporting and notification of incidents that will apply to the facility if the Council issues a site certificate for the proposed facility. Note that, if a site certificate is issued, the applicant must also comply with additional construction- and operation-related regulations that may apply to the proposed facility but that may not be covered by the site certificate, as provided in ORS 469.401(4).

Under OAR 345-026-0048, the applicant must develop and implement a plan that verifies compliance with all site certificate terms and conditions and applicable statutes and rules. To ensure compliance with this requirement, the Department recommends the Council require that the plan be submitted at least 90-days prior to construction unless otherwise agreed to by the Department and authorize the Department to request additional information if needed to evaluate compliance, as presented below:

Recommended General Standard Condition 8 (PRE): At least 90 days prior to construction of the facility or phase, as applicable (unless otherwise agreed to by the Department), the certificate holder shall submit to the Department a compliance plan documenting and demonstrating actions completed or to be completed to satisfy the requirements of all site certificate terms and conditions and applicable statutes and rules. The plan shall be provided to the Department for review and compliance determination for each requirement. The Department may request additional information or evaluation deemed necessary to demonstrate compliance.
[OAR 345-026-0048, PRE-GS-02; Final Order on ASC]

Under OAR 345-025-0006(2) the Council must impose a condition requiring the applicant to submit a legal description of the site to the Department after the facility becomes operational. The Department recommends the Council adopt this condition as General Standard Condition 9, as presented below:

General Standard Condition 9 (**OPR):** The certificate holder must submit a legal description of the site to the Department within 90 days after beginning operation of the facility. The legal description must include a description of metes and bounds or a description of the site by reference to a map and geographic data that clearly and specifically identify the outer boundaries that contain all parts of the facility.
[Mandatory Condition OAR 345-025-0006(2); OPR-GS-01; Final Order on ASC]

Under OAR 345-026-0080(1)(b), each applicant must submit an annual report to the Department each year the facility is operational. To ensure compliance with this rule, the Department recommends the Council adopt General Standard Condition 10, as presented below:

General Standard Condition 10 (OPR): After January 1 but no later than April 30 of each year after beginning operation of the facility, the certificate holder shall submit an annual report to the Department. The Council Secretary and the certificate holder may, by mutual agreement, change the reporting date.

1. The annual report must include the following information for the calendar year preceding the date of the report:
    a. Facility Status: An overview of site conditions, the status of facilities under construction and a summary of the operating experience of facilities that are in operation. The certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the like that occurred during the year and that had a significant adverse impact on the facility.
    b. Reliability and Efficiency of Power Production: For electric power plants, the plant availability and capacity factors for the reporting year. The certificate holder shall describe any equipment failures or plant breakdowns that had a significant impact on those factors and shall describe any actions taken to prevent the recurrence of such problems.
    c. Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period.
    d. Monitoring Report: A list and description of all significant monitoring and mitigation activities performed during the previous year in accordance with site certificate terms and conditions, a summary of the results of those activities and a discussion of any significant changes to any monitoring or mitigation program, including the reason for any such changes.
    e. Compliance Report: A report describing the certificate holder's compliance with all site certificate conditions that are applicable during the reporting period. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate.
    f. Facility Modification Report: A summary of changes to the facility that the certificate holder has made during the reporting period without an amendment of the site certificate in accordance with OAR 345-027-0350.
2. To the extent that information required by this rule is contained in reports the certificate holder submits to other state, federal or local agencies, the certificate holder may submit excerpts from such other reports to satisfy this rule. The Council reserves the right to request full copies of such excerpted reports.

[Mandatory Condition 345-026-0080(1); OPR-GS-02; Final Order on ASC]

IV.A.2. Conclusions of Law

Based on the facts and evidence provided on the record of the ASC, recommended findings of fact and conclusions of law presented in this DPO, subject to recommended, mandatory and site-specific conditions, the Department recommends Council find that the proposed facility would satisfy the requirements of ORS 469.300 to 469.570 and 469.590 to 469.619, the Council's standards in OAR chapter 345, and all other Oregon statutes and administrative rules applicable to the issuance of a site certificate.

IV.B. Organizational Expertise: OAR 345-022-0010

(1) To issue a site certificate, the Council must find that the applicant has the organizational expertise to construct, operate and retire the proposed facility in compliance with Council standards and conditions of the site certificate. To conclude that the applicant has this expertise, the Council must find that the applicant has demonstrated the ability to design, construct and operate the proposed facility in compliance with site certificate conditions and in a manner that protects public health and safety and has demonstrated the ability to restore the site to a useful, non-hazardous condition. The Council may consider the applicant's experience, the applicant's access to technical expertise and the applicant's past performance in constructing, operating and retiring other facilities, including, but not limited to, the number and severity of regulatory citations issued to the applicant.

(2) The Council may base its findings under section (1) on a rebuttable presumption that an applicant has organizational, managerial and technical expertise, if the applicant has an ISO 9000 or ISO 14000 certified program and proposes to design, construct and operate the facility according to that program.

(3) If the applicant does not itself obtain a state or local government permit or approval for which the Council would ordinarily determine compliance but instead relies on a permit or approval issued to a third party, the Council, to issue a site certificate, must find that the third party has, or has a reasonable likelihood of obtaining, the necessary permit or approval, and that the applicant has, or has a reasonable likelihood of entering into, a contractual or other arrangement with the third party for access to the resource or service secured by that permit or approval.

(4) If the applicant relies on a permit or approval issued to a third party and the third party does not have the necessary permit or approval at the time the Council issues the site certificate, the Council may issue the site certificate subject to the condition that the certificate holder shall not commence construction or operation as appropriate until the third party has obtained the

> *necessary permit or approval and the applicant has a contract or other arrangement for access to the resource or service secured by that permit or approval.*[84]

IV.B.1. Findings of Fact

IV.B.1.1 Applicant Information

The applicant is Sunstone Solar, LLC. The company was formed in the State of Oregon on May 10, 2021, under the name "Bombing Range Solar I, LLC." [85] On September 21, 2021, the applicant filed Articles of Amendment changing the company's name to "Echo Solar, LLC."[86] The NOI was submitted and reviewed under that name. On April 28, 2023, the applicant again filed Articles of Amendment, changing the company's name to "Sunstone Solar, LLC."[87]

FP 2021 Dev Holdco, LLC is the sole member and manager of Sunstone Solar, LLC.[88] FP 2021 Dev Holdco, LLC is a wholly-owned subsidiary of Pine Gate Development, LLC, which in turn is a wholly-owned subsidiary of Pine Gate Renewables, LLC (Pine Gate, PGR or parent company).[89]

In a letter dated May 23, 2023, the applicant provided a legal opinion from David Alessandri, Senior Counsel for PGR, stating that, subject to compliance with all applicable federal, state and local laws, the applicant had the authority to construct and operate the facility under its own operating agreements and organizing documents.[90]

Under OAR 345-025-0006(15), the Council must impose a condition in every site certificate requiring the applicant to inform the Department of any transfer of ownership of the facility or applicant prior to the transfer. The Department recommends the Council impose this mandatory condition as Organizational Expertise Condition 1, as presented below.

> **Organizational Expertise Condition 1 (GEN):** Before any transfer of ownership of the facility or ownership of the site certificate holder, the certificate holder must inform the Department of the proposed new owners. The requirements of OAR 345-027-0400 apply to any transfer of ownership that requires a transfer of the site certificate. [Mandatory Condition OAR 345-025-0006(15); GEN-OE-01]

[84] Administrative Order EFSC 1-2002, effective April 3, 2002
[85] SSPAPPDoc25-01 ASC Exhibit A Applicant Information 2024-05-15. Attachment A-2
[86] *Id*.
[87] SSPAPPDoc25-01 ASC Exhibit A Applicant Information 2024-05-15. Attachment A-3
[88] SSPAPPDoc25-01 ASC Exhibit A Applicant Information 2024-05-15. Attachment A-2
[89] SSPAPPDoc25-01 ASC Exhibit A Applicant Information 2024-05-15. Section 3.0.
[90] SSPAPPDoc25-13 ASC Exhibit M Financial Capability 2024-05-15. Attachment M-1.

IV.B.1.2 Expertise to Construct, Operate and Retire the Proposed Facility.

Under OAR 345-022-0010(1), to conclude that the applicant has adequate organizational expertise to construct, operate and retire the proposed facility, the Council must find the applicant has demonstrated the ability to design, construct and operate the proposed facility in compliance with site certificate conditions and in a manner that protects public health and safety, and has demonstrated the ability to restore the site to a useful, non-hazardous condition.

Experience Designing, Constructing, And Operating Solar Facilities

The applicant did not provide evidence that it has experience or expertise in the construction, operation, and retirement of energy facilities of its own, and instead, represents that it will have access to the experience, resources, and staff of its parent company.[91] Pine Gate provided a "commitment letter", dated May 30, 2024, from Pine Gate Renewables, LLC's Chief Development Officer Jon Saxon stating that the parent company "is committed to provide financial and technical resources to the Sunstone Solar Project" and has "committed to providing the financial assurance outlined in Exhibit M of the Application and the human capital and expertise outlined in Exhibit D..."[92]

Pine Gate was formed in North Carolina in 2014.[93] The company is headquartered in Asheville, North Carolina, and represents that it currently has over 275 employees based across the United States.[94] ASC Exhibit D lists the principal officers and staff at Pine Gate that would support the project.[95]

Pine Gate owns or operates 17 solar facilities in Oregon with a combined generating capacity of 89.75 MW, and over 100 solar facilities with a combined generating capacity of 1.9 gigawatts (GW) in operation nationwide.[96] The applicant provided an illustrative list of eleven projects developed, financed, and constructed by Pine Gate. The projects entered into service between August 2020 and June 2023 and range from 15 to 101 MW in nameplate capacity. The Bowman Solar Facility, located in Bowman, South Carolina, is the largest and oldest facility on the list.[97] At 101 MW, the Bowman facility is approximately one twelfth the size of the proposed facility.

The facilities owned and operated by Pine Gate are significantly smaller than the proposed facility, however, much of the technological and engineering considerations are likely the same for a photovoltaic facility of any size due to the modular nature of the technology.

[91] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15. Section 6.0.
[92] SSPAPPDoc40-01 ASC Exhibit D Organizational Expertise 2024-06-12. Attachment D-1
[93] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15, Section 2.0.
[94] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15, Sections 3.0 and 5.0.
[95] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15, Section 3.1 to 3.9.
[96] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15, Sections 2.0 and 5.0.
[97] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15, Table D-1.

Based on the commitments May 30, 2024 parent company letter, and Pine Gate's experience designing, constructing, and operating facilities with a similar technology, at a smaller size, the Department recommends the Council find that the parent company's experience demonstrates the ability of the applicant to design, construct and operate the proposed facility in compliance with site certificate conditions and in a manner that protects public health and safety.

Access to Technical Expertise

During construction of the facility, the applicant would rely on third-party contractors for technical expertise in engineering, procurement, and construction. The applicant has not selected an architect, engineer, major component vendor, or prime contractor for the construction and operation of the facility but represents that Pine Gate has developed relationships with several "seasoned" contractors through its previous experience developing energy facilities and is committed to selecting highly qualified contractors for this project.[98] The applicant further represents that Pine Gate has dedicated staff to ensure oversight of all engineering, procurement, construction, and project management throughout the life of the facility.[99]

The Department recommends that the Council find that Pine Gate's past experience in constructing and operating energy facilities demonstrates its ability to secure contracts with third-party contractors with the technical expertise needed to design, construct and operate the proposed facility in compliance with site certificate conditions and in a manner that protects public health and safety. The Department recommends the Council impose Organizational Expertise Condition 1, as presented below, to ensure that the Department is notified of the identity and qualifications of the selected contractors prior to the beginning of construction.

> **Recommended Organizational Expertise Condition 2 (PRE):** Prior to construction of the facility or phase, as applicable, the certificate holder shall notify the Department of the identity and qualifications of the major design, engineering and construction contractor(s). The certificate holder shall select contractors that have substantial experience in the design, engineering and construction of similar facilities. The certificate holder shall report to the Department any changes of major contractors. [PRE-OE-01; Final Order on ASC]

To ensure all work is performed in compliance with site certificate conditions and in a manner that protects public health and safety, the Department recommends the Council impose Organizational Expertise Conditions 3, 4, and 5, as presented below.

[98] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15, Section 4.0.

[99] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15, Section 2.0.

Recommended Organizational Expertise Condition 3 (CON): The certificate holder shall contractually require all contractors and subcontractors to comply with all applicable laws and regulations and with the terms and conditions of the site certificate. The contractual obligation shall be required of each contractor and subcontractor prior to that firm working on the facility. Such contractual provisions shall not operate to relieve the certificate holder of responsibility under the site certificate.
[CON-OE-01; Final Order on ASC]

Recommended Organizational Expertise Condition 4 (GEN): Any matter of non-compliance under the site certificate is the responsibility of the certificate holder. Any notice of violation issued under the site certificate will be issued to the certificate holder. Any civil penalties under the site certificate will be levied on the certificate holder.
[GEN-OE-02; Final Order on ASC]

Recommended Organizational Expertise Condition 5 (GEN): The certificate holder must notify the Department within 72 hours of any occurrence of the following:
a. There is an attempt by anyone to interfere with the facility's safe operation.
b. There is a significant nature event such as a fire, earthquake, flood, tsunami or tornado, or human-caused events such as a fire or explosion.
c. There is any fatal injury at the facility.
[OAR 345-026-0170, GEN-OE-03; Final Order on ASC]

Relevant Experience in Mitigation

The applicant represents that it utilizes environmental consulting firms to develop and implement mitigation strategies for its projects. As discussed below, the applicant has contracted Tetra Tech, Inc. (Tetra Tech) as the environmental consultant for this project.[100] Tetra Tech has developed and implemented mitigation projects for several facilities under the Council's jurisdiction.

Pine Gate has taken steps to design facilities in a manner that protects agricultural land and provides habitat for native species. Examples of actions taken under this initiative at existing solar facilities include the installation of native flora and pollinator-friendly plant species at eight facilities in North Carolina and Oregon and the installation of wildlife permeable fencing at seven facilities to allow smaller animals to access the site.[101]

The Department recommends the Council find that the applicant's access to third-party contractors with experience developing and implementing mitigation programs, and Pine Gate's experience incorporating design measures intended to reduce the impacts of its facilities

[100] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15, Section 8.0.
[101] SSPAPPDoc25-04 Exhibit D Org Expertise 2024-05-15. See also https://pinegaterenewables.com/impact/, accessed 11/2/2023.

on agriculture and fish and wildlife support the conclusion that the applicant has the ability to comply with site certificate conditions requiring mitigation for impacts to resources. Further discussion of conditions of approval to ensure that impacts to resources are avoided, minimized, and mitigated in accordance with Council Standards, and mitigation plans with sufficient specificity to determine that mitigation can be successfully implemented where required, is included throughout this Order.

Public Health and Safety

Facility components including the solar array, substation transformers, transmission line, and battery energy storage system could result in health and safety impacts from unanticipated fire- and electrical hazards. Section IV.N., *Wildfire Prevention and Risk Mitigation* provides an evaluation of potential fire related risks from proposed facility design, construction and operation. Recommended Wildlife Prevention and Risk Mitigation Conditions 1 through 4 require the applicant to finalize and implement Wildfire Mitigation Plans, to then be implemented during construction and for the operational life of the facility.

The Department recommends Council impose the following conditions to ensure that the facility is designed, constructed, operated and retired in a manner that protects public health and safety.

Recommended Organizational Expertise Condition 6 (GEN): The certificate holder shall, as soon as reasonably possible:

a. Report incidents or circumstances that may violate the terms or conditions of the site certificate, terms or conditions of any order of the Council, or the terms or conditions of any order issued under OAR 345-027-0230, to the Department. In the report to the Department, the certificate holder shall provide all pertinent facts including an estimate of how long the conditions or circumstances existed, how long they are expected to continue before they can be corrected, and whether the conditions or circumstances were discovered as a result of a regularly scheduled compliance audit;
b. Initiate and complete appropriate action to correct the conditions or circumstances and to minimize the possibility of recurrence;
c. Submit a written report within 30 days of discovery to the Department. The report must refer to the language in (d) of the condition and contain:
    i. A discussion of the cause of the reported conditions or circumstances;
    ii. The date of discovery of the conditions or circumstances by the responsible party;
    iii. A description of immediate actions taken to correct the reported conditions or circumstances;
    iv. A description of actions taken or planned to minimize the possibility of recurrence; and
    v. For conditions or circumstances that may violate the terms or conditions of a site certificate, an assessment of the impact on the resources considered under the standards of OAR Chapter 345 Divisions 22 and 24 as a result of the reported

conditions or circumstances.

d. Upon receipt of the written report in sub(c) of this condition, the Department may review the facility record for incidents or circumstances reported or reportable under sub(a) related to public health and safety, the environment, or other resources protected under Council standards. If these incidences are determined by the Department to impact the adequacy of the facility decommissioning cost, the Department or Council may adjust the contingencies identified in Final Order on ASC Table 8 and shall request and receive an updated bond or letter of credit from certificate holder in the adjusted amount.

[OAR 345-029-0010, GEN-OE-04; Final Order on ASC]

Recommended Organizational Expertise Condition 7 (PRE): Prior to construction of the facility or phase, as applicable, the certificate holder shall select a construction contractor with a low rate of historic environmental and safety compliance citations. Certificate holder shall provide the following documentation to the Department:

a. Qualifications and contact information of the of the major design, engineering and construction contractor(s) and subcontractors, as applicable.
b. Construction contractor compliance history.
c. Contract excerpt affirming that contractors are required to comply with the terms and conditions of the site certificate, including selecting design layout and construction materials that minimize impacts to resources protected under Council standards.

[PRE-OE-02; Final Order on ASC]

Recommended Organizational Expertise Condition 8 (PRE): Prior to construction of the facility or phase, as applicable, the certificate holder shall provide the Department the qualifications and contact information of the certificate holder's construction manager. [PRE-OE-03; Final Order on ASC]

Recommended Organizational Expertise Condition 9 (CON): During construction, the certificate holder shall:

a. Maintain an onsite construction manager.
b. Require that the construction manager implement and monitor all applicable construction related site certificate conditions.
c. Within six months after beginning construction, and every six months thereafter during construction of the energy facility and related or supporting facilities, the certificate holder shall submit a semiannual construction progress report to the Department. In each construction progress report, the certificate holder shall describe any significant changes to major milestones for construction. The certificate holder shall report on the progress of construction and shall address the following:
    i. Facility Status: An overview of site conditions, the status of facilities under construction and a summary of the operating experience of facilities that are in operation. The certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the like that

occurred during the year and that had a significant adverse impact on the facility.

ii. Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period.

iii. Compliance Report: A report describing the certificate holder's compliance with all site certificate conditions that are applicable during the reporting period. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate.

iv. Facility Modification Report: A summary of changes to the facility that the certificate holder has made during the reporting period without an amendment of the site certificate in accordance with OAR 345-027-0050.

[OAR 345-026-0080(1)(a), CON-OE-01; Final Order on ASC]

Recommended Organizational Expertise Condition 10 (PRO): Prior to operation, the certificate holder shall provide to the Department the qualifications and contact information of the individuals responsible for monitoring facility operations, including individuals or third-party entity responsible for onsite maintenance.
[PRO-OE-01; Final Order on ASC]

Recommended Organizational Expertise Condition 11 (OPR): During operation, the certificate holder shall provide to the Department the qualifications and contact information of the individuals responsible for monitoring facility operations, including individuals or third-party entity responsible for onsite maintenance.
[OPR-OE-01; Final Order on ASC]

<u>Ability to Restore the Site to a Useful, Non-Hazardous Condition</u>

The applicant's ability to restore the facility site to a useful, non-hazardous condition is evaluated in Section IV.G., *Retirement and Financial Assurance* of this order.

As described above, the Department recommends the Council find that the applicant, through its parent company, has demonstrated that it has the experience needed to construct the proposed facility in compliance with site certificate conditions and in a manner that protects public health and safety, and has demonstrated the ability to secure contracts with third-party contractors that have the necessary technical expertise to meet that standard. Specific requirements and recommended conditions of approval related to retirement and financial assurance are discussed in more detail in Section IV.G.

IV.B.1.3 Third-Party Permits

The applicant would rely upon its contractors to obtain required permits during construction of the facility, including but not limited to, coverage under the Oregon Department of

Environmental Quality's (DEQ) National Pollutant Discharge Elimination System (NPDES) 1200-C and 1200-A Construction Stormwater permits, and the Onsite Sewage Disposal Construction-Installation Permit required for the O&M Buildings. The construction contractor would also be required to obtain any required permits from the Oregon Department of Transportation, and any required state and local building and electrical permits.

The construction contractor would be responsible for obtaining any required permits for the use of stationary or portable concrete batch plant at the facility, if such a plant is constructed or operated at the site.[102]

Under OAR 345-022-0010(4), if an applicant relies on a permit or approval issued to a third-party contractor, and the third party does not have the permit or, as in this case, has not yet been identified, the Council may issue a site certificate subject to the condition that the applicant shall not commence construction or operation as appropriate until the third party has obtained the necessary permits or approvals and the applicant has a contract or other arrangement for access to the resource or service secured by that permit or approval. The Department recommends the Council impose Organizational Expertise Condition 12, as presented below, to ensure that the applicant's contractors obtain all necessary permits and approvals prior to the beginning of construction.

Recommended Organizational Expertise Condition 12 (PRE): Prior to construction of the facility or phase, as applicable, the certificate holder shall:

a. Provide the Department a list of federal, state and local permits, including any third-party permits related to facility siting; and a schedule for obtaining identified permits.
b. Once obtained, provide copies of all permits, including third-party permits, required for facility siting to the Department.

[PRE-OE-04]

IV.B.2. Conclusions of Law

Based on the foregoing analysis, and subject to compliance with the recommended conditions of approval as described above, the Department recommends Council find that the applicant has the organizational expertise to construct, operate and retire the proposed facility in compliance with Council standards and conditions of the site certificate.

IV.C. Structural Standard: OAR 345-022-0020

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that:

(a) The applicant, through appropriate site-specific study, has adequately characterized the seismic hazard risk of the site; and

[102] SSPAPPDoc25-05 ASC Exhibit E Permits 2024-05-15. Section 5.0.

(b) The applicant can design, engineer, and construct the facility to avoid dangers to human safety and the environment presented by seismic hazards affecting the site, as identified in subsection (1)(a);

(c) The applicant, through appropriate site-specific study, has adequately characterized the potential geological and soils hazards of the site and its vicinity that could, in the absence of a seismic event, adversely affect, or be aggravated by, the construction and operation of the proposed facility; and

(d) The applicant can design, engineer and construct the facility to avoid dangers to human safety and the environment presented by the hazards identified in subsection (c).

(2) The Council may not impose the Structural Standard in section (1) to approve or deny an application for an energy facility that would produce power from wind, solar or geothermal energy. However, the Council may, to the extent it determines appropriate, apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

(3) The Council may not impose the Structural Standard in section (1) to deny an application for a special criteria facility under OAR 345-015-0310. However, the Council may, to the extent it determines appropriate, apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.[103]

IV.C.1. Findings of Fact

The analysis area for geologic conditions and soil stability, as established in the Project Order, is the area within the proposed 10,960-acre site boundary. ASC Exhibit H also includes an evaluation of historic seismicity and potentially active faults within 50-miles of the proposed site boundary.

The proposed site is in the Columbia Plateau, which is dominated by geologically young lava flows known as the Columbia River basalts. Basalt flows in the site include the Tertiary Wanapum Basalt and Alkali Canyon formations. The Wanapum Basalt is fine- to coarse-grained basalt and varies from intact to weathered conditions. The Alkali Canyon formation includes interbedded basalt flows consisting of vitric tuff, silty clay, silt, basalt gravel, and alluvial fan and braided stream deposits. The bedrock is covered by quaternary deposits in most of the site; however, basalt bedrock is mapped at the surface in the portion of the facility to the east of Sand Hollow. A large alluvial fan made up of gravel, sand, and smaller sediments including loess covers most of the western portion of the site, and smaller alluvial deposits, consisting of loess,

[103] Administrative Order EFSC 2-2017, effective October 18, 2017.

sand, and gravel from local, parent-material bedrock, are located along two major drainages associated with Sand Hollow within the eastern portion of the site boundary. Missoula flood deposits, consisting of boulder to pebble gravel, sandy gravel, sand, and silt are in the northwestern portion of the site boundary.

Slopes at the site range from 0 to 32 percent. Over 90 percent of the site consists of land that is nearly level (0 to 2 percent slopes) or gently sloping (2 to 7 percent slopes). Very steep slopes (>20 percent) within the site are limited to the walls of Sand Hollow although some strongly sloping areas occur along natural drainages throughout the site. Elevations range from 879 to 1,440 feet above mean sea level.

IV.C.1.1 Potential Seismic Hazards

Potential seismic hazards within the analysis area were evaluated through literature review, mapping and modeling. Literature and data sources evaluated include USGS's National Geophysical Data Center, DOGAMI's HazVu Layers: Statewide Geohazards Viewer Cascadia Earthquake Expecting Shaking Layer; Floodplains, Earthquake Hazards and Landslide Hazards. [104] Based on review of these data sources, the general earthquake hazard within the proposed site boundary is rated moderate to very strong within the area of the alluvial fan deposits, which covers most of the western portion of the proposed site boundary.[105] Potential seismic hazards within the analysis area include damaging shaking, rupture of the ground along the surface trace of a fault, liquefaction of areas with particular sediment and groundwater characteristics, and earthquake-triggered landslides.

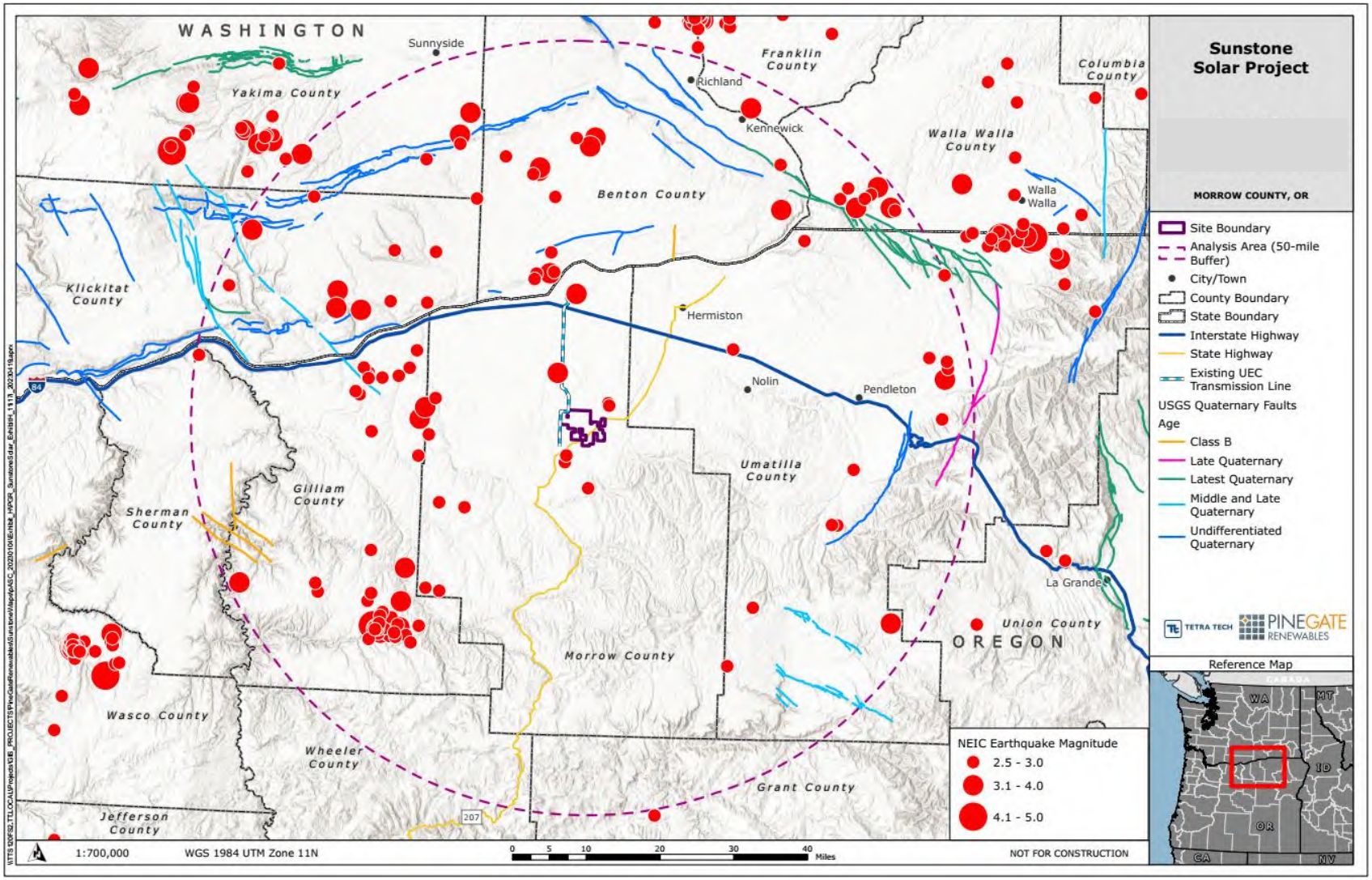
Primary sources of seismic hazard in Oregon include the crustal faults, intraplate activity, volcanic activity, and the Cascadia Subduction Zone. There are 188 earthquakes recorded within 50 miles of the proposed site boundary, as presented in Figure 3 below. The strongest recorded earthquake had a moment magnitude of 4.1 and had an epicenter approximately 31.09 miles from the proposed site. A slightly less intense 3.9 magnitude earthquake occurred approximately five miles from the proposed site. Two earthquakes, with moment magnitudes of 2.7 and 2.9, occurred within one mile of the proposed site. There is one mapped fault within the proposed site boundary, to the east of Sand Hollow Creek (Fault Line 4611).[106] Based on DOGAMI's HazVu, there are several potentially active undifferentiated, Quaternary-age faults and one Class B fault within 25-miles of the proposed site boundary, as presented in Figure 3 below.

[104] SSPAPPDoc25-08 ASC Exhibit H Geologic and Soil Stability 2024-05-15, Attachment H-1. Council rules at OAR 345-021-0010(1)(h)(B) require applicant consultation with DOGAMI on the appropriate methodology and scope for evaluating seismic hazards. Based on an April 26, 2023 meeting, DOGAMI reviewed and concurred with the methods utilized by the applicant to evaluate potential seismic hazards within the analysis area and recommended that the further evaluation be completed on the fault running through the site boundary.

[105] SSPAPPDoc25-08 ASC Exhibit H Geologic and Soil Stability 2024-05-15, Figure H-3.

[106] SSPAPPDoc25-08 ASC Exhibit H Geologic and Soil Stability 2024-05-15, Attachment H-1. In the consultation, DOGAMI requested that additional evaluation be conducted to confirm whether the fault traversing the site was active.

Figure 3: Historic Seismicity and Potentially Active Faults within 50-mile of the Proposed Facility Site



Seismic Shaking or Ground Motion

The general earthquake hazard within the proposed site boundary is rated moderate to very strong. The maximum considered earthquake at the site has a peak ground acceleration of 0.2392 acceleration from gravity at the bedrock surface of the site.[107] Soft or loose soil and near-surface geologic deposits can greatly amplify the shaking in an earthquake. The National Earthquake Hazard Reduction Program (NEHRP) has defined a series of site classes that can be used to calculate the amount of amplification that will occur that range from A (very hard rock, no amplification) to E (soft soil, strong amplification) and F (very soft soil with special characteristics that require detailed investigation). Based on NEHRP data, some areas within the site generally have the characteristics of Site Class B or C, but most of the site, including the areas within the alluvial fan, would be considered Site Class D.

Fault Rupture

There are no known active faults within the proposed site boundary. There is a mapped fault traversing through the proposed site boundary, which requires further evaluation (as described in Section IV.C.1.1). The nearest known or potentially active faults are over 25 miles away.[108] Therefore, fault rupture risk within the proposed site boundary is low.

Liquefaction

Soil within the proposed site boundary is generally cohesive and unsaturated. Therefore, liquefaction risk within the proposed site boundary is low.

Seismically Induced Landslides

The general earthquake hazard within the proposed site boundary is rated moderate to very strong within the area of the alluvial fan deposits, which covers most of the western portion of the proposed site boundary.[109] Regional seismicity could potentially trigger landslides and mass wasting within the proposed site boundary. Therefore, risk of seismically induced landslides within the proposed site boundary is low to moderate.

Subsidence

Bedrock within the proposed site boundary is relatively shallow and the overlying soils are unsaturated. Therefore, risk of subsidence within the proposed site boundary is low.

IV.C.1.2 Non-Seismic Geologic Hazards

Non-seismic geologic hazards in the Columbia Plateau region include landslides, volcanic eruptions, erosion, shrinking and swelling soils, and collapsing soils.[110] Erosion risk, and recommended conditions, are discussed in Section IV.D; other non-seismic geologic hazards are discussed below.

[107] SSPAPPDoc25-08 ASC Exhibit H Geologic and Soil Stability 2024-05-15, Section 7.2.
[108] SSPAPPDoc25-08 ASC Exhibit H Geologic and Soil Stability 2024-05-15, Section 7.2.5 and Figure H-2.
[109] SSPAPPDoc25-08 ASC Exhibit H Geologic and Soil Stability 2024-05-15, Figure H-3.
[110] SSPAPPDoc25-08 ASC Exhibit H Geologic and Soil Stability 2024-05-15, Section 8.0.

Landslides

The Oregon Statewide Landslide Data Layer (SLIDO Release 4.4) indicates that landslide susceptibility within the proposed site boundary is generally relatively low and limited to small drainages. Based on available light detection and ranging (LiDAR) data, there are potential areas of concern along Sand Hollow Creek southeast of the intersection of State Highway 207 and Sand Hollow Road; and east of State Highway 207 south of the intersection with Grieb Lane. Therefore, risk of non-seismically induced landslides within the proposed site boundary is low.

Volcanic Activity

Volcanic activity in the Cascade Range is driven by the subduction of the Juan de Fuca Plate beneath the North American Plate. The closest volcanoes to the proposed site boundary are Mount Hood and Mount Adams, each located approximately 100 miles away. Most of the potential volcanic hazard impacts would occur within a 50-mile radius of the erupting volcano. Depending on the prevailing wind direction at the time of the eruption and the source of the eruption, ash fallout in the region surrounding the proposed facility may occur.

Because of the distance to the nearest volcanoes, impacts from volcanic activity to the proposed facility would be indirect and likely limited to ash fallout. In addition, the proposed facility site is not located near any streams that would be subject to pyroclastic flows from a volcanic eruption from these close volcanoes. Therefore, risk of impacts from volcanic activity within the proposed site boundary is low.

Flooding

ASC Figures H-1 and H-3 present Federal Emergency Management Agency (FEMA) 100-year and 500-year floodplains within the proposed site boundary. Proposed facility components that would cross these designated floodplain areas include a proposed collector line and the proposed overhead transmission line crossing Sand Hollow. Because facility components are proposed within designated floodplain areas, there is flood risk at the site.

Shrinking, Swelling, and Collapsing Soils

Potential risks from shrinking, swelling and collapsing soils within the proposed site boundary will be further evaluated during the preconstruction site-specific geotechnical investigation.

IV.C.1.1 Design Measures for Seismic and Non-Seismic Hazards

Under OAR 345-025-0006(12) to (14), the Council must impose conditions requiring the applicant to design, engineer and construct the facility to avoid dangers to human safety and the environment presented by seismic hazards affecting the site; and to notify the Department and other appropriate authorities if site specific geotechnical investigations reveal significantly different geologic conditions from those described in the application, or if certain geologic formations are identified in the vicinity of the site. Accordingly, the Department recommends the Council adopt these conditions as Structural Standard Conditions 1 to 3, as presented below:

Structural Standard Condition 1 (GEN): The certificate holder must design, engineer and construct the facility to avoid dangers to human safety and the environment presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. "Seismic hazards" include ground shaking, ground failure, landslide, liquefaction triggering and consequences (including flow failure, settlement buoyancy, and lateral spreading), cyclic softening of clays and silts, fault rupture, directivity effects and soil-structure interaction.
[Mandatory Condition OAR 345-025-0006(12); GEN-SS-01; Final Order on ASC]

Structural Standard Condition 2 (GEN): The certificate holder must notify the Department, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if site investigations or trenching reveal that conditions in the foundation rocks differ significantly from those described in the application for a site certificate. After the Department receives the notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division to propose and implement corrective or mitigation actions.
[Mandatory Condition OAR 345-025-0006(13); GEN-SS-02; Final Order on ASC]

Structural Standard Condition 3 (GEN): The certificate holder must notify the Department, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if shear zones, artesian aquifers, deformations or clastic dikes are found at or in the vicinity of the site. After the Department receives notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division to propose and implement corrective or mitigation actions.
[Mandatory Condition OAR 345-025-0006(14); GEN-SS-03; Final Order on ASC]

Under OAR 345-022-0020(1)(a) and (c), the Council must find that the applicant has, through appropriate site-specific study, adequately characterized the seismic and non-seismic geologic and soils hazards of the site. As discussed above, the information in this section is based on the applicant's desktop analysis of potential seismic, geologic, and soils hazards. The applicant represents that it will conduct additional geotechnical investigation at the site to fully characterize site conditions and to allow the applicant to design, engineer, and construct the facility to the most current standards at the time of construction. The applicant represents that, to inform the design of the pile foundations, substation pads, inverter pads, battery energy storage system pads, operations and maintenance (O&M) building pads, and roads, the geotechnical investigation will include the following tests:

- Soil Borings, Standard Penetrator, and/or Cone Penetrator Tests
- Soil Electrical Resistivity Tests
- Standard Proctor Compaction Tests
- Soil Thermal Resistivity Tests
- Moisture Content Analysis

- Sieve Analysis
- Atterberg Limits Tests
- Corrosivity Tests
- California Bearing Ratio Tests

The results of the investigation will be reported to DOGAMI and ODOE following the 2014 Oregon State Board of Engineering Geology Reports guidelines.[111] In addition, a geotechnical assessment of the alluvial fan deposits will include the potential for future debris flows to impact the alluvial fan area.

The proposed facility will be designed, engineered, and constructed to meet or exceed the standards established in the latest International Building Code, Oregon Structural Specialty Code, and building codes adopted by the State of Oregon at the time of construction and that final seismic design criteria will be determined by the structural engineer based on the final geotechnical report.[112] The facility will be designed based on Site Class D.

The Department recommends the Council impose the following conditions to ensure that the preconstruction, site specific geotechnical investigation is completed and submitted to the Department and DOGAMI, and that the evaluation demonstrates that facility design is based on applicable building and structural requirements at the time of construction, as presented below:

> **Recommended Structural Standard Condition 4 (PRE):** Prior to construction of the facility or phase, as applicable, the certificate holder shall submit a site-specific geotechnical investigation report, consistent with the Oregon State Board of Geologist Examiners Guideline for Preparing Engineering Geologic Reports, or newer guidelines if available to the Department, for review in consultation with its third-party consultant. [PRE-SS-01; Final Order on ASC]
>
> **Recommended Structural Standard Condition 5 (GEN):** The certificate holder shall design, engineer, and construct the facility in accordance with the versions of the International Building Code, Oregon Structural Specialty Code, and local building codes in effect at the time of construction.
> [GEN-SS-04; Final Order on ASC]

IV.C.2. Conclusions of Law

Based on the foregoing analysis, and subject to compliance with the recommended conditions of approval as described above, the Department recommends Council find that the applicant adequately characterized potential seismic and geologic hazards at the site and can design,

[111] SSPAPPDoc25-08 ASC Exhibit H, Section 7.1. 2024-05-15

[112] SSPAPPDoc25-08 ASC Exhibit H, Section 7.2.4; Section 7.2.9. 2024-05-15

engineer and construct the proposed facility to avoid dangers to human safety and the environment presented by those hazards.

IV.D. Soil Protection: OAR 345-022-0022

To issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are not likely to result in a significant adverse impact to soils including, but not limited to, erosion and chemical factors such as salt deposition from cooling towers, land application of liquid effluent, and chemical spills.[113]

IV.D.1. Findings of Fact

The analysis area for the Soil Protection standard is the area within the proposed 10,960-acre site boundary, as established in the Project Order.[114]

As described in Section IV.E., *Land Use,* the land within the analysis area is primarily used for dryland winter wheat production, with a vegetated (uncultivated) dry wash that runs through the middle of the site.

IV.D.1.1 Existing Soil Conditions and Land Use

Table 3 below summarizes 13 major soil units found within the analysis area according to the Natural Resources Conservation Service (NRCS) Web Soil Survey.[115]

[113] Administrative Order EFSC 1-2007, effective May 15, 2007.
[114] ESPNOIDoc7 Project Order 2022-09-26, p. 40.
[115] Based on NRCS Web Soil Survey data, as of February 2023.

Table 3: Soil Characteristics within and Adjacent to the Site Boundary

NRCS Soil Unit	Acres	NRCS Soil Capability Class (irrigated; nonirrigated)	NRCS Farmland Classification	Soil Erodibility (K-factor)	Wind Erosion Rating	Permeability
13E/Gravden very gravelly loam, 20 to 40 percent slopes	120	7; 7	Not prime farmland	0.15	3	Very high
13D/Gravden very gravelly loam, 5 to 20 percent slopes	39	7; 7	Not prime farmland	0.15	3	Very high
28E/Lickskillet very stony loam, 7 to 40 percent slope	98	7; 7	Not prime farmland	0.20	7	Low
45A/Ritzville silt loam, 0 to 2 percent slopes	412	1; 3	Prime farmland if irrigated	0.49	7	Low
45B/Ritzville silt loam, 2 to 7 percent slopes	1,711	2; 3	Prime farmland if irrigated	0.49	7	Low
71A/Warden silt loam, 0 to 2 percent slopes	2,766	1; 4	Prime farmland if irrigated	0.55	5	High
71B/Warden silt loam, 2 to 5 percent slopes	3,606	2; 4	Prime farmland if irrigated	0.55	5	High
71C/Warden silt loam, 5 to 12 percent slopes	601	3; 4	Farmland of statewide importance	0.55	5	High
70B/ Warden very fine sandy loam, 2 to 5 percent slopes	79	2; 4	Prime farmland if irrigated	0.55	--	Low
75B/Willis silt loam, 2 to 5 percent slopes	1,011	3; 3	Prime farmland if irrigated	0.55	3	High
75C/Willis silt loam, 2 to 5 percent slope	273	3; 3	Farmland of statewide importance	0.55	3	High
78/ Xeric Torriorthents, nearly level	245	3; 6	Farmland of statewide importance	0.24	3	High

IV.D.1.2 Potential Adverse Impacts to Soil

Construction

Proposed facility construction could result in adverse impacts to soils from construction activities such as clearing and grubbing vegetation, constructing access roads, hauling heavy equipment, and onsite fuel storage/fueling or maintaining construction equipment or vehicles.

Erosion, soil compaction, and fugitive dust impacts will occur as a result of construction activities. As indicated in ASC Exhibit I Table I-1, 89 percent (9,791 acres) of soils within the site boundary have a moderate to severe erosion hazard rating. Additionally, Morrow County has a semi-arid climate, leaving the fine silt and loam dominated soils within the facility site boundary dry for much of the year.

Impacts from clearing and grubbing vegetation will be minimized through limiting the extent of grading to the maximum extent practicable. The Department recommends Council impose Soil Protection Conditions 1 and 2 requiring that, prior to and during construction, the applicant be required to develop a Vegetation and Grading Plan that ensures grading activities are limited to areas where the slope and gradient are outside of panel and racking tolerances (typically 10% maximum on North slopes and 15% maximum in other directions). These are limitations the applicant represents can be met.

Recommended Soil Protection Condition 1 (PRE): Prior to construction of the facility or phase, as applicable, the certificate holder shall provide a Vegetation and Grading Plan that demonstrates contractors are required to adhere to the following:

a. Existing vegetation (e.g., crop stubble, fallow vegetation) and associated root systems shall be left intact to the maximum extent practicable.
b. Grading within solar arrays shall be limited to areas where the slope and gradient are outside of panel and racking tolerances (typically 10% maximum on North slopes and 15% maximum in other directions).

[PRE-SP-01; Final Order on ASC]

Recommended Soil Protection Condition 2 (CON): During construction, as applicable, the certificate holder shall require that contractors adhere to the requirements of the Vegetation and Grading Plan.
[CON-SP-01; Final Order on ASC]

Reestablishing vegetation is expected to be challenging given the local climate and site conditions. The Department, in consultation with ODAg, ODFW, and the Morrow County Weed Department recommends Council require additional measures to facilitate establishment of desirable species necessary to stabilize soils.[116]

[116] ODOE and ODAg Consultation Meeting on June 28, 2024. See consultation notes summary: SSPAPPDoc ODOE_ODAg Consultation_Reveg Plan 2024-06-28.

- Applicant shall quantify anticipated construction disturbance levels based on final layout and finalize the Reclamation and Revegetation Plan based on impacts associated with the final design/layout by disturbance level.
- Applicant shall prepare a crosswalk outlining the construction measures of the draft Reclamation and Revegetation Plan (Attachment G of this order), and a separate crosswalk outlining the revegetation measures of the plan to facilitate implementation by their contractors.
- Applicant shall hold a kick-off call with their contractors and ODOE prior to start of construction and again prior to start of revegetation to ensure all parties are prepared to implement the Reclamation and Revegetation Plan (Attachment G of this order) as written.
- Applicant shall develop revegetation methods for each disturbance level in consultation with ODOE, ODAg, ODFW, SWCD, NRCS, and the Morrow County Weed Department.
- Applicant shall provide the restoration and seeding contractor's qualifications and scope of work as a submittal to ODOE prior to construction.
- Applicant shall perform soil compaction testing prior to and after construction. If soil measurements demonstrate that the soils within the work areas are more than 10 percent compacted than the baseline condition, then remediation activities must be completed prior to initiation of revegetation activities.
- The applicant shall prepare a long-term monitoring plan for both temporary and permanent impact areas after five years of revegetation monitoring are complete, in consultation with ODOE, ODA, ODFW, SWCD, NRCS, and the Morrow County Weed Department.
- The applicant shall maintain the area within the fence line in a stabilized condition for the life of the facility. This will be demonstrated through submittal of regular monitoring reports and maintained through adaptive management actions if monitoring finds success criteria are not met.
- After the site has been prepared for installation of facility components (i.e., grading is complete), but prior to installation, the Applicant will seed all areas with less than 70 percent vegetative cover with a non-invasive, non-persistent cover crop (e.g., triticale). Establishment of a cover crop at this stage of construction will serve to stabilize soils and suppress noxious weed infestations to reduce erosion and dust pollution, and facilitate final revegetation with desired plant species.

Because revegetation is also a requirement for restoration of temporarily impacted habitat, the supporting conditions that requires preconstruction finalization and implementation of the plan during construction and operation is presented in Section IV.H., *Fish and Wildlife Habitat* of this order (see recommended Fish and Wildlife Habitat Condition 1, 2 and 3).

A National Pollutant Discharge Elimination System (NPDES) 1200-C construction permit and an Erosion and Sediment Control Plan (ESCP) are required for construction. This federally delegated permit is not within Council's jurisdiction; however, the applicant relies on the ESCP and Best Management Practices (BMPs) required by the permit in part to minimize erosion

impacts. A draft ESCP is provided in ASC Exhibit I Attachment I-1 and would be updated based on final facility design, prior to and during construction. The applicant also proposes to comply with the requirements of a Fugitive Dust Control Plan to minimize wind-borne erosion impacts. A draft Fugitive Dust Control Plan is provided in Attachment D of this order. Measures in this plan include monitoring, training and applying dust suppressants, and restricting traffic speeds on-site.

The Department recommends Council impose the following condition requiring that, prior to construction, the applicant obtain its NPDES 1200-C from DEQ, inclusive of a final ESCP, and that the applicant be required to finalize the Fugitive Dust Control Plan, as provided in Attachment D of this order, including verification of names and contact information of individuals responsible for implementation, measures to be implemented and forms to be used for monitoring and reporting.

> **Recommended Soil Protection Condition 3 (PRE):** Prior to construction of the facility or phase, as applicable, the certificate holder shall:
> a. Obtain a NPDES 1200-C Pemit from DEQ. A copy of the approved permit and attached Erosion and Sediment Control Plan (ESCP) must be submitted to the Department.
> b. Finalize the Fugitive Dust Control Plan, as provided in the Final Order on ASC Attachment D. Finalization includes verification of names and contact information of individuals responsible for implementation, measures to be implemented and forms to be used for monitoring and reporting.
> [PRE-SP-02; Final Order on ASC]

Under the 1200-C permit, an ESCP can be revised throughout construction to address numerous changes.[117] Because the 1200-C permit is a permit regulated by DEQ, but the applicant relies in part on the BMPs under the 1200-C ESCP to minimize erosion impacts under the Council's standards, the Department recommends Council include language in the condition that provides the *Department* the authority to require that changes be implemented in an ESCP, as presented below:

> **Recommended Soil Protection Condition 4 (CON):** During construction of the facility or phase, as applicable, the certificate holder shall:
> a. Conduct all work in compliance with the NPDES 1200-C Permit and Erosion and Sediment Control Plan (ESCP) or revised ESCP if applicable. The ESCP shall be revised if determined necessary by the certificate holder, certificate holder's contractor(s) or the Department. Any Department-required ESCP revisions shall be implemented

[117] DEQ Construction Stormwater Application and Forms Manual. Accessed June 11, 2023: wqp1200cInfo.pdf (oregon.gov), pg. 17-18. ESCP revisions under the 1200-C permit can be made for: emergency situations; registrant change of address; change in size of project; change in size or location of disturbed areas; changes to best management practices; changes in erosion and sediment control inspector; and changes in DEQ or agent requests.

within 14-days, unless otherwise agreed to by the Department based on a good faith effort to address erosion issues.

b. Conduct all work in compliance with the Fugitive Dust Control Plan. The Fugitive Dust Control Plan may be amended, as needed, to ensure that control measures are effective at the site.

[CON-SP-02; Final Order on ASC]

Under DEQ's 1200-C permit, the applicant is required to stabilize the site in order to obtain authorization from DEQ to terminate the permit. If not terminated, the monitoring and control measures of the ESCP remain applicable to site actions. The Department recommends Council find that reliance on the 1200-C for site stabilization is reasonable, however, it is a point in time following construction and does not address long-term site stabilization or revegetation that may be needed as result of ongoing operations and maintenance activities at the site. Therefore, to allow for the 1200-C to be used to demonstrate short-term site stabilization and require that the applicant ensure a long-term plan, the Department recommends Council impose the following condition:

Recommended Soil Protection Condition 5 (PRO): Following the termination of the NPDES 1200-C Permit, the certificate holder shall update the requirements of the Revegetation and Reclamation Plan, specific to the areas within the fenceline not occupied by facility infrastructure. Certificate holder shall provide evidence to the Department that the permit was terminated by DEQ.
[PRO-SP-01; Final Order on ASC]

Proposed facility construction will include onsite, temporary storage of diesel and gasoline. The fuel sources would be stored in 1,000 gallon, aboveground tanks, with self-contained secondary containment (e.g., double-walled containers) or would be placed in a constructed secondary containment area that is impervious and is diked or otherwise contained to provide the required fuel and precipitation capacity.[118] Secondary containment and refueling procedures for on-site fuel storage will follow a Spil Prevention Countermeasure and Control (SPCC) Plan. Secondary containment will be compliant with requirements in 40 CFR §112.7(c), which requires secondary containment for all above ground, buried, and partially buried containers.

The Department recommends Council adopt the following conditions, requiring the applicant to finalize and implement the SPCC Plan prior to and during facility construction.

Recommended Soil Protection Condition 6 (PRE): Prior to construction of the facility or phase, as applicable, the certificate holder must submit to the Department a Construction Spill Prevention Countermeasures and Control (SPCC) Plan.
[PRE-SP-03; Final Order on ASC]

[118] SSPAPPDoc25-02 Exhibit B Project Description, Section 2.5, 2.6, 3.5 and 4.9. 2024-05-15.

Recommended Soil Protection Condition 7 (CON): During construction, the certificate holder shall require that all onsite contractors and personnel adhere to the requirements of the SPCC Plan. Any SPCC revisions and updates shall be reported to the Department.
[CON-SP-03; Final Order on ASC]

Operation

Operational activities that could result in negative impacts to soil including erosion, compaction and contamination from solar panel washing, routine service maintenance of the facility components, and inadvertent spills from facility components.

The transformers associated with the solar panels would contain approximately 800 gallons of transformer oil per station. The substation transformers would contain approximately 16,000 gallons of transformer oil in total. Small quantities of lubricants, degreasers, herbicides, or other chemicals may be stored in the O&M building. Storage of these chemicals will follow label instructions. Spill kits containing items such as absorbent pads would be located on equipment and in on-site temporary storage facilities to respond to accidental spills.

Given the oil-containment capacity of the transformers, secondary containment and an SPCC are required. The Department recommends Council impose conditions to ensure that an operational SPCC is developed and implemented to address potential spill-related incidents during operations.

Recommended Soil Protection Condition 8 (PRO): Prior to operation, the certificate holder shall submit to the Department an Operational Spill Prevention Control and Countermeasures (SPCC) Plan.
[PRO-SP-02]

Recommended Soil Protection Condition 9 (OPR): During operation, the certificate holder shall adhere to the requirements of the Operational SPCC Plan. Any SPCC updates shall be described and included in the Annual Report to the Department. Certificate holder shall report spill and cleanup activities to the Department within 72 hours and shall make inspection records available to the Department upon request.
[OPR-SP-02]

IV.D.2. Conclusions of Law

Based on the foregoing analysis, and subject to compliance with the recommended conditions of approval as described above, the Department recommends Council find that the proposed facility is not likely to result in a significant adverse impact to soil.

IV.E. Land Use: OAR 345-022-0030

(1) To issue a site certificate, the Council must find that the proposed facility complies with the statewide planning goals adopted by the Land Conservation and Development Commission.

(2) The Council shall find that a proposed facility complies with section (1) if:

(a) The applicant elects to obtain local land use approvals under ORS 469.504(1)(a) and the Council finds that the facility has received local land use approval under the acknowledged comprehensive plan and land use regulations of the affected local government; or

(b) The applicant elects to obtain a Council determination under ORS 469.504(1)(b) and the Council determines that:

(A) The proposed facility complies with applicable substantive criteria as described in section (3) and the facility complies with any Land Conservation and Development Commission administrative rules and goals and any land use statutes directly applicable to the facility under ORS 197.646(3);

(B) For a proposed facility that does not comply with one or more of the applicable substantive criteria as described in section (3), the facility otherwise complies with the statewide planning goals or an exception to any applicable statewide planning goal is justified under section (4); or

(C) For a proposed facility that the Council decides, under sections (3) or (6), to evaluate against the statewide planning goals, the proposed facility complies with the applicable statewide planning goals or that an exception to any applicable statewide planning goal is justified under section (4).

(3) As used in this rule, the "applicable substantive criteria" are criteria from the affected local government's acknowledged comprehensive plan and land use ordinances that are required by the statewide planning goals and that are in effect on the date the applicant submits the application. If the special advisory group recommends applicable substantive criteria, as described under OAR 345-021-0050, the Council shall apply them. If the special advisory group does not recommend applicable substantive criteria, the Council shall decide either to make its own determination of the applicable substantive criteria and apply them or to evaluate the proposed facility against the statewide planning goals.

(4) The Council may find goal compliance for a proposed facility that does not otherwise comply with one or more statewide planning goals by taking an

exception to the applicable goal. Notwithstanding the requirements of ORS 197.732, the statewide planning goal pertaining to the exception process or any rules of the Land Conservation and Development Commission pertaining to the exception process, the Council may take an exception to a goal if the Council finds:

(a) The land subject to the exception is physically developed to the extent that the land is no longer available for uses allowed by the applicable goal;

(b) The land subject to the exception is irrevocably committed as described by the rules of the Land Conservation and Development Commission to uses not allowed by the applicable goal because existing adjacent uses and other relevant factors make uses allowed by the applicable goal impracticable; or

(c) The following standards are met:

(A) Reasons justify why the state policy embodied in the applicable goal should not apply;

(B) The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the Council applicable to the siting of the proposed facility; and

(C) The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.

(5) If the Council finds that applicable substantive local criteria and applicable statutes and state administrative rules would impose conflicting requirements, the Council shall resolve the conflict consistent with the public interest. In resolving the conflict, the Council cannot waive any applicable state statute.

(6) If the special advisory group recommends applicable substantive criteria for an energy facility described in ORS 469.300(11)(a)(C) to (E) or for a related or supporting facility that does not pass through more than one local government jurisdiction or more than three zones in any one jurisdiction, the Council shall apply the criteria recommended by the special advisory group. If the special advisory group recommends applicable substantive criteria for an energy facility described in ORS 469.300(11)(a)(C) to (E) or a related or supporting facility that passes through more than one jurisdiction or more than three zones in any one jurisdiction, the Council shall review the recommended criteria and decide whether to evaluate the proposed facility against the applicable substantive criteria recommended by the special advisory group, against the statewide planning goals or against a combination

of the applicable substantive criteria and statewide planning goals. In making the decision, the Council shall consult with the special advisory group, and shall consider:

(a) The number of jurisdictions and zones in question;

(b) The degree to which the applicable substantive criteria reflect local government consideration of energy facilities in the planning process; and

(c) The level of consistence of the applicable substantive criteria from the various zones and jurisdictions.[119]

IV.E.1. Findings of Fact

For this ASC, the applicant requested a Council determination under ORS 469.504(1)(b).

IV.E.1.1 Local Applicable Substantive Criteria

The Council's Land Use standard defines "applicable substantive criteria" as criteria from the affected local government's acknowledged comprehensive plan and land use ordinances that are required by the statewide planning goals and that are in effect on the date the applicant submits the application. The application was submitted to the Department on August 8, 2023; therefore, the applicable substantive criteria are based on those in effect on August 8, 2023.

The proposed site is located entirely within Morrow County on land zoned for Exclusive Farm Use (EFU). The proposed facility includes the following land uses and zones:

- Photovoltaic solar power generation facility, EFU zone
- Utility facilities necessary for public service, EFU,

Applicable substantive criteria for these uses within EFU zoned lands are presented in Table 4 below.[120]

[119] Administrative Order EFSC 1-2003, effective September 3, 2003.

[120] On July 27, 2022, the Morrow County Board of Commissioners, as Special Advisory Group for the review of the application, recommended potentially applicable substantive criteria from the Morrow County Zoning Ordinance (MCZO) and the Morrow County Comprehensive Plan (MCCP). Table 4 is consistent with the SAGs recommendations.

Table 4: Morrow County Applicable Substantive Criteria

Morrow County Zoning Ordinance (MCZO)	
*Article 1 – Introductory Provisions**	
Section 1.050	Zoning Permit
Article 3 – Use Zones	
Section 3.010	Exclusive Farm Use, EFU Zone
Article 4 – Supplementary Provisions	
Section 4.010	Access
Section 4.020	Site Distance
Section 4.035	Permit Requirements
Section 4.040	Off-Street Vehicle Parking Requirements
Section 4.070	Sign Limitations and Regulations
Section 4.165	Site Plan Review
Article 6 – Conditional Uses	
Section 6.020	General Criteria
Section 6.025	Resource Zone Standards for Approval
Section 6.030	General Conditions
Section 6.040	Permits and Improvements
Morrow County Comprehensive Plan	
Citizen Involvement Policies General Land Use Policies Agricultural Lands Policies Economic Policies Housing Policies Public Facilities and Services Policies Energy Policies	
*MCZO 1.030 provides definitions for words and phrases used within the Zoning Ordinance. These definitions have been referenced throughout this section where relevant.	

MCZO 1.050: Zoning Permit

Prior to the construction, reconstruction, alteration, or change of use of any structure larger than 100 square feet or use for which a zoning permit is required, a zoning permit for such construction, reconstruction, alteration, or change of use or uses shall be obtained from the Planning Director or authorized agent thereof. A zoning permit shall become void after 1 year unless the development action has commenced. A 12-month extension may be granted when submitted to the Planning Department prior to the expiration of the approval period. At the Planning Director's sole discretion, the Director may refer any Zoning Permit application to the Planning Commission for

> *consideration and decision, following notice and public hearing consistent with the public hearing procedures in Section 9.050.*

Because the proposed facility would be larger than 100 square feet, the applicant must obtain a Zoning Permit from the Morrow County Planning Director prior to construction under MCZO 1.050. As discussed in more detail below, solar photovoltaic power generation facilities are conditionally allowed use in Morrow County's EFU Zone, and as such, a Conditional Use Permit would also be required.

Under ORS 469.401(3), a site certificate is binding upon the County as to the approval of the site and the construction and operation of the facility. After issuance of the site certificate, the County must, upon submission by the applicant of the proper applications and payment of the proper fees, but without hearings or other proceedings, promptly issue any permits addressed in the site certificate, subject only to conditions set forth in the site certificate. The County has adopted an ordinance further describing how it will satisfy the requirements of ORS 469.401 under MCZO 6.015.

To ensure the applicant obtains the necessary local land use permits, the Department recommends the Council impose Land Use Condition 1, as presented below.

> **Recommended Land Use Condition 1 (PRE):** Prior to construction of the facility or phase, as applicable, the certificate holder must provide to the Department a copy of the approved Conditional Use Permit and applicable Zoning Permit(s). [PRE-LU-01; Final order on ASC]

As discussed in the evaluation of MCZO 4.165, a site plan review is also required for any use requiring a Zoning Permit in Morrow County and the Department recommends the Council impose Land Use Condition 8, requiring the applicant to obtain final site plan approval from the Department prior to construction.

<u>MCZO 3.010.B.25 and D.10: Utility Facilities Necessary for Public Service</u>

> *B. Uses Permitted Outright. In the EFU zone, the following uses and activities and their accessory buildings and uses are permitted subject to the general provisions set forth by this ordinance:*
>
> ** * * * **
>
> *25. Utility facilities necessary for public service, including associated transmission lines as defined in Article 1 and wetland waste treatment systems, but not including commercial facilities for the purpose of generating electrical power for public use by sale or transmission towers over 200 feet in height as provided in Subsection D.10.*

* * * * *

Under MCZO 3.010.B.25 and the underlying provisions of ORS 215.274, when processed as a separate use, an associated transmission line with support structures under 200 feet in height is a use permitted outright in Morrow County's EFU zone if it meets the criteria under MCZO 3.010.D.10. Under MCZO 1.030, and ORS 469.300 and 215.274, an "associated transmission line" is a transmission line constructed "to connect an energy facility to the first point of junction with either a power distribution system or an interconnected primary transmission system or both or to the Northwest Power Grid."

The applicant asserts that the overhead 230-kV transmission lines are associated transmission lines that should be evaluated as a separate use from the energy facility, rather than as an accessory use.[121] As described in Section III.A., *Proposed Facility Components*, the two 230-kV transmission lines proposed as part of the facility would connect the six proposed collector substations to the proposed switchyard, which is the facility's point of interconnection with the Umatilla Electric Cooperative's 230-kV Blue Ridge transmission line. All transmission support structures would be under 200 feet tall. Because the transmission lines connect the energy facility to its point of interconnection and have support structures less than 200 feet tall, the Department recommends the Council find that the lines may be considered associated transmission lines. As such, an evaluation of compliance with the use standards in MCZO 3.010.D.10 is provided below.

** * * * **

D. Use Standards

** * * * **

10. A utility facility that is necessary for public service.

** * * * **

b. An associated transmission line is necessary for public service upon demonstration that the associated transmission line meets either the following requirements of Subsection (1) or Subsection (2) of this Subsection.

(1) An applicant demonstrates that the entire route of the associated transmission line meets at least one of the following requirements:

(a) The associated transmission line is not located on high-value farmland, as defined in ORS 195.300, or on arable land;

[121] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Sections 5.2.1.1 and 5.2.2.3.

(b) The associated transmission line is co-located with an existing transmission line;

(c) The associated transmission line parallels an existing transmission line corridor with the minimum separation necessary for safety; or

(d) The associated transmission line is located within an existing right of way for a linear facility, such as a transmission line, road or railroad, that is located above the surface of the ground.

(2) After an evaluation of reasonable alternatives, an applicant demonstrates that the entire route of the associated transmission line meets, subject to Subsections D.10.b(3) and (4), two or more of the following criteria:

(a) Technical and engineering feasibility;

(b) The associated transmission line is locationally-dependent because the associated transmission line must cross high-value farmland, as defined in ORS 195.300, or arable land to achieve a reasonably direct route or to meet unique geographical needs that cannot be satisfied on other lands;

(c) Lack of an available existing right of way for a linear facility, such as a transmission line, road or railroad, that is located above the surface of the ground;

(d) Public health and safety; or

(e) Other requirements of state or federal agencies.

(3) As pertains to Subsection (2), the applicant shall demonstrate how the applicant will mitigate and minimize the impacts, if any, of the associated transmission line on surrounding lands devoted to farm use in order to prevent a significant change in accepted farm practices or a significant increase in the cost of farm practices on the surrounding farmland.

(4) The county may consider costs associated with any of the factors listed in Subsection (2), but consideration of cost may not be the only consideration in determining whether the associated transmission line is necessary for public service.

To be considered necessary for public service, an associated transmission line must either satisfy the requirements of MCZO 3.010.D.10.b.(1) or (2). The applicant acknowledges that the

entire proposed 230-kV transmission line route does not meet the requirements of MCZO 3.010.D.10.b.(1) but asserts that it does meet the requirements of subsection (2).[122]

As a threshold matter, MCZO 3.010.D.10.b.(2) first requires the applicant to demonstrate that it has considered reasonable alternatives to placing the line within an EFU zone. The evaluation of "reasonable alternatives" does not require an evaluation of all alternative EFU zoned routes on which the transmission line could be located.[123] Rather, the applicant must consider reasonable alternatives and show that the transmission line must be sited on EFU-zoned land to provide the service. The proposed 230 kV transmission lines would interconnect the six proposed collector substations to the proposed facility switchyard. ASC Exhibit K Figure K-2 demonstrates that there is no non-EFU zoned land between the proposed substations and switchyard.

The Department therefore recommends that the Council find that alternative transmission line routes have been evaluated and that no reasonable alternatives that would avoid EFU land exist within the land use analysis area.

To meet the requirements of subsection (2), the applicant must demonstrate that at least two out of the five criteria discussed below are satisfied, and how the applicant will mitigate and minimize the impacts, if any, of the associated transmission line on surrounding lands devoted to farm use.

Technical and engineering feasibility

MCZO 3.010.D.10.b.(2)(a) provides that an applicant may demonstrate that the proposed transmission line must be sited in an EFU zone due to technical and engineering feasibility constraints. The Council interprets this factor as requiring a demonstration that technical or engineering constraints, such as extreme topographic features, cannot be overcome but for facility engineering through EFU-zoned land.

The applicant, in contrast, evaluates alternative routes with potentially lessor impacts to arable and high-value farmland, but does not address any specific engineering or technical constraints that necessitate siting on EFU-zoned lands. This is not consistent with the Council's interpretation of this factor. The Department recommends Council find that there are not technical or engineering constraints, such as extreme topographic features, that cannot be overcome but for siting the proposed 230 kV transmission lines through EFU zoned land and therefore, MCZO 3.010.D.10.b.(2)(a) is not satisfied.

Locational Dependence

[122] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.3.

[123] *Sprint PCS v. Washington Cnty*., 186 Or. App. 470, 479, 63 P.3d 1261, 1266 (2003).

To meet the criterion under MCZO 3.010.D.10.b.(2)(b), the applicant must demonstrate that the associated transmission line must cross high-value farmland or arable land to achieve a reasonably direct route or to meet unique geographical needs that cannot be satisfied on other lands. As described in the evaluation of MCZO 3.010.C.24 and K.3 below, the entire site is composed of arable land and there are 4,950 acres of high-value farmland within the site. Because the transmission lines are needed to connect components within the site, there is likely no reasonably direct alternative that would completely avoid all arable or high-value farmland land.[124] In addition, the non-arable portions of the site are located within Sand Hollow and do not provide a reasonably direct route between the proposed collector substations and the Blue Ridge line. Because the associated transmission line must cross arable land to achieve a reasonably direct route from the proposed collector substations to the 230-kV Blue Ridge Line, the Department recommends the Council find the locational dependence criterion under MCZO 3.010.D.10.b.(2)(b) is satisfied.

Lack of existing right-of-way

To meet the criterion under MCZO 3.010.D.10.b.(2)(c), the applicant must demonstrate that there is not an existing right of way for a linear facility, such as a transmission line, road or railroad, that is located above the surface of the ground available for the siting of the transmission line. The applicant represents that it has sited the proposed transmission lines within or adjacent to existing linear rights-of-way to the greatest extent practicable.[125] A portion of the southern transmission line route would be constructed within the public right-of-way of Bombing Range Road, and a portion would cross Doherty Road and the Lexington-Echo Highway. The applicant does not provide evidence or explain why additional rights-of-way near or adjacent to the proposed collector substation sites, such as Alpine Lane, Grieb Lane, and the Lexington Echo Highway were not available, but instead asserts that the proposed transmission line routes provide the most direct connection between collector substations, regardless of whether it is located within a public right of way (ROW).

This criterion requires transmission line siting within existing rights of way, unless it can be demonstrated that those rights-of-way are not available or suitable for siting. The Department recommends Council impose a condition requiring that, prior to transmission line construction, evidence be provided to the Department demonstrating that the applicant coordinated with Morrow County Public Works Department and Oregon Department of Transportation on the feasibility of utilizing the existing ROW for siting of the transmission lines. The Department recommends that Council require that the transmission line be sited in the existing road ROW unless Morrow County Public Works Department and Oregon Department of Transportation confirm that it is not feasible for either planning, safety or similar reasons.

> **Recommended Land Use Condition 2 (PRE)**: Prior to construction of the 230 kV transmission lines, the certificate holder shall demonstrate to the Department that the

[124] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15., Figure K-8, Arable and Non-Arable Soils.
[125] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.3.

transmission lines will be sited within the exiting road rights-of-way, unless Morrow County Public Works Department and Oregon Department of Transportation, as applicable, confirm that use of the existing road rights-of-way is not feasible. [PRE-LU-02; Final Order on ASC]

Based on compliance with the above recommended condition, the Department recommends the Council find that the lack of available rights of way criterion under MCZO 3.010.D.10.b.(2)(c) is satisfied.

Public health and safety

To meet the criterion under MCZO 3.010.D.10.b.(2)(d), the applicant must demonstrate that the proposed associated transmission line must be sited on EFU zoned land for public health and safety reasons. The applicant represents that the route of the associated transmission line was not selected based on health and safety reasons.[126] Accordingly, the Department recommends the Council find that this criterion is not satisfied.

Other State and Federal Requirements

To meet the criterion under MCZO 3.010.D.10.b.(2)(e), the applicant must demonstrate that the proposed associated transmission line must be sited on EFU zoned land to meet other requirements of state or federal agencies. The applicant represents that the route of the associated transmission line was not selected to meet the requirements of state or federal agencies.[127] Accordingly, the Department recommends the Council find that this criterion is not satisfied.

MCZO 3.010.D.10.b.(2) Summary

The Department recommends the Council find the applicant has demonstrated that there are no reasonable alternatives to placing the associated transmission line within EFU lands because the associated transmission line is locationally-dependent and, based on evidence to be provided prior to construction, either existing road ROWs will be used for siting of the transmission line or it will be demonstrated that there is a lack of availability in the existing road ROW.

Under MCZO 3.010.D.10.b.(3), the applicant must demonstrate how it will mitigate and minimize the impacts, if any, of the associated transmission line on surrounding lands devoted to farm use in order to prevent a significant change in accepted farm practices or a significant increase in the cost of farm practices on the surrounding farmland. As described below, the facility has been designed to minimize impacts on accepted farm practices on adjacent lands. Because the associated transmission line would be sited entirely within the proposed facility

[126] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.3.
[127] *Id*.

footprint, within the rights-of-way of existing roads, or within lands not currently used for agricultural purposes, the Department recommends the Council find the requirements of MCZO 3.010.D.(b)(3) are satisfied.

Because the associated transmission line would satisfy two of the criteria listed in MCZO 3.010.D.10.b.(2) and the requirements of (3), the Department recommends the Council find the requirements of MCZO 3.010.D.10 are satisfied, and that the associated transmission line is permitted in Morrow County's EFU Zone as a utility facility necessary for public service.

MCZO 3.010.C.24 and K.3: Commercial Photovoltaic Solar Power Generation Facilities

> *C. Conditional Uses. The following uses are permitted subject to county review, any specific standards for the use set forth in Section D, Article 6, the general standards for the zone, and any other applicable standards and review process in the ordinance:*
>
> ** * * * **
>
> *24. Photovoltaic solar power generation facilities as commercial utility facilities for the purpose of generating power for public use by sale subject to Subsection K.3.*

The proposed facility, including the energy facility and its related or supporting facilities, is a "photovoltaic solar power generation facility" as defined in MCZO 3.010.K.3.e. Under MCZO 3.010.C.24, a commercial photovoltaic solar power generation facility for the purpose of generating power for public use by sale is a conditionally permitted use in Morrow County's EFU Zone, subject to the approval criteria in MCZO 3.010.K.3.[128]

> ** * * * **
>
> *K. Commercial Facilities for Generating Power*
>
> ** * * * **
>
> *3. Photovoltaic Solar Power Generation Facility. A proposal to site a photovoltaic solar power generation facility shall be subject to the following definitions and provisions:*
>
> *a. "Arable land" means land in a tract that is predominantly cultivated or, if not currently cultivated, predominantly comprised of arable soils.*

[128] MCZO 3.010.K.3 implements the provisions of OAR 660-033-0130(38).

b. "Arable soils" means soils that are suitable for cultivation as determined by the governing body or its designate based on substantial evidence in the record of a local land use application, but "arable soils" does not include high-value farmland soils described at ORS 195.300(10) unless otherwise stated.

c. "Nonarable land" means land in a tract that is predominantly not cultivated and predominantly comprised of nonarable soils.

d. "Nonarable soils" means soils that are not suitable for cultivation. Soils with an NRCS agricultural capability class V–VIII and no history of irrigation shall be considered nonarable in all cases. The governing body or its designate may determine other soils, including soils with a past history of irrigation, to be nonarable based on substantial evidence in the record of a local land use application.

e. "Photovoltaic solar power generation facility" includes, but is not limited to, an assembly of equipment that converts sunlight into electricity and then stores, transfers, or both, that electricity. This includes photovoltaic modules, mounting and solar tracking equipment, foundations, inverters, wiring, storage devices and other components. Photovoltaic solar power generation facilities also include electrical cable collection systems connecting the photovoltaic solar generation facility to a transmission line, all necessary grid integration equipment, new or expanded private roads constructed to serve the photovoltaic solar power generation facility, office, operation and maintenance buildings, staging areas and all other necessary appurtenances. For purposes of applying the acreage standards of this Section, a photovoltaic solar power generation facility includes all existing and proposed facilities on a single tract, as well as any existing and proposed facilities determined to be under common ownership on lands with fewer than 1320 feet of separation from the tract on which the new facility is proposed to be sited. Projects connected to the same parent company or individuals shall be considered to be in common ownership, regardless of the operating business structure. A photovoltaic solar power generation facility does not include a net metering project established consistent with ORS 757.300 and OAR chapter 860, division 39 or a Feed-in-Tariff project established consistent with ORS 757.365 and OAR chapter 860, division 84.

Under MCZO 3.010.K.3, the standards for approval of a solar facility proposed in an EFU Zone depend, in part, on whether the land on which the facility is proposed to be sited is classified as high-value farmland, arable land, or non-arable land. As described in Section III, the proposed site boundary encompasses approximately 10,960 acres of land. Up to 9,442 of those acres would be permanently occupied by the proposed facility. The proposed site is made up of all or

part of seven tracts.[129] In total, the seven tracts include approximately 11,314 acres of EFU zoned land.[130]

As defined in MCZO 3.010.K.3., "arable land" means land in a tract that is predominantly cultivated or, if not currently cultivated, predominantly comprised of soils determined to be suitable for cultivation based on substantial evidence in the record of a local land use application. "Nonarable land" means land in a tract that is predominantly not cultivated and predominantly comprised of soils determined to not be suitable for cultivation. Soils in capability class V–VIII with no history of irrigation are considered nonarable in all cases.

Approximately 213 acres of the site boundary within Sand Hollow are comprised of nonarable soils, however, all the tracts within the site boundary are currently predominantly cultivated and are therefore considered either arable land or high-value farmland.[131]

The determination of whether land is non-arable, arable, or high-value farmland is based, in part, on the land capability classification established National Cooperative Soil Survey operated by the Natural Resources Conservation Service for the soils underlying the tract. Soil units are categorized as Class I to VIII, with Class I being the soils that are most productive for agriculture, and Class VIII being the least. Soil units may also be classified as prime or unique, or as farmland of statewide importance.

The classification of a particular soil unit depends, in part, on whether the land containing the soil unit is irrigated. An area of land is considered to be irrigated if it is currently watered by an artificial or controlled means or has established rights to use water for irrigation. An area or tract within a water or irrigation district that was once irrigated continues to be considered "irrigated" even if the irrigation water is removed or transferred to another tract.[132]

There are three current groundwater place-of-use water rights within the site boundary:

- Water Right Certificate 43515 authorizes the irrigation of 2,831.9 acres of land within the site boundary. The certificate has a priority date of July 19, 1967, and is the most senior water right in the West subarea of the Butter Creek Critical Ground Water Area (CGWA). The water associated with this right was historically applied as supplemental water for wheat crops, but no water has been used since at least 2017.

- Water Right Certificate 38473 authorizes the irrigation of 36.3 acres of land within the site boundary. The certificate has a priority date of March 13, 1967, and is junior to 16

[129] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.4, Figure K-3. A "tract" includes all contiguous lots or parcels under the same ownership.
[130] Table K-2, K-3. Throughout the remainder of this section, the seven tracts combined are referred to as the "subject property."
[131] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 3.3.3.2.
[132] MCZO 1.030 and OAR 660-033-0020(9).

other groundwater rights in the Pine City subarea of the Butter Creek CGWA. The water associated with this right was historically used to water livestock and pasture within the sand hollow area, but the landowner has indicated that the source well is not viable and has not requested or been allocated groundwater since at least 2005.[133]

- Water Right Certificate 62326 authorizes the irrigation of 494.6 acres, half of which are in the site boundary. This certificate has a priority date of June 24, 1970, and is the most junior water right in the Pine City subarea of the Butter Creek CGWA. The water associated with this right was historically used for pivot irrigation, but no water has been requested or allocated since 1997.[134]

Figure 4, below, shows the authorized places of use associated with the water rights in relation to the proposed site boundary and the underlying tracts. Table 5 summarizes the irrigation status and soil capability classification of lands within each tract.

As defined in MCZO 1.030, "high-value farmland" includes, in relevant part, land in a tract composed predominantly of soils that are classified Class I or II, prime, or unique. As shown in Table 5, Tracts 4, 5, and 7 all contain, but are not composed predominately of, high-value farmland soils and are not considered high-value farmland for this reason. Under ORS 195.300(10)(c), high-value farmland includes land within the authorized place of use of a water right, and land located within the boundaries of an American Viticultural Area meeting certain elevation, slope, and aspect criteria.[135] As described above, there are three authorized places of use for water rights in the site boundary which encompass approximately 3,115 acres in total. In addition, approximately 2,433 acres of the site boundary are considered high-value farmland due to their location within the authorized place of use of a water right or the Columbia Valley AVA.[136] After adjusting for areas of overlap, there are approximately 4,950 acres of high-value farmland within the site boundary, including 4,414 acres within the permanent disturbance footprint of the energy facility.

[133] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 3.3.1.3.
[134] *Id*.
[135] ORS 195.300(10)(c)(A), (e), and (f).
[136] See also SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.4.

Figure 4: Tracts and Water Rights within the Analysis Area

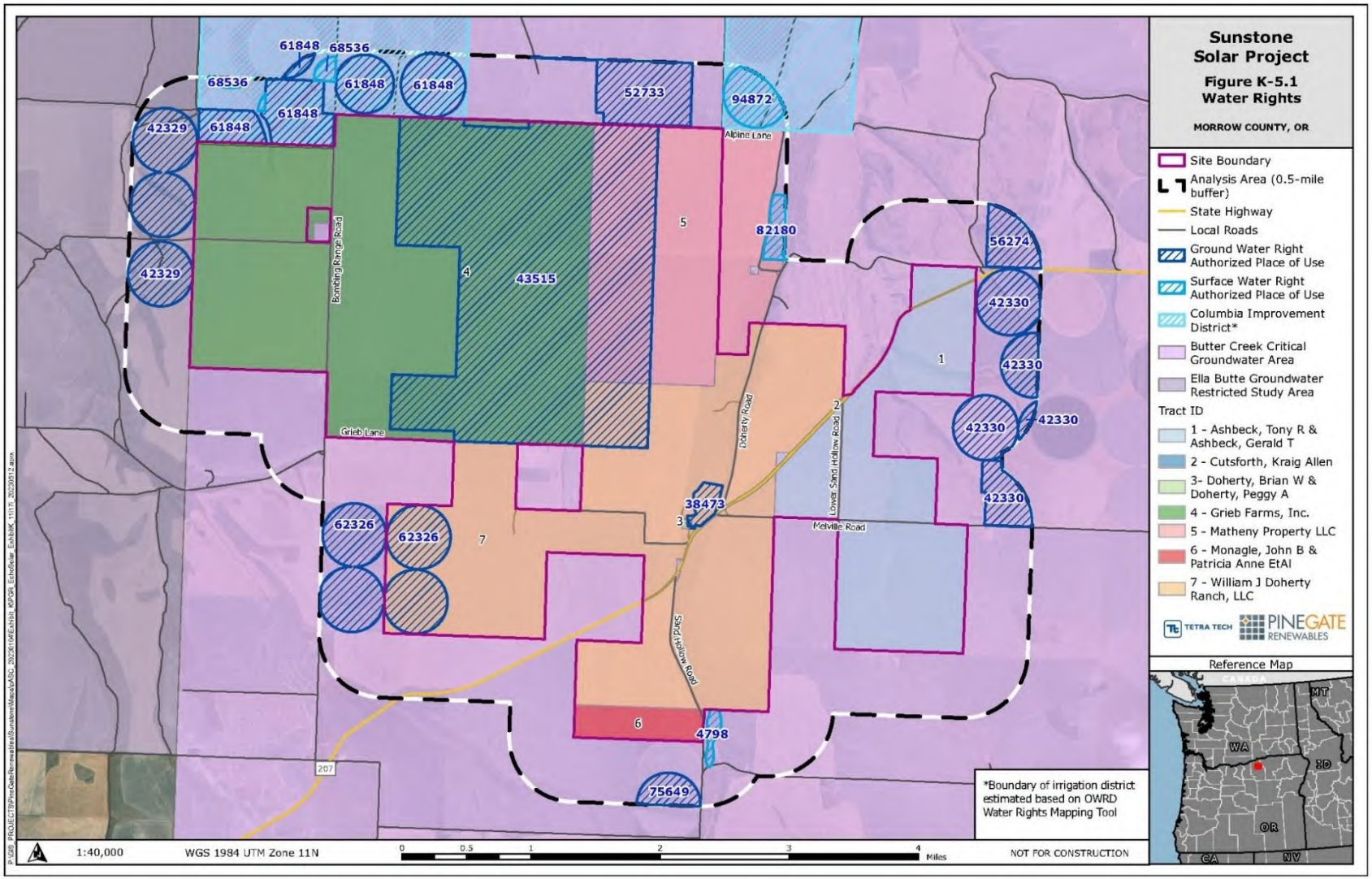


Table 5: High-Value Farmland Soils and Water Rights within the Subject Property

Tract	Owner	Total Acres	Water Rights				High-value Farmland Soils	
			38473[1]	43515[2]	62326[3]	Total Irrigated Acres[4]	Class I, II, Prime, and Unique Soils[5]	Percent of Tract
1	Ashbeck, Tony R & Ashbeck, Gerald T	1,548	0	0	0	0	0	0%
2	Cutsforth, Kraig Allen	1	0	0	0	0	0	0%
3	Doherty, Brian W & Doherty, Peggy A	2	1	0	0	1	0	0%
4	Grieb Farms, Inc	4,356	0	2,016	0	2,016	1,909	44%
5	Matheny Property LLC	1,706	0	650	0	650	599	35%
6	Monagle, John B & Patricia Anne Et al	160	0	0	0	0	0	0%
7	William J Doherty Ranch, LLC	3,541	35	166	247	449	406	11%
Total		**11,314**	**36**	**2,832**	**248**	**3,115**	**2,914**	**26%**

Notes:
[1] Source well not viable; no water allocation since at least 2005.
[2] Available allocations below requested minimum; no water used since at least 2017.
[3] No water requested or used since at least 1997.
[4] "Irrigated Acres" represent acres that could be irrigated based on identified water rights. No irrigation has occurred since 2017 or earlier.
[5] All high-value farmland soils were categorized as such based on their irrigated capability class. No Class I, II, prime or Unique soils were identified in non-irrigated portions of the site.
Source: SSPAPPDoc25-11 ASC Exhibit K Land Use, Table K-2. 2024-05-15.

> *f. For high-value farmland described at ORS 195.300(10), a photovoltaic solar power generation facility shall not preclude more than 12 acres from use as a commercial agricultural enterprise unless an exception is taken pursuant to ORS 197.732 and OAR chapter 660, division 4 or the requirements of paragraph (7) are met. * * **

As described above, the facility would occupy up to 4,414 acres of high-value farmland, and the applicant does not claim that the requirements of MCZO 3.010.K.3.f.(7) are met. Accordingly, an exception to the acreage standard in MCZO 3.010.K.3.f. must be taken to find that the proposed facility complies with the Council's Land Use Standard.

> *(1) The proposed photovoltaic solar power generation facility will not create unnecessary negative impacts on agricultural operations conducted on any portion of the subject property not occupied by project components. Negative impacts could include, but are not limited to, the unnecessary construction of roads dividing a field or multiple fields in such a way that creates small or isolated pieces of property that are more difficult to farm, and placing photovoltaic solar power generation facility project components on lands in a manner that could disrupt common and accepted farming practices;*

The site boundary encompasses approximately 10,960 of the 11,314 acres that make up the subject property. As described in Section III, up to 9,442 acres of land within the site boundary would be occupied by facility components. A cultivated field within Tract 5 occupies approximately 380 of the acres outside of the site boundary.[137] As shown in Figure 1 (C-2), approximately 1,518 acres within the site boundary are excluded from development. This includes approximately 489 acres of cultivated fields in Tract 7, areas within Sand Hollow, and areas immediately adjacent to dwellings.

The owners of Tract 5 and Tract 7 have indicated that they intend to continue farming the retained fields after the construction and operation of the proposed facility.[138] The fields are located on the edges of the subject property and are accessible by existing roads. Under Recommended General Standard Condition 1, the facility will be constructed and operated substantially as described in the site certificate and these areas are identified in the site certificate figures and description, this ensure that no solar facility components would be sited within or otherwise interfere with common and accepted farming practices in these areas. While the majority of the subject property would be occupied by the proposed facility, the Department recommends the Council find that, subject to compliance with Recommended General Standard Condition 1, the design, construction and operation of the facility will not create unnecessary negative impacts on agricultural operations conducted on portions of the subject property not occupied by project components. Accordingly, the Department recommends the requirements of MCZO 3.010.K.3.f.(1) are satisfied.

[137] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Table K-5.

[138] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Attachment K-1.

There are three tax lots owned by nonparticipating landowners that are entirely surrounded by the site boundary. Tax Lots 02N26E000001201 and 02N26E000001202 are owned by Gas Transmission Northwest and are the site of a compressor station for the pipeline that crosses the site, and as such, are not available for farm use.[139] Tax Lot 01N26E000000800 is owned by North Lex Power and Land, LLC, and while the lot is partially within the site boundary of Wheatridge Renewable Energy Facility I, at least a portion of the land is currently leased by the OSU Columbia Basin Agricultural Research Center for dryland crop research.[140] Potential impacts to agricultural practices on this, and other surrounding lots, are discussed more in under the evaluation of compliance with MCZO 6.025.

> *(2) The presence of a photovoltaic solar power generation facility will not result in unnecessary soil erosion or loss that could limit agricultural productivity on the subject property. This provision may be satisfied by the submittal and county approval of a soil and erosion control plan prepared by an adequately qualified individual, showing how unnecessary soil erosion will be avoided or remedied and how topsoil will be stripped, stockpiled and clearly marked. The approved plan shall be attached to the decision as a condition of approval;*

In Section IV.D., of this Order, the Department recommends the Council find that, subject to compliance with conditions of approval, the design, construction and operation of the facility are not likely to result in a significant adverse impact to soils including, but not limited to, erosion. Specifically, the Vegetation and Grading Plan required under recommended Soil Protection Conditions 1 and 2 would bind the applicant to its commitments to implement a minimal grading approach. The minimal grading approach includes applying criteria where grading is necessary, specifically to areas where slope is 10% maximum north-facing, 15% maximum in any other direction or other relatively unique undulations that are identified that would not support infrastructure installation unless graded.

In addition, recommended Soil Protection Condition 4 would require all construction activities at the site to be conducted in accordance with an Erosion and Sediment Control Plan approved as part of the applicant's National Pollutant Discharge Elimination System (NPDES) 1200-C Construction Stormwater Permit; and that onsite construction activities adhere to the monitoring and control measures of a Fugitive Dust Control Plan. Accordingly, the Department recommends the Council find that the requirements of MCZO 3.010.K.3.f.(2) are satisfied.

> *(3) Construction or maintenance activities will not result in unnecessary soil compaction that reduces the productivity of soil for crop production. This provision may be satisfied by the submittal and county approval of a plan prepared by an adequately qualified individual, showing how unnecessary soil*

[139] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.3.

[140] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.4.

> *compaction will be avoided or remedied in a timely manner through deep soil decompaction or other appropriate practices. The approved plan shall be attached to the decision as a condition of approval;*

As described above, in Section IV.D., *Soil Protection*, of this order, the Department recommends the Council find that, subject to compliance with conditions of approval, the design, construction and operation of the facility are not likely to result in a significant adverse impact to soils. Specifically, the Vegetation and Grading Plan required under recommended Soil Protection Conditions 1 and 2 would bind the applicant to its commitments to implement a minimal grading approach (i.e., grading in areas where slope is 10% maximum north-facing, 15% maximum in any other direction or other relatively unique undulations that are identified that would not support infrastructure installation unless graded). Accordingly, the Department recommends the Council find that the requirements of MCZO 3.010.K.3.f.(3) are satisfied.

> *(4) Construction or maintenance activities will not result in the unabated introduction or spread of noxious weeds and other undesirable weed species. This provision may be satisfied by the submittal and county approval of a weed control plan prepared by an adequately qualified individual that includes a long-term maintenance agreement. The approved plan shall be attached to the decision as a condition of approval;*

Under ORS 569.175, noxious weeds are plants designated by the Oregon State Weed Board as a top priority for action by weed control programs. Under the Oregon Department of Agriculture's Noxious Weed Classification System, weeds are included on either the A or B Weed List and may also be included on the T list. A-listed weeds are weeds of economic importance that are subject to eradication or intensive control when found due to their limited distribution. B-listed weeds are subject to limited to intensive control as determined on a site-specific bases, with biological control being the preferred primary control method. T-listed weeds have been identified as a priority for control by the Oregon State Weed Board. Morrow County has developed its own Noxious Weed Lists classifying weeds as either "Noxious Weeds" (A list) or "Weeds of Economic Importance" (B list), where the B-listed weeds are subject to intensive control or eradication where feasible.

The applicant identified occurrences of four listed noxious weed during the 2022 rare plant and habitat categorizations surveys discussed in Section IV.H., *Fish and Wildlife Habitat*, the species, their classifications, and the frequency and location of the weed observations are provided in Table 6, below. The Department notes that surveys did not appear to include the currently cultivated lands on which the energy facility is proposed to be sited, and as such, observations were generally located outside of permanent disturbance footprint of the proposed facility.

Table 6: Noxious Weeds Observed During 2022 Surveys

Scientific Name	Common Name	Oregon State Status[1]	Morrow County Status[1]	Frequency
Aegilops cylindrica	Jointed goatgrass	B	B	Few small patches found in highly disturbed area in Sand Hollow between active cropland and roads.
Chondrilla juncea	Rush skeletonweed	B*, T	A	Occasional single plants and isolated small populations found in Sand Hollow on hillside between active cropland and a gravel county road.
Secale cereale	Cereal rye	Not listed	B	Scattered large-sized patches found in Sand Hollow and previously disturbed areas outside of active crop fields immediately to the North of the site.
Tribulus terrestris	Puncturevine	B*	B	Few small to large-sized patches found in the highly disturbed border in between active cropland to the North of site and roads.
*Indicated biological control methods preferred as primary contol method.				

A draft Noxious Weed Control Plan in Attachment E of this order. The draft plan contains the applicant's proposed methods to prevent the introduction and spread of designated noxious weeds from proposed facility construction and operation, control existing populations of noxious weeds within construction areas, and monitor the success of efforts to prevent and control noxious weeds. The Department has proposed revisions to provide additional clarity and more stringent requirements where appropriate based on consultation and comments from ODFW, Morrow County, and other reviewing agencies including the US Fish and Wildlife Service.[141]

The draft plan indicates that the applicant will take the following preventative actions to prevent the spread of weeds at the site:

- Training site personnel to identify and prevent the spread of noxious weeds;
- Flagging areas of noxious weed infestations prior to construction;

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- Limiting vehicle access to designated routes and limiting vehicle traffic in noxious weed-infested areas;
- Installing wash stations and cleaning vehicles and equipment;
- Isolating or treating soils from infested areas;
- Revegetating temporarily disturbed areas as soon as practicable;
- Ensuring that seed and straw mulch used for site rehabilitation and revegetation are certified free of noxious weed seed and propagules;
- Monitoring areas of disturbance for noxious weed.

The draft plan also indicates that existing noxious weed populations will be prevented from expanding or spreading to new sites and eradicated where practicable through mechanical or chemical treatments and explains the types of treatments that may be used. Based on comments from the Morrow County Weed Department, the draft plan also requires the use of biological controls when possible, consistent with the requirements of the County and the State Noxious Weed Policy.

The draft plan proposes that final monitoring methods will be determined in the final plan submitted prior to construction, but provides that monitoring for noxious weeds will occur at least once in the spring, June, July, August and in the fall during the first five years following construction to capture the different life cycles of noxious weed species and that the results will be discussed with the Department and County Weed Department at least once per season and provided in annual monitoring report. The plan allows the applicant to request to reduce the monitoring frequency after the first two years of monitoring based on progress toward success criteria.

In addition to provisions for the control of listed noxious weeds, the draft plan contains monitoring requirements and success criteria for the control of annual invasive grasses such as cheatgrass. The unabated spread of these species can adversely impact habitat, increase fire risk, and impair the establishment of native species needed to ensure compliance with the Revegetation Plan required under Recommended Fish and Wildlife Condition 1.

Because it may not be feasible to eliminate all noxious weeds from the site, the draft plan also includes success criteria recommended by the Department to ensure that noxious weed populations are contained at minimal levels. The draft plan limits Class A and B listed species to no more than 15 total populations and limits Class T listed species to no more than 5 total populations; with all populations consisting of no more than 20 individual plants or 20 square feet. The draft plan also contains success criteria for the management of annual invasive grasses and noxious weeds located outside of the energy facility footprint to ensure consistency with the requirements of the Revegetation Plan required under Recommended Fish and Wildlife Condition 1.

The Department recommends the Council find that, subject to compliance with the requirements of the revised draft Noxious Weed Control Plan, the construction and operation

of the proposed facility will not result in the unabated introduction or spread of noxious weeds and other undesirable weed species. The Department recommends the Council impose Recommended Land Use Condition 2 requiring the applicant to submit a final Noxious Weed Control Plan to the Department, for review and approval in consultation with the Morrow County Weed Department before beginning construction of the facility.

> **Recommended Land Use Condition 3 [PRE]:** Prior to construction of the facility or phase, as applicable, the certificate holder shall finalize the draft Noxious Weed Control Plan, as provided in the Final Order on ASC Attachment E, and submit to the Department for review and approval in consultation with the Morrow County Weed Department.
> [PRE-LU-03; Final Order on ASC]

The Department further recommends the Council impose the Land Use Conditions 3 and 4, requiring that the Revegetation Plan, as finalized per the recommended condition above, be implemented and adhered to for the first five years following the beginning of construction and to develop a long-term weed monitoring plan for the remainder of operations.

> **Recommended Land Use Condition 4 [CON]:** During construction, the certificate holder shall implement and adhere to the Noxious Weed Control Plan required under Condition PRE-LU-03.
> [CON-LU-01; Final Order on ASC]

> **Recommended Land Use Condition 5 [OPR]:** Following the fifth year of monitoring under the Noxious Weed Control Plan required under PRE-LU-03, the certificate holder shall submit a Long-term Noxious Weed Monitoring Plan to the Department, for review and approval. The certificate holder shall implement the plan for the remainder of the facility's operating life.
> [OPR-LU-01]

> *(5) The project is not located on high-value farmland soils unless it can be demonstrated that:*
>
> *(a) Non high-value farmland soils are not available on the subject tract;*
>
> *(b) Siting the project on non high-value farmland soils present on the subject tract would significantly reduce the project's ability to operate successfully; or*
>
> *(c) The proposed site is better suited to allow continuation of an existing commercial farm or ranching operation on the subject tract than other possible sites also located on the subject tract, including those comprised of non highvalue farmland soils; and*

As shown in Table 5, above, the proposed site includes approximately 3,115 acres that are within the authorized place of use of a water right, including 2,914 acres comprised of soils that are considered high-value when irrigated. When not irrigated, these soils generally have a capability class of Class III or IV and would be considered arable soils.

The facility design/layout excludes approximately 1,518 acres of the site, including approximately 489 acres of cultivated fields in Tract 7, areas within Sand Hollow, and areas immediately adjacent to dwellings, from the siting of energy facility components. The largest exclusion area is the area within Sand Hollow. This area is not comprised of high-value or arable soils; however, it is not suitable for the solar arrays due to its topography and location within a flood hazard area. This area also contains higher quality fish and wildlife habitat than is available on the rest of the site, and siting facility components within this area would increase the proposed facility's impacts and mitigation obligations for these resources. Accordingly, the Department recommends the Council find that siting the project on non-high-value or non-arable soils within Sand Hollow would significantly reduce the project's ability to operate successfully.

The cultivated fields in Tract 7 that are excluded from development, are also not located on high-value farmland soils based on irrigation status but have higher non-irrigated capability class (III) than the "irrigated" portions (Class IV). In addition, these fields, and the 380-acre field in Tract 5 that is outside of the proposed site boundary, are located on the edge of the subject property in an area that will not be affected by project components and are accessible from public roads. As described above, the owners of Tract 5 and 7 have indicated that they intend to continue farming these fields following construction and operation of the facility. Accordingly, the Department recommends that the Council find the proposed site is better suited to allow continuation of existing commercial farm operations on the subject tract than possible sites within the excluded fields in Tract 5 and 7.

Additional patches of high-value farmland soil associated with the Columbia Valley AVA are also dispersed throughout the site. Because these soils are distributed throughout the site, large contiguous areas of non-high value soils are not available on the site. Accordingly, the Department recommends the Council find that siting the proposed facility in a manner that completely avoids AVA-related high-value farmland soils would significantly reduce the proposed facility's ability to operate successfully.

Because the areas of non-high-value soils within Sand Hollow are not available for the siting of energy facility components, the non-high-value soils located on the other portions of the site not used by the facility are better suited for continued farm operations, and because complete avoidance of Columbia Valley AVA soils would significantly reduce the proposed facility's ability to operate successfully, the Department recommends the Council find the criterion under MCZO 3.010.K.3.f.(5) is satisfied.

(6) A study area consisting of lands zoned for exclusive farm use located within one mile measured from the center of the proposed project shall be established and:

(a) If fewer than 48 acres of photovoltaic solar power generation facilities have been constructed or received land use approvals and obtained building permits within the study area, no further action is necessary.

(b) When at least 48 acres of photovoltaic solar power generation have been constructed or received land use approvals and obtained building permits, either as a single project or as multiple facilities within the study area, the local government or its designate must find that the photovoltaic solar energy generation facility will not materially alter the stability of the overall land use pattern of the area. The stability of the land use pattern will be materially altered if the overall effect of existing and potential photovoltaic solar energy generation facilities will make it more difficult for the existing farms and ranches in the area to continue operation due to diminished opportunities to expand, purchase or lease farmland or acquire water rights, or will reduce the number of tracts or acreage in farm use in a manner that will destabilize the overall character of the study area.

Due to the size of the proposed facility, the area within 1 mile of the center of the proposed site boundary is almost entirely located within the proposed site. Portions of the 1-mile study area overlap with the approved site boundaries of Wheatridge Renewable Energy Facility I and Wheatridge Renewable Energy Facility III; however, the overlapping portions are less than 48 acres. Accordingly, the Department recommends the Council find that no further action is required to find that the proposed facility complies with the provisions of MCZO 3.010.K.3.f.(6); however, as discussed further in the evaluation of MCZO 6.025, because the facility would occupy more than 48 acres of EFU lands by itself, the Department recommends the Council find that the construction and operation of the proposed facility has the potential to materially alter the stability of the overall land use pattern of the area.

(7) A photovoltaic solar generation facility may be sited on more than 12 acres of high-value farmland described in ORS 195.300(10)(f)(C) without taking an exception pursuant to ORS 197.732 and OAR chapter 660, division 4, provided the land:

(a) Is not located within the boundaries of an irrigation district;

(b) Is not at the time of the facility's establishment, and was not at any time during the 20 years immediately preceding the facility's establishment, the place of use of a water right permit, certificate, decree, transfer order or ground water registration authorizing the use of water for the purpose of irrigation;

(c) Is located within the service area of an electric utility described in ORS 469A.052(2);

(d) Does not exceed the acreage the electric utility reasonably anticipates to be necessary to achieve the applicable renewable portfolio standard described in ORS 469A.052(3); and

(e) Does not qualify as high-value farmland under any other provision of law.

As described above, the applicant does not claim that the requirements of MCZO 3.010.K.3.f.(7) are met, and the facility would be sited on more than 12 acres of high-value farmland. Accordingly, the Department recommends the Council find that an exception to the acreage standard in MCZO 3.010.K.3.f. must be taken to find that the proposed facility complies with the Council's Land Use Standard.

*g. For arable lands, a photovoltaic solar power generation facility shall not preclude more than 20 acres from use as a commercial agricultural enterprise unless an exception is taken pursuant to ORS 197.732 and OAR chapter 660, division 4. * * **

As described above, the facility would occupy up to 9,442 acres of arable land. Accordingly, the Department recommends the Council find that an exception to the acreage standard in MCZO 3.010.K.3.g. must be taken to find that the proposed facility complies with the Council's Land Use Standard.

(1) The project is not located on high-value farmland soils or arable soils unless it can be demonstrated that:

(a) Nonarable soils are not available on the subject tract;

(b) Siting the project on nonarable soils present on the subject tract would significantly reduce the project's ability to operate successfully; or

(c) The proposed site is better suited to allow continuation of an existing commercial farm or ranching operation on the subject tract than other possible sites also located on the subject tract, including those comprised of nonarable soils;

(2) No more than 12 acres of the project will be sited on high-value farmland soils described at ORS 195.300(10) unless an exception is taken pursuant to 197.732 and OAR chapter 660, division 4;

(3) A study area consisting of lands zoned for exclusive farm use located within one mile measured from the center of the proposed project shall be established and:

(a) If fewer than 80 acres of photovoltaic solar power generation facilities have been constructed or received land use approvals and obtained building permits within the study area no further action is necessary.

(b) When at least 80 acres of photovoltaic solar power generation have been constructed or received land use approvals and obtained building permits, either as a single project or as multiple facilities, within the study area the local government or its designate must find that the photovoltaic solar energy generation facility will not materially alter the stability of the overall land use pattern of the area. The stability of the land use pattern will be materially altered if the overall effect of existing and potential photovoltaic solar energy generation facilities will make it more difficult for the existing farms and ranches in the area to continue operation due to diminished opportunities to expand, purchase or lease farmland, acquire water rights or diminish the number of tracts or acreage in farm use in a manner that will destabilize the overall character of the study area; and

(4) The requirements of Subsections K.3.f(1), (2), (3), and (4) are satisfied.

The Department recommends the Council find that demonstration of compliance with the stricter requirements for a facility proposed to be sited on high-value farmland under MCZO 3.010.K.3.f also satisfy the requirements for a facility proposed to be sited on arable land under MCZO 3.010.K.3.g.

h. For nonarable lands, a photovoltaic solar power generation facility shall not preclude more than 320 acres from use as a commercial agricultural enterprise unless an exception is taken pursuant to ORS 197.732 and OAR chapter 660, division 4. The governing body or its designate must find that:

(1) The project is not located on high-value farmland soils or arable soils unless it can be demonstrated that:

(a) Siting the project on nonarable soils present on the subject tract would significantly reduce the project's ability to operate successfully; or

(b) The proposed site is better suited to allow continuation of an existing commercial farm or ranching operation on the subject tract as compared to other possible sites also located on the subject tract, including sites that are comprised of nonarable soils;

(2) No more than 12 acres of the project will be sited on high-value farmland soils described at ORS 195.300(10);

(3) No more than 20 acres of the project will be sited on arable soils unless an exception is taken pursuant to ORS 197.732 and OAR chapter 660, division 4;

(4) The requirements of Subsection K.3.f(4) are satisfied

(5) If a photovoltaic solar power generation facility is proposed to be developed on lands that contain a Goal 5 resource protected under the county's comprehensive plan, and the plan does not address conflicts between energy facility development and the resource, the applicant and the county, together with any state or federal agency responsible for protecting the resource or habitat supporting the resource, will cooperatively develop a specific resource management plan to mitigate potential development conflicts. If there is no program present to protect the listed Goal 5 resource(s) present in the local comprehensive plan or implementing ordinances and the applicant and the appropriate resource management agency(ies) cannot successfully agree on a cooperative resource management plan, the county is responsible for determining appropriate mitigation measures; and

The proposed facility would be sited entirely on high-value farmland or arable land. As such, the provisions of MCZO 3.010.K.3.h are not applicable to the proposed facility.

i. The project owner shall sign and record in the deed records for the county a document binding the project owner and the project owner's successors in interest, prohibiting them from pursuing a claim for relief or cause of action alleging injury from farming or forest practices as defined in ORS 30.930(2) and (4).

The applicant represents that it will comply with the requirements of MCZO 3.010.K.3.i.[142] Consistent with this representation, and the ordinance, the Department recommends the Council impose Recommended Land Use Condition 6, as presented below.

Recommended Land Use Condition 6 (PRE): Prior to construction of the facility or phase, as applicable, the certificate holder must submit an executed document prohibiting the certificate holder, and the certificate holder's successors in interest, from pursuing a claim for relief or cause of action alleging injury from farming or forest practices as defined in ORS 30.930(2) and (4), and provide evidence that the document has been recorded in the deed records for Morrow County.
[PRE-LU-04]

[142] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.4.

Subject to compliance with this condition, the Department recommends the Council find that the requirements of MCZO 3.010.K.3.i are satisfied.

> *j. Nothing in this Section shall prevent the county from requiring a bond or other security from a developer or otherwise imposing on a developer the responsibility for retiring the photovoltaic solar power generation facility.*

MCZO 3.010.K.3.j allows for the governing body to require a bond or letter of credit for the amount necessary to retire the facility during decommissioning. Recommended Retirement and Financial Assurance Condition 4 would require that, prior to construction, the applicant obtain and provide to the Department a bond or letter of credit in the specified amount recommended by considered by Council as satisfactory for facility decommissioning. Based upon compliance with this condition, the Department recommends Council conclude that the requirements under MCZO 3.010.K.3.j would be satisfied.

MCZO 3.010.M: Yards.

> *In an EFU Zone, the minimum yard setback requirements shall be as follows:*
>
> *1. The front yard setback from the property line shall be 20 feet for property fronting on a local minor collector or marginal access street ROW, 30 feet from a property line fronting on a major collector ROW, and 80 feet from an arterial ROW unless other provisions for combining accesses are provided and approved by the County.*
>
> *2. Each side yard shall be a minimum of 20 feet except that on corner lots or parcels the side yard on the street side shall be a minimum of 30 feet.*
>
> *3. Rear yards shall be a minimum of 25 feet[.]*
>
> *4. Stream Setback. All sewage disposal installations such as outhouses, septic tank and drainfield systems shall be set back from the high-water line or mark along all streams and lakes a minimum of 100 feet, measured at right angles to the high-water line or mark. All structures, buildings, or similar permanent fixtures shall be set back from the high-water line or mark along all streams or lakes a minimum of 100 feet measured at right angles to the high-water line or mark.*

The applicant represents the proposed solar arrays, inverters, and O&M buildings, would meet the minimum front yard setbacks under MCZO 3.010.M.1 for all property fronting minor collector Sand Hollow Road (20 feet), major collector Bombing Range Road (30 feet), and arterial Highway 207 (80 feet), as well as the minimum side and rear yard setbacks (25-30 feet) under MCZO 3.010.M.2 and M.3 along the perimeter of the site boundary. In addition, the applicant represents that the O&M buildings would meet the minimum side and rear yard (25-

30 feet) setback under MCZO 3.010.M.2 and M.3 along the internal property lines not adjacent to minor collector, major collector, or arterial roads.[143] The applicant makes no specific representations with regards to properties fronting other access roads, including Grieb Lane, Alpine Lane, Doherty Road, or Melville Road.

Under MCZO 7.100.B.2, fences not interfering with the vision clearance requirements of MCZO 4.020 may occupy a yard and not impact setback requirements. The proposed facility's compliance with MCZO 4.020 is evaluated below. In addition, the Council, in consultation with the County, has previously found that compliance with side and rear yard setbacks is not required between two lots that are both occupied by a facility with no intervening use or public right-of-way.[144]

Under MCZO 3.010.M.4, all facility structures and the on-site septic systems that would be constructed at the four proposed O&M buildings must be set back at least 100 feet from the high-water mark along any streams within the site boundary. As discussed in Section V.B, there are 19 delineated waterways within the site boundary, all of which consist of ephemeral streams within Sand Hollow. The applicant represents that it will document consistency with the applicable setbacks through the Site Plan Review required under MCZO 4.165.[145] In accordance with the requirements of OAR 345-025-0006(10), the Department recommends the Council impose Land Use Condition 7 requiring compliance with the applicable setback requirements, as presented below.

> **Recommended Land Use Condition 7 (PRE):** Prior to construction of the facility or phase, as applicable, the certificate holder shall demonstrate that the final design adheres to the following setbacks:
>
> a. All facility structures and above-ground components except the perimeter fenceline must be sited:
>
> 1. At least 20 feet from a property line fronting the right-of-way of a local minor collector or marginal access street, including but not limited to Sand Hollow Road, Grieb Lane, Alpine Lane, Doherty Road, or Melville Road.
> 2. At least 30 feet from a property line fronting the right-of-way, of a major collector, including but not limited to, Bombing Range Road.
> 3. At least 80 feet from a property line fronting the right-of-way for an arterial road, including but not limited to State Highway 207.
>
> b. All facility structures, and all on-site septic systems or other sewage disposal systems must be set back at least 100 feet from delineated waterways.
>
> [PRE-LU-05; Final Order on ASC]

[143] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.5.

[144] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.5, citing Final Order on Request for Amendment 4 of the Site Certificate for the Wheatridge Wind Facility, p. 36-37.

[145] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.1.5.

Recommended Land Use Condition 8, presented in the evaluation of MCZO 4.165, would require the applicant to document consistency with any applicable setback requirements through the Site Plan Review required under MCZO 4.165.

MCZO 3.010.N: Transportation Impacts

> *1. Traffic Impact Analysis (TIA). In addition to the other standards and conditions set forth in this section, a TIA will be required for all projects generating more than 400 passenger car equivalent trips per day. Heavy vehicles – trucks, recreational vehicles and buses – will be defined as 2.2 passenger car equivalents. A TIA will include: trips generated by the project, trip distribution for the project, identification of intersections for which the project adds 30 or more peak hour passenger car equivalent trips, and level of service assessment, impacts of the project, and, mitigation of the impacts. If the corridor is a State Highway, use ODOT standards. (MC-C-8-98)*

As discussed in Section IV.M.1.5; the applicant estimates that on average, the construction of the facility will generate 910 commuting trips and 250 truck trips per day over approximately 1,224 construction workdays (about 47 months). At the peak of construction, the applicant estimates a maximum of approximately 1,266 commuting trips per day and 250 truck trips per day.[146] The applicant provided a detailed Traffic Impact Analysis (TIA) as Attachment U-6 of ASC Exhibit U. Traffic impacts are anticipated to be temporary, intermittent, and minimal on most affected roadways, but some short-term traffic delays are expected during large component deliveries and some significant impacts could occur on OR-207, bombing range road, and Grieb Lane due to high-volumes of commuter related traffic. The TIA estimates that during peak construction periods, LOS during peak hour traffic would not be affected at the majority of affected roads and intersections, but that LOS at the intersection of OR-207 and Grieb Lane could be reduced from LOS A to LOS B during both the AM and PM peak commuting hours.

The applicant provided a Construction Traffic Management Plan as Attachment U-7 of ASC Exhibit U which provides the applicant's proposed measures to mitigate and minimize traffic impacts. The Traffic Management Plan was created to become part of a Road Use Agreement executed with the County; the Draft Road Use Agreement with Traffic Management Plan are included as Attachment N to this order. The Department recommends the Council impose Public Services Conditions 1 and 2 to require the applicant to finalize a Road Use Agreement with the County which includes a Traffic Management Plan prior to construction and implement the plan during construction. The Department recommends the Council find that, subject to compliance with these conditions, the proposed facility complies with the requirements of MCZO 3.010.N.

[146] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.2.3.2; 2.4.7.1. All trips are one way (e.g. 910 commuter trips include 455 worker vehicles travelling to and from the site.)

MCZO 4.010: Access

* * *

This ordinance shall apply to all public roadways under the jurisdiction of Morrow County and to application for development for any property that abuts these roadways.

This ordinance is adopted to implement the land access and access management policies of Morrow County as set forth in the Transportation System Plan. Access shall be provided based on the requirements below.

MCZO 4.010 provides minimum lot frontage requirements, and access and access spacing requirements applicable to development in Morrow County. MCZO 4.010.B, C, E, and H apply to the proposed facility.

B. Access Permit Requirement. Where access to or construction on a county road is needed, an access permit or right-of-way permit from Morrow County Public Works department is required subject to the requirements in this Ordinance. Where access to a state highway is needed, an access permit from ODOT is required as part of the land use application. Where access is needed to a road managed by the Forest Service or other entity, an access permit or other authorization from the appropriate entity shall be required as part of the land use application.

As discussed in Section III.A.2.9., *Access Road and Service Roads*, the applicant proposes to construct up to 55 miles of access roads, which will provide access to the site from private and county roads and state highways, including Lower Sand Hollow Road, Melville Road, Sand Hollow Road, Doherty Road, Grieb Lane, and OR-207. The applicant represents that all necessary construction permits, including access permits, will be obtained by the applicant's construction contractor.[147]

While MCZO 4.010.B. requires all state or federal access permits to be provided as part of the land use application, when an applicant relies on a permit or approval that will be issued to a third party, the Council's Organizational Expertise Standard allows the Council to approve an application for site certificate subject to the condition that the third party obtain the necessary permit or approval and the applicant secure a contract or other arrangement with the third-party prior to the beginning of construction.

As described in Section IV.B.1.2, recommended Organizational Expertise Condition 2 would require the applicant to identify its construction contractors prior to the beginning of

[147] SSPAPPDoc25-05 ASC Exhibit E Permits 2024-05-15, Table E-1; SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.1.

construction, and Organizational Expertise Condition 12 would require the applicant to provide evidence that all necessary permits for construction of the facility were obtained by the contractors prior to construction. Subject to compliance with these conditions, the Department recommends the Council find that the requirements of MCZO 4.010.B. are satisfied.

> *C. Emergency Vehicle Access. It is the responsibility of the landowner to provide appropriate access for emergency vehicles at the time of development. A dead-end private street exceeding one hundred-fifty (150) feet in length shall have an adequate turn around facility approved by the appropriate Fire Marshal or, if the Fire Marshal fails to review the private street, approval by the Building Official or his designee.*

As discussed in Section III.2.A.9, the applicant proposes to construct up to 55 miles of access roads. The applicant represents that appropriate access for emergency vehicles will be provided and that facility roads will be sufficiently sized for emergency vehicle access, and will be reviewed by the Fire Marshal or, if the Fire Marshal fails to review, the Building Official prior to construction of each phase.[148]

As discussed in Section IV.M., *Public Services*, the proposed facility is within the boundaries of the Ione Rural Fire Protection District (Ione RFPD), and the Department recommends the Council find that the Fire Chief for the Ione RFPD is the appropriate fire official to review emergency vehicle access for the proposed facility.

As presented in the evaluation of compliance with MCZO 4.165, below, the Department recommends that the Council impose Land Use Condition 8, requiring, in part, that the applicant demonstrate compliance with the emergency vehicle access standards in MCZO 4.010.C through the site plan review. Subject to compliance with this condition, the Department recommends the Council find the requirements of MCZO 4.010 are satisfied.

> *E. Access Spacing Requirements for Development Accessing State Highways. Applications for development with access onto state highways shall be provided to ODOT for review, to ensure consistency with adopted ODOT Access Management Standards shown in Table 4.010-1. These standards apply only to unsignalized access points. Where a right of access exists, a property shall be allowed to have access onto a state highway at less than adopted access spacing requirements only if all the following conditions are met:*
>
> *1. The property does not have reasonable access via an alternative to the state highway;*

[148] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.1.

2. There are no other possible access options along the parcel's highway frontage; and

3. The access spacing standards cannot be accomplished.

When a proposed access onto a state highway does not meet the access spacing standards in Table 4.010-1, a deviation from standard will be considered by the ODOT Region Manager, subject to requirements in OAR 734-051-0135.

[Table 4.010-1 Omitted]

The facility, as proposed, would have access points onto OR-207, and would be subject to the requirements of MZCO 4.010.E and OAR 734-051-0135. The portion of OR-207 that crosses through the site boundary has a Posted Speed of 55 mph. As provided in Table 4.010-1, any unsignalized access onto OR-207 must be spaced at least 700 ft apart. The applicant represents that accesses to OR-207 will meet the applicable spacing standards.[149]

As discussed in the evaluation of MCZO 4.165 below, the Department recommends the Council impose Land Use Condition 8 requiring, in part, that the applicant demonstrate compliance with the access spacing standards in MCZO 4.010.E through the site plan review.

H. Access Spacing Requirements for Development Accessing County Facilities. All developments shall have legal access to a County or public road. Except for interim access as provided in Section 4.010 H [Interim Access], access onto any County road in the unincorporated or incorporated urban area shall be permitted only upon issuance of an access permit upon demonstration of compliance with the provisions of the County road standards and the standards of Section 4.010. For County roadways designated as major collector or arterial in the Transportation System Plan, the standards in Table 4.010-2 apply for intersections created by a new public roadway, new private roadway or new private driveway. For County roadways designated as minor collectors or local access roads, intersections created by a new public roadway, new private roadway or new private driveway shall meet minimum County traffic safety and operational requirements, including sight distance, as determined by the County Engineer.

[149] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.1.

TABLE 4.010-2
ACCESS MANAGEMENT STANDARDS FOR MORROW COUNTY ROADWAYS

	Access Spacing Standards for Public or Private Access (ft)		
Classification	Public Roadway	Private Roadway	Private Driveway[a]
Arterial	600	600	300
Collector	300	300	100
Local	200	200	Access to each lot

a. For most roadways, at-grade crossings are appropriate. Also, allowed moves and spacing requirements may be more restrictive than those shown to optimize capacity and safety. Any access to a state highway requires a permit from the district office of ODOT and is subject to the access spacing standards in Table 4.010-1 in this section.

No use will be permitted to have direct access to a street or road except as specified below, or as provided in Section 4.010.H (Interim Access). Access spacing shall be measured from existing or approved accesses on either side of a street or road. Measurements shall be made from easement or right-of-way line to easement or right-of-way line. [Note Omitted]

1. All minimum distances stated in the following sections shall be governed by sight distance requirements according to this Ordinance and applicable County Road Standards.

2. All minimum distances stated in the following sections shall be measured to the nearest easement line of the access or edge of travel lane of the access on both sides of the road.

3. The minimum curb radius shown in the diagram below (i.e., distance from Point "A" to Point "B") shall be 15 feet. In areas zoned for industrial uses, the minimum curb radius shall be 30 feet. At intersections between facilities classified as major collector, arterial or highway, any new or modified intersection shall be designed to accommodate a WB-50 Semitrailer Design Vehicle. If either route is designated by the County as a truck route, the intersection shall be designed to accommodate a WB-65 Interstate Semitrailer Design Vehicle. The curb alignment shall be designed so that the design vehicle can complete a right turn without entering a lane used by opposing traffic.

4. All minimum distances between accesses shall be measured from existing or approved accesses on both sides of the road.

5. Minimum spacing between driveways shall be measured from Point "D" to Point "D" as shown below (i.e., the edges of adjacent driveways closest to each other).

6. In all instances, access points near an intersection with a Collector or Arterial shall be located beyond the influence of standing queues of the intersection in accordance with AASHTO standards. Additionally, access shall be located beyond the back of any left turn refuge either existing on the affected road or required to accommodate the proposed development. This requirement may result in an access spacing greater than one hundred (100) feet in the case of a collector, or 300 feet in the case of an arterial.

7. Access onto local roads will not be permitted within ten (10) feet of Point "B" as shown below. If no radius exists, access will not be permitted within twenty-five (25) feet of Point "A".

8. Access onto collector roads will not be permitted within fifty (50) feet of Point "B" as shown below. If no radius exists, access will not be permitted within sixty-five (65) feet of Point "A". Where a common or shared access is available it shall be used, provided that such use will not result in operational or safety problems. Minimum spacing between driveways shall be one-hundred (100) feet.

9. Direct access to an arterial will be permitted provided that Point 'C' of such access is more than three hundred (300) feet from any intersection Point 'A' or other access to that minor arterial.

The applicant represents that accesses to County rights-of way will comply with the access standards provided in MCZO 4.010.H.[150] As discussed in the evaluation of MCZO 4.165 below, the Department recommends that Council impose Land Use Condition 8 requiring, in part, that the applicant demonstrate compliance with the access spacing standards in MCZO 4.010.H through the site plan review.

MCZO 4.020: Sight Distance

SECTION 4.020. SIGHT DISTANCE. In all zones, adequate sight distance shall be maintained at the intersection of two roads (public or private), a road intersecting a private driveway, or a road crossing a railroad.

A. Sight Distance Requirements for New Accesses. It is the intent of this section to ensure that each new access point or each new lot or parcel created or development in the County will have a safe access to a public road, with the exception of development actions listed in Section 4.020.B. but are subject to improvements to maximize sight distance to the extent practicable by the County Operations Division through an Access Permit or Right-of-way Permit:

[150] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.1.

1. Existing access points that do not satisfy the sight distance standards and are on property included with a development action which will not add any additional vehicle trips to that access, are exempt from this Section. Improvements at these existing access points may be required of the applicant to maximize sight distance to the extent practicable through an Access Permit application.

2. The minimum intersectional sight distance shall be based on the vehicular speeds of the road. The vehicular speeds for the purpose of determining intersectional sight distance shall be the greater of the following, to be selected by the County Engineer or designee.

a. Design Speed - A speed selected by a registered engineer (Oregon) for purposes of design and correlation of those features of a road, such as curvature, superelevation, and sight distance, upon which the safe operation of vehicles is dependent.

b. Posted Speed - That speed which has been established by the Oregon State Speed Control Board and is posted by the County.

c. Eighty-fifth Percentile Speed - That speed as certified by a registered engineer (Oregon) below which 85 percent of all traffic units travel, and above which 15 percent travel. The eighty-fifth percentile speed shall be measured at the point where the sight restriction occurs.

3. The intersectional sight distance shall:

a. Be based on an eye height of 3.5 feet and an object height of 4.25 feet above the road; and

b. Be assumed to be 10 feet from the near edge of pavement or the extended curb line or the near edge of the graveled surface of a gravel road to the front of a stopped vehicle.

4. Minimum intersectional sight distance shall be equal to ten (10) times the vehicular speed of the road such as in the table below.

[TABLE OMITTED]

5. Intersectional sight distance values shall conform to (3) above. For significant road improvement projects, the above intersectional standards shall be met in addition to the applicable AASHTO roadway sight distance standards.

6. In those instances where there are no access locations available to the site that meet or can meet the sight distance requirements, a written request for modification may be submitted to the County Engineer or designee. The request for modification of the sight distance requirements shall be subject to the following requirements:

a. Submitted and certified by a registered engineer (Oregon);

b. Nationally accepted specifications or standards are documented and referenced;

c. Certification that the modification will not compromise safety or the intent of the County's transportation standards;

d. Agreement that the cost of any modifications agreed to must be borne by the applicant; and

e. Statement that there is no location available to provide an alternative access location which currently meets the sight distance requirements, or which can be altered to meet the sight distance requirements. Alterations needed to provide adequate sight distance include but are not limited to grading and the removal of vegetation. For the purpose of this subsection alternative access location means:

i. Any location on the proposed development site which meets or can meet the sight distance requirements; or

ii. Any location off the proposed development site which can provide access to the site by an existing access easement or through an access easement which will be provided to the site as part of the development application. Such an off-site access must be shown to meet or be able to meet sight distance requirements.

B. Accesses Exempt from Sight Distance Requirements. Accesses for the following development actions are exempt from the Sight Distance standards (Section 4.020.A), but are subject to improvements to maximize sight distance to the extent practicable by the County Operations Division through an Access Permit or Right-of-way Permit:

1. Replacement dwellings;

2. Nonbuildable parcels;

3. Applications for one dwelling on an existing vacant parcel;

> *4. Home Occupation applications in the EFU, FU, SF-40, FR-2 and RR-1 zones; or*
>
> *5. Applications which will not add additional vehicle trips to an existing access which does not meet the sight distance standards.*

As described in Section III.A.2., the applicant proposes to construct approximately 52 new access gates, many of which are assumed to enter the site from new approaches. The applicant represents that all facility approaches will maintain adequate sight distances as required by MCZO 4.020.A.[151]

As discussed in the evaluation of MCZO 4.165 below, the Department recommends the Council impose Land Use Condition 8 requiring, in part, that the applicant demonstrate compliance with the sight distance requirements in MCZO 4.020 through the site plan review.

MCZO 4.035: Permit Requirements for Land Use Development

> *Except where otherwise noted, all proposed projects should meet the following Plot Plan Requirements as described in Table 4.035-1 below. A common threshold for a TIA (traffic impact analysis) applying to all types of development is 400 daily trips (e.g., 40 houses). Trip generation should be estimated using the current edition of Trip Generation by the Institute of Transportation Engineers, other similar published resources, or actual driveway counts of similar land uses. The County Planning Commission, County Planning Director or County Public Works Director or designee may require a TIA for any level of development. TIA requirements are described in the Appendix.*
>
> *A. Consent to Participate Agreement Required. For those Local roads which are not improved in accordance with Morrow County Road Standards or maintained by the County, and which abut the property owner's proposed development or which do not abut the development but provide direct access to the development, the property owner shall sign a consent to participate agreement for the potential formation of a local improvement district or other mechanism to improve and maintain these roads to County standards, per the Morrow County standard Consent to Participate Agreement. Applications for property line adjustments, nonbuildable parcels, temporary housing permits, land partitions in resource zones, and one dwelling on an existing vacant parcel, are not subject to this requirement. For those Arterial and Collector roads which are not improved in accordance with Morrow County Road Standards and which abut the development site or those roads which do not*

[151] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.2.

abut the development site but provide access to the site, the property owner shall sign a consent to participate agreement for the potential formation of a local improvement district or other mechanism to improve the base facility of this road(s) to County standards, per the Morrow County standard Consent to Participate Agreement. Applications for property line adjustments, nonbuildable parcels, temporary housing permits, land partitions in resource zones, and one dwelling on an existing vacant parcel, are not subject to this requirement.

* * *

As discussed in Section IV.M.1.5, the applicant provided a detailed Traffic Impact Analysis (TIA) as Attachment U-6 of ASC Exhibit U. Traffic impacts are anticipated to be temporary, intermittent, and minimal on most affected roadways, but some short-term traffic delays are expected during large component deliveries and some significant impacts could occur on OR-207, bombing range road, and Grieb Lane due to high-volumes of commuter related traffic. While no significant improvements to County roads are anticipated during construction and operation of the facility, the applicant provided a draft Road Use Agreement as Attachment U-8 of ASC Exhibit U. The agreement requires the applicant to assess road conditions prior to construction, complete any road improvements or maintenance as needed to maintain compliance with County Standards, and to ensure that all roads used for construction are returned to at least their pre-construction condition following the completion of construction. The Department recommends the Council impose Public Services Condition 1 to require the applicant to finalize the Road Use Agreement prior to construction and submit the executed agreement to the Department and adhere to the final agreement during construction. Subject to compliance with this condition, the Department recommends the Council find the proposed facility satisfies the requirements of MCZO 4.035.

<u>MCZO 4.040: Off-Street Vehicle Parking</u>

Because vehicle parking facilities can occupy large amounts of land, they must be planned and designed carefully to use the land efficiently while maintaining the visual character of the community. At the time of construction, reconstruction, or enlargement of a structure, or at the time a use is changed in any zone, off-street parking space shall be provided as follows unless greater requirements are otherwise established. When the requirements are based on the number of employees, the number counted shall be those working on the premises during the largest shift at peak season. Fractional space requirements shall be counted as a whole space. Off-street parking spaces may include spaces in garages, carports, parking lots, and/or driveways if vehicles are not parked in a vehicle travel lane (including emergency or fire access lanes), public right-of- way, pathway or landscape area. The County may allow credit for "on-street parking", as provided in Section 4.050. For uses not specified in Table 4.040-1, parking requirements

shall be determined by the use in Table 4.040-1 found to be most similar in terms of parking needs.

Table 4.010-1 does not specify off-street parking requirements for commercial photovoltaic solar power generation facilities, and as such parking requirements must be determined based on the use found to be most similar in terms of parking needs. Because the facility would not be open to the public, and would only be staffed on a limited basis, the Department recommends the Council find that the most similar use in the Table would be an industrial storage warehouse or manufacturing establishment. The minimum vehicle parking requirements for this use is one space per employee on the largest shift.

As discussed in Section III.C.2, the applicant estimates that 10 permanent employees will be hired for the operation and maintenance of the facility. The applicant represents that parking for O&M personnel working at the facility will be accommodated within the solar array site access roads and in permanent graveled parking areas located at each of the four O&M buildings proposed to be constructed at the facility.[152] Given the minimal number of employees required during operation of the facility and the availability of access roads and graveled locations within the proposed site, the Department recommends the Council find the requirements of MCZO 4.040 are satisfied.

MCZO 4.070: Sign Limitations and Regulations

In addition to sign limitations and regulations set forth in a specific zone, the following limitations and regulations shall apply to any sign hereafter erected, moved or structurally altered within the jurisdiction of the County.

A. All outdoor advertising signs shall be in compliance with the provisions of this Ordinance and the provisions of ORS Chapter 377 when applicable.

B. No outdoor advertising sign permitted by ORS Chapter 377 shall be erected within 300 feet of a residential dwelling without written consent of the owner and/or occupant of said dwelling.

C. No sign shall be placed so as to interfere with visibility or effectiveness of any permanent traffic control device.

D. No sign shall be placed so as to impede the sight distance triangle at any access point or intersection as specified in Section 4.020 of this Ordinance.

E. No sign shall cause glare, distraction or other driving hazards within a street or road right-of-way.

[152] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.4.

F. No sign shall shine directly upon a residential dwelling or otherwise create a nuisance.

G. In addition to the limitations on signs as provided by (1) through (5) above, additional sign restrictions may be required as determined by the Planning Commission in approving conditional uses, as provided by Article 6.

H. Signs erected along Scenic Byways or other roads with similar designations must meet applicable criteria for sign placement.

I. Residents may request specific cautionary signage for individual resident(s) to be installed within County right-of-way. All costs including materials, installation, maintenance, and removal, shall be borne by the requestor, and shall otherwise conform with Morrow County Policy M-43674.

J. Installation of Regulatory Signs in Public Right-of-Way. Developers are to install street name, posted speed, and other traffic control signage required for private developments, per applicable standards from Morrow County and the Manual on Uniform Traffic Control Devices (MUTCD).

The applicant represents that any signage installed at site access roads will comply with MCZO 4.070.[153] As presented in the evaluation of compliance with MCZO 4.165, below, the Department recommends that Council impose Land Use Condition 8, requiring, in part, that the applicant demonstrate compliance with the sign limitations and standards in MCZO 4.070 through the final site plan review. Subject to compliance with this condition, the Department recommends the Council find the requirements of MCZO 4.070 are satisfied.

MCZO 4.165: Site Plan Review

Site Plan Review is a non-discretionary or "ministerial" review conducted without a public hearing by the County Planning Director or designee. Site Plan Review is for less complex developments and land uses that do not require site development or conditional use review and approval through a public hearing.

A. Purpose. The purpose of Site Plan Review (ministerial review) is based on clear and objective standards and ensures compliance with the basic development standards of the land use district, such as building setbacks, lot coverage, maximum building height, and similar provisions. Site Plan review also addresses conformity to floodplain regulations, consistency with the Transportation System Plan, and other standards identified below.

[153] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.4.

B. Pre-application review. Prior to filing its application for site plan review, the applicant shall confer with the County Planning Director or designee, who shall identify and explain the relevant review procedures and standards.

C. Applicability. Site Plan Review shall be required for all land use actions requiring a Zoning Permit as defined in Section 1.050 of this Ordinance. The approval shall lapse, and a new application shall be required, if a building permit has not been issued within one year of Site Review approval, or if development of the site is in violation of the approved plan or other applicable codes.

As described in the evaluation of MCZO 1.050, the Department recommends the Council impose Land Use Condition 1, requiring the applicant to obtain a Conditional Use Permit and Zoning Permit from the Morrow County Planning Department prior to construction and operation of the proposed facility. These land use permits are addressed in, and governed by, the site certificate, and as such are subject to the provisions of ORS 469.401(3) and must be promptly issued by the County upon submission by the applicant of the proper applications and payment of the proper fees.

Under MCZO 4.165, a site plan review is required by the County prior to the issuance of the required Zoning Permit. As described in the ordinance, the site plan review is a ministerial review intended to verify compliance with County development standards based on clear and objective standards. The site plan review applies the review criteria under MCZO 4.165.D to a final site plan submitted by the applicant under MCZO 4.165.E.

As described below, the Department recommends that Council impose Land Use Condition 8, requiring the applicant submit its final site plan to the Department prior to construction for review and approval in consultation with the County. The recommended condition identifies the relevant criteria in MCZO 4.165.D for the review. Like other land use approvals, the Department recommends that the site plan approval is a matter addressed in and governed by the site certificate under ORS 469.401(3); and the only issues to be decided is whether the permit is consistent with the terms of the site certificate, including the terms of Recommended Land Use Condition 8. If the County finds that the final site plan complies with the listed criteria, it must promptly issue the site plan approval without further hearings or other proceedings.

D. Review Criteria.

1. The lot area shall be adequate to meet the needs of the establishment.

The applicant has not proposed any partitions or property line adjustments, and due to its modular nature, a solar photovoltaic power generation facility may be designed to fit the available lot area. Notwithstanding the spacing requirements and design standards discussed in this section and throughout this order, the Department recommends the Council find that the requirements of MCZO 4.165.D.1 are satisfied.

2. The proposed land use is permitted by the underlying land use district.

The proposed facility is a solar photovoltaic power generation facility and is conditionally allowed use in Morrow County's EFU Zone, consistent with ORS 215.283(2)(g). The proposed facility would exceed the allowable acreage thresholds for a solar photovoltaic power generation facility sited on high-value farmland and arable land in Morrow County; however, as described below, the Department recommends the Council grant an exception to these requirements and find compliance with the statewide planning goals as required by the Land Use Standard. Subject to compliance with the terms and conditions of the site certificate, the Department recommends the Council find the requirements of MCZO 4.165.D.2 are satisfied.

3. The land use, building/yard setback, lot area, lot dimension, density, lot coverage, building height and other applicable standards of the underlying land use district and any sub-district(s) are met.

As described in the sections evaluating the proposed facilities compliance with MCZO 3.010.M, 4.010, 4.020, 4.035. 4.040, and 4.070, the applicant has represented that it will comply with all applicable setback, lot, and height standards established in the MCZO, and has represented that it will demonstrate compliance with the majority of these requirements through the site plan review. In addition to the requirements of the MCZO, MCCEO 5.400.E requires all outdoor lighting to be directed downward and sited, hooded and shielded in a manner that prevents the lighting from projecting onto adjacent properties.

As presented below, the Department recommends the Council impose Land Use Condition 8 requiring, in part, that the applicant to demonstrate compliance with these requirements, and by extension, the requirements of MCZO 4.165.D.3, through the site plan review.

4. Development in flood plains shall comply with Section 3.100 Flood Hazard Overlay Zone of the Ordinance.

A portion of the proposed site within Sand Hollow is designated as a Zone A, Special Flood Hazard Area.[154] The applicant represents that no energy facility components will be sited in this area;[155] however, under the proposed facility layout, a portion of the proposed southern 230-kV transmission line would cross the flood zone. As presented below, the Department recommends the Council impose Land Use Condition 8 requiring, in part, that the applicant to demonstrate that no facility structures, including transmission line support structures, are sited within the Special Flood Hazard Area, through the site plan review.

[154] FEMA FIRM Panel 41049C0450D.

[155] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.6.

5. Development in hazard areas identified in the Morrow County Comprehensive Plan shall safely accommodate and not exacerbate the hazard and shall not create new hazards.

As described above, a portion of the proposed site is located within a FEMA designated Special Flood Hazard Area, however, recommended Land Use Condition 8 would ensure no structures are constructed within this area.

In addition, the Morrow County Comprehensive Plan refences the alluvial fan which underlies the majority of the site as a potential landslide risk but does not specifically identify it as a hazard area, regardless, potential landslide risk is addressed in Section IV.C., of this order, and subject to compliance with the recommended Structural Standard Conditions, the Department recommends the Council find that the construction and operation of the facility will not exacerbate existing or create new landslide hazards.

6. Off-street parking and loading-unloading facilities shall be provided as required in Section 4.040 and 4.050 of the Morrow County Zoning Ordinance. Safe and convenient pedestrian access to off-street parking areas also shall be provided as applicable.

The applicant represents that parking for O&M personnel will be accommodated within the solar array site access roads and in permanent graveled parking areas located at each of the four O&M buildings proposed to be constructed at the facility.[156]

As discussed above, MCZO 4.040 requires that one parking space must be provided for each worker that will be on the premises during the largest shift at peak season. The applicant estimates that there will be 10 permanent employees hired for the operation and maintenance of the facility. As discussed above, the Department recommends the Council find that site access roads not used for emergency access and other graveled areas allow sufficient area for parking at the site.[157]

7. County transportation facilities shall be located, designed and constructed in accordance with the design and access standards in the Morrow County Transportation System Plan.

The applicant represents that it will follow the design and access standards in the Morrow County Transportation System Plan. As discussed in Section IV.M.1.5, recommended Public Services Conditions 1 and 2 requires the applicant to enter into a Road Use Agreement with the

[156] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.4.

[157] In Exhibit K, Section 5.2.2.6, the applicant appears to assert that the off-street parking requirements of MCZO 4.040, and by extension MCZO 4.165.D.6 do not apply to the facility because "a photovoltaic solar power generation facility is not a use listed or described in [the ordinance]…" As described in the section evaluating compliance with MCZO 4.040 above, that ordinance requires parking requirements for uses not listed or described in the ordinance to be determined "by the use…found to be most similar in terms of parking needs."

Morrow County Public Works Department. That agreement would include a pre-construction assessment of road surfaces and other provisions to assure that roads used by the proposed facility continue to meet County standards.[158]

> *8. Site planning, including the siting of structures, roadways and utility easements, shall provide, wherever practicable, for the protection of trees eight inch caliper or greater measured four feet from ground level, with the exception of noxious or invasive species, such as Russian olive trees.*

The majority of the site consists of cultivated dryland-wheat fields that do not contain trees of any size; however, some trees do occur within the site boundary, particularly in areas near residences and the portion of the site within Sand Hollow.

As described below, the Department recommends that Council impose Land Use Condition 8, requiring, in part, that the applicant Demonstrate compliance with MCZO 4.165.D.8 as part of the Site Plan Review.

> *9. Development shall comply with Section 3.200 Significant Resources Overlay Zone or 3.300 Historic Buildings and Sites protecting inventoried significant natural and historic resources.*

No natural or historic resources inventoried as significant in the Morrow County Comprehensive Plan are located within the site boundary, and as such, the provisions of MCZO 3.200 and 3.00 do not apply to the construction and operation of the proposed facility.[159]

> *10. The applicant shall determine if compliance is required with Oregon Water Resources Department water quantity and/or Oregon Department of Environmental Quality water quality designations.*

As described in Section III.A., the applicant proposes to construct up to four Operations and Maintenance buildings as part of the facility, which would each include wells for potable water and onsite sanitary facilities. As discussed in Section V.C, no permits or approvals are required for construction and operation of the wells as long as the applicant complies with the Oregon Water Resources Department use limitations and standards for "exempt" wells under ORS 537.545. Recommended Water Rights Condition 3 would ensure compliance with these limitations and standards.

As discussed in Section III.E, the applicant would be required to obtain an Onsite Sewage Disposal Construction-Installation Permit from Umatilla County Public Health under ORS 454

[158] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.6.

[159] MCCP, Goal 5 Analysis (10-1-13), p. 18. Sand Hollow is identified in the County's Goal 5 resource inventory of Ecologically and Scientifically Significant Natural Areas as a 1B designated resource, indicating that additional information was needed to determine the significance of the resource.

and MCCEO Section 10. Recommended Organizational Expertise Condition 12 would require the applicant, or its construction contractor, to obtain the required permit prior to construction of the facility. The Department recommends the Council find that compliance with these conditions would satisfy the requirements of MCZO 4.165.D.10.

> *11. The applicant shall determine if previous Code Enforcement violations have been cleared as applicable.*

No code enforcement violations associated with the tracts have been identified by the applicant or County. As such, the Department recommends the Council find the requirements of MCZO 4.165.D.11 are satisfied.

> *12. The applicant shall determine the method of disposal for solid waste, with staff providing information to the applicant about recycling opportunities.*

As described in Sections IV.M and IV.O, the Department recommends that Council find, subject to compliance with recommended conditions of approval, the applicant's solid waste plans are likely to minimize generation of solid waste from the construction and operation of the proposed facility, that solid wastes will be recycled to the extent reasonably practicable, and that the wastes generated by the construction and operation of the facility are likely to result in minimal adverse impacts on surrounding and adjacent areas and public service providers. Accordingly, the Department recommends that the requirements of MCZO 4.165.D.12 are satisfied.

> *13. The applicant shall obtain the necessary access permit through the Public Works Department as required by Morrow County Resolution R-29-2000.*

As described in the evaluation of MCZO 4.010, the applicant represents that it will obtain all necessary local permits, including access permits through the Morrow County Public Works Department, prior to construction.[160] Recommended Organizational Expertise Condition 12 would require the applicant to provide evidence that it, or its construction contractors, have obtained the necessary permits prior to construction of the facility. The Department recommends that, subject to compliance with this condition, the requirements of MCZO.4.165.D.13 are satisfied.

> *E. Submittal Requirements. A site plan shall be submitted including all of the following information except for specific items determined at the pre-application review not to be applicable. All site plans shall have dimensions clearly indicated. An applicant may provide the information on separate sheets, if necessary or desirable for clarity.*
>
> *1. North arrow and scale.*

[160] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.2.6.

2. Location of property boundaries, including adjacent public or private streets and rights of way.

3. Location of existing structures and natural features.

4. Areas affected by the proposed development with slopes in excess of 10 percent.

5. Location of utilities and facilities, or proposed locations (sewer, water, fire hydrants, septic system, storm water facilities, etc.).

6. Proposed landscaping.

7. Exterior lighting.

8. Circulation plan for vehicles, pedestrians, and bicyclists, including existing and proposed points of access and sidewalks.

9. Parking lot layout, with circulation plan and striping details.

10. Sign location and details.

As described in the sections above, the Department the Department recommends that Council impose Land Use Condition 8, requiring the applicant to submit a final site plan that complies with the requirements of MCZO 4.165.E, and demonstrates compliance with the relevant criteria in MCZO 4.165.D, as presented below.

Recommended Land Use Condition 8 (PRE): Prior to construction of the facility or phase, as applicable, the certificate holder shall submit a final site plan that includes all information required by MCZO 4.165.E to the County and the Department. The Department may defer review and approval to the County.
[PRE-LU-06; Final Order on ASC]

MCZO 6.020: General Criteria

In judging whether or not a conditional use proposal shall be approved or denied, the Commission shall weigh the proposal's appropriateness and desirability, or the public convenience or necessity to be served against any adverse conditions that would result from authorizing the particular development at the location proposed and, to approve such use, shall find that the following criteria are either met or can be met by observance of conditions.

> *A. The proposal will be consistent with the Comprehensive Plan and the objectives of the Zoning Ordinance and other applicable policies and regulations of the County.*
>
> *B. If located within the Urban Growth Boundary of a city, that said city has had an opportunity to review and comment on the subject proposal.*
>
> *C. The proposal will not exceed carrying capacities of natural resources or public facilities*

Except for the size thresholds under MCZO 3.010.K.3, the Department recommends that Council find that the facility complies with the applicable substantive criteria from the County's comprehensive plan and land use regulations. As described in Section IV.E.1.3., *Goal 3 Exception* of this order, the Department recommends that Council find that an exception to those acreage thresholds is justified under ORS 469.504(2)(b). Accordingly, the Department recommends the Council find that the criterion under MCZO 6.020.A is satisfied.

The facility is not located within the Urban Growth Boundary of a city, so the criterion under MCZO 6.020.B is not applicable to the proposed facility.

As discussed in Section IV.A., *General Standard of Review*, the Department recommends that Council find that, subject to compliance with recommended conditions of approval, the proposed facility would with the Council's standards, including all standards for the protection of natural resources and public services. Accordingly, the Department recommends the Council find that the criterion under MCZO 6.020.C is satisfied.

Because the facility complies with, or justifies an exception to, all applicable substantive criteria from the County's comprehensive plan and implementing ordinances, is not located with the Urban Growth Boundary of any City and complies with all Council standards protected natural resources and public facilities, the Department recommends the criteria under MCZO 6.020 are satisfied.

<u>MCZO 6.025: Resource Zones Standards for Approval</u>

> *A. In the Exclusive Farm Use zone a conditional use may be approved only when the County finds that the use will not:*
>
> *1. Force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use; or*

Like the site itself, the majority of lands surrounding the proposed site are cultivated land and are primarily used for dryland winter wheat production. In addition, Tax Lot 01N26E000000800 is owned by North Lex Power and Land, LLC and is currently leased by the Oregon State University Columbia Basin Agricultural Research Center for dryland crop research.

Based on information provided by participating landowners, it is a common and accepted practice in the area to cultivate dryland wheat in rotation, so that approximately 50 percent of the land is actively cultivated one year, and left fallow the next. Based on information from participating landowners, most dryland wheat crops are planted in September or October and harvested in July or August. Fertilizer is applied at the time of planting, and some farmers apply additional fertilizer in the spring. Both seeded and fallow fields are sprayed for weeds in March or April, with additional herbicide applications as necessary.[161] In addition to dryland wheat cultivation, irrigation pivots are used on some of the adjacent lands to the north and east of the site. Irrigated crops include winter wheat, potatoes, and other vegetables or seed crops. [162]

Non-farm uses in the analysis area include the Naval Weapons Training Facility Boardman to the Northeast and energy development, including wind and solar power generation facilities, transmission lines, and natural gas pipelines and infrastructure.

As discussed in this section, as well as in Section IV.D, IV.H, IV.M, and IV.N, facility structures and components located within the site boundary are not likely to interfere with accepted farm practices on surrounding lands; however, activities associated with the construction and operation of the facility could potentially result in adverse impacts from erosion, dust, weeds, and traffic. The Department has recommended that Council impose conditions to address these impacts in compliance with Council Standards and applicant representations, including but not limited to:

- Recommended Soil Protection Conditions 1, 2, 3, 4 and 5
- Recommended Land Use Conditions 2 and 4
- Recommended Public Services Condition 1 and 2

The applicant represents that it will consult with area landowners during proposed facility construction and operation to determine further measures to reduce or avoid any adverse impacts to farm practices on surrounding lands and to avoid any increase in farming costs. [163] The applicant also represents that it will consult with participating landowners to design facility components to minimize obstacles to farming in cultivated fields within the subject property.[164]

The Department recommends that Council impose Land Use Condition 9 to ensure that landowners are consulted as represented by the applicant:

> **Recommended Land Use Condition 9 (GEN):** The certificate holder shall provide evidence to the Department of coordination with the owners of adjacent lands dedicated to agricultural use. Coordination must include information about the facility

[161] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Table K-5, Attachment K-2, Table A-1.
[162] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Attachment K-2, p. 29-30.
[163] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.2.3.3.
[164] *Id*.

that could impact agricultural activities. The certificate holder must document any recommendations made by adjacent landowners regarding measures to reduce or avoid any adverse impacts to farm practices on surrounding lands and to avoid any increase in farming costs as well as any responses made to these recommendations. [GEN-LU-01; Final Order on ASC]

Subject to compliance with Recommended Land Use Condition 9, and other recommended conditions of approval addressing the potential adverse impacts from erosion, dust, weeds, and traffic that may result from the construction and operation of the proposed facility the Department recommends Council find that the proposed facility will not force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use.

2. Significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use.

Under MCZO 3.010.K.3.f.(6) and the corresponding subsection of OAR 660-033-0130(38), when a facility is proposed to be sited on high-value farmland and at least 48 acres of photovoltaic solar power generation facilities have received land use approvals (or 80 acres, when a facility is proposed to be sited on arable land) within one mile of the center of the proposed site, the local government must make a finding that the proposed facility will not materially alter the stability of the overall land use pattern of the area. The ordinance and rule specify that:

" * * The stability of the land use pattern will be materially altered if the overall effect of existing and potential photovoltaic solar energy generation facilities will make it more difficult for the existing farms and ranches in the area to continue operation due to diminished opportunities to expand, purchase or lease farmland or acquire water rights, or will reduce the number of tracts or acreage in farm use in a manner that will destabilize the overall character of the study area."*

While the ordinance does not take the acres used by a proposed facility into consideration, it does imply that the removal of more than 48 acres from farm use has the potential to materially alter the stability of the area's land use pattern, and could, as a result, increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use.

Proposed facility construction and operation would remove approximately 9,442 acres of cultivated land from farm use for a period of up to 40 years or more. Removal of this amount of cultivated land could diminish opportunities to expand, purchase or lease farmland during the operational life of the facility. Potential impacts to the cost of farm practices on surrounding lands would be minimized by the following:

- Implementation of a detailed Noxious Weed Control Plan prior to and during construction and for the life of the facility will reduce the risk of noxious and invasive weed infestations and associated costs to landowners for weed control.

- Coordination with adjacent landowners on facility design, construction schedule and disturbance related operations and maintenance activities.
- Construction-related traffic impacts during harvest season will be minimized through adherence to a Traffic Management Plan and terms and conditions of a Road Use Agreement, executed between the county and the applicant.
- Facility structures and design will avoid any impacts to the ability of pesticide and fertilizer applicators.

Additionally, the majority of participating landowners have stated that they intend to continue farming other properties in the area following the construction and operation of the proposed facility. Some landowners have indicated that their continued operations would benefit from the financial stability provided by lease payments made for the energy facility. One of the participating landowners has indicated that they do not intend to continue farming after construction and operation of the proposed facility and will sell their tract to the applicant. [165] This tract also has a senior water right with current, albeit small, allocations of water for irrigation. Absent the opportunity to convert the land to energy use, it is possible that this land, and its water right, would be available for lease or purchase by other farm operations.
Given these measures and subject to the aforementioned recommended conditions, the Department recommends the Council find that a preponderance of evidence demonstrates the proposed facility will not significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use and, therefore, MCZO 6.025(2) is satisfied.

MCZO 6.030: General Conditions

> *In addition to the standards and conditions set forth in a specific zone, this article, and other applicable regulations; in permitting a new conditional use or the alteration of an existing conditional use, the Commission may impose conditions which it finds necessary to avoid a detrimental impact and to otherwise protect the best interests of the surrounding area or the County as a whole.*
>
> ** * * * **

MCZO 6.030 does not establish standards or criteria for review of a proposed use, but rather authorizes the County to impose additional conditions of approval during its review of a conditional use as it sees fit to avoid detrimental impacts or protect surrounding areas or the County.[166]

[166] Under ORS 469.401(3), upon receipt of the proper applications and payment of the proper fees, a county must issue any permits addressed in a site certificate, including a Conditional Use Permit, "subject only to conditions set forth in the site certificate or amended site certificate." As a result, any additional conditions the County wishes to impose under MCZO Section 6.030 would need to be considered by the Council as part of the siting review and incorporated into the site certificate.

Because the County has not recommended that any such conditions of approval are needed to address the potential impacts of the proposed facility, the Department recommends the Council find that no further evaluation of MCZO 6.030 is necessary.

MCZO 6.040: Permit and Improvements

> *The Commission may require an applicant to furnish the County with a performance bond or such other form of assurance that the Commission deems necessary to guarantee development in accordance with the standards established and the conditions attached in granting a conditional use permit.*

MCZO 6.040 does not establish standards or criteria for review of a proposed use, but rather authorizes the County to require an applicant to provide a performance bond or such other assurance to guarantee development in accordance with applicable standards and conditions attached to a conditional use permit. As described in Section IV.G, the Council's Retirement and Financial Assurance Standard requires an applicant to provide a bond or letter of credit to ensure the site can be restored to a useful, non-hazardous condition.

Morrow County Comprehensive Plan Policies

The County recommends that County Policies related to Citizen Involvement, General Land Use, Agricultural Lands, Economic Development, Housing, Public Facilities and Services, and Energy are applicable to the review of the proposed facility, and the applicant provides evidence to support its compliance with a number of specific policies. The County has adopted specific standards in the MCZO to implement the policies for solar photovoltaic power generation systems, and the MCZO and Council Standards, require the applicant to evaluate the potential adverse impacts the construction and operation of the proposed facility would have on accepted farm practices, natural resources, public services, and public health and safety, and to avoid, minimize, and mitigate impacts as needed.

As described in this section, the Department recommends that Council find, with the exception of the acreage standards for solar photovoltaic power generation facilities under MCZO 3.010 and the use criterion under MCZO 6.025.A.2, the applicant has met the applicable standards and in doing so, has demonstrated that the proposed facility is consistent with the applicable goals and policies of the comprehensive plan.

IV.E.1.2 Directly Applicable State Statutes and Administrative Rules

Because the County has adopted ordinances and local land use regulations implementing the applicable provisions of ORS chapter 215 and OAR chapter 660, there are administrative rules or land use statutes that are directly applicable to the facility under ORS 197.646(3).

IV.E.1.3 Goal 3 Exception: OAR 345-022-0030(4)

The Council may find goal compliance for a proposed facility that does not otherwise comply with one or more statewide planning goals by taking an exception to the applicable goal. Notwithstanding the requirements of ORS 197.732, the statewide planning goal pertaining to the exception process or any rules of the Land Conservation and Development Commission pertaining to the exception process goal, the Council may take an exception to a goal if the Council finds:

(a) The land subject to the exception is physically developed to the extent that the land is no longer available for uses allowed by the applicable goal;

(b) The land subject to the exception is irrevocably committed as described by the rules of the Land Conservation and Development Commission to uses not allowed by the applicable goal because existing adjacent uses and other relevant factors make uses allowed by the applicable goal impracticable; or

(c) The following standards are met:

(A) Reasons justify why the state policy embodied in the applicable goal should not apply;

(B) The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the Council applicable to the siting of the proposed facility; and

(C) The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.

As described above, the proposed facility would use, occupy or cover more than 12 acres of high-value farmland, and more than 20 acres of arable land and as a result, does not comply with the use standards in MCZO 3.010.K.3 implementing statewide planning goal 3, and the applicant has requested that the Council take an exception to goal 3. The provisions of OAR 345-022-0030(4)(a) and (b) are not applicable to the proposed facility. In ASC Exhibit K, the applicant asserts that a "reasons" exception under OAR 345-022-0030(4)(c) is justified for the reasons described below.[167]

Reasons Supporting an Exception: OAR 345-022-0030(4)(c)(A)

The applicant provides the following reasons to justify why the state policy embodied in Goal 3 should not apply to the agricultural lands that will be impacted by the Facility:

[167] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.

1. The facility is locationally dependent because of its proximity to existing energy infrastructure, the regional grid for interconnection, and major transportation corridors.
2. The facility is located on water-challenged land and therefore does not impact irrigated crops and imposes minimal direct impacts to high value agricultural soils due to lack of available irrigation water.
3. The facility preserves water supply in the Butter Creek CGWA for the benefit of other irrigators who rely on the same limited groundwater resource.
4. The facility creates local economic benefit and mitigates economic impacts to local agricultural economy.
5. The facility imposes minimal impacts to resources protected by Council standards.
6. The facility responds to important state and county goals and priorities.[168]

Each of these reasons is examined in more detail below.

1. The Facility is locationally dependent because of its proximity to existing energy infrastructure, the regional grid for interconnection, and major transportation corridors.

The applicant argues that the facility is locationally dependent due to its proximity to existing energy infrastructure, the regional grid for interconnection, and major transportation corridors.

The proposed facility would interconnect with the Umatilla Electric Cooperative's 230-kV Blue Ridge Transmission Line, which travels along portions of the western and northern edges of the site boundary.[169] While the proposed facility would include two overhead 230-kV transmission lines with a combined length of 9.5 miles, these lines would connect internal facility collector substations to the facility switchyard in the northwest corner of the site and, except for crossings between solar array areas and between the switchyard and the UEC line, would be located within the energy facility footprint.[170] The applicant further argues that the UEC line has available capacity to transmit the electricity that would be generated by the facility to the regional transmission grid, and that the line was constructed with the explicit purpose of facilitating renewable energy development in Morrow County.[171]

[168] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1. While not presented as a "reason" for the exception to be granted, the applicant also notes that the legislature has adopted goals requiring carbon emissions from electric generation in the state be eliminated by 2040 and argues that the Council should consider whether a facility contributes to meeting these goals in a manner that is least disruptive to and most compatible with Goal 3's commitment to preserving and maintaining agricultural lands.

[169] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1.1.

[170] See ASC Exhibit C, Figure C-2.

[171] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Sections 3.2.3 and 5.5.1.1.

The Council has previously found that proximity to existing transmission infrastructure may be relied upon to demonstrate locational dependence.[172] Because the construction and operation of the proposed facility would not require new transmission infrastructure to be constructed outside of the energy facility footprint, the Department recommends the Council accept the applicant's argument that proximity to transmission supports a locational dependence reason to partially justify an exception to Statewide Planning Goal 3.

The applicant also argues that the facility is locationally dependent on existing transportation corridors and infrastructure to provide access during construction and operation of the proposed facility.[173] As described in Section IV.M., *Public Services*, Interstate 84, OR-207, and Bombing Range Road are the primary access routes to the site. While the applicant proposes to construct up to 55 miles of access roads within the site, no major improvements to any public roads are expected to be required to accommodate deliveries of materials or large facility components.

The Council has previously found that proximity to transportation infrastructure can be relied upon to demonstrate locational dependence, particularly when existing infrastructure precludes the need for new external access roads or significant improvements to existing public roads.[174] Because existing transportation corridors would provide access to the site without the need for the construction of new, or substantial modification, of existing public roads, the Department recommends the Council accept the applicant's argument that proximity to transportation infrastructure supports a locational dependence reason to partially justify an exception to Statewide Planning Goal 3.

The applicant argues that the facility is locationally dependent on other energy facilities because it consolidates land use impacts to agricultural lands to a specific area and reduces the cumulative need for new transmission and interconnection infrastructure.[175] The proposed site is located near several other local and state jurisdictional energy facilities including Wheatridge Renewable Energy Facility I, II, and III and East; the Boardman to Hemingway Transmission Line; the Gas Transmission Northwest Pipeline System; the Orchard Wind Farm, the Carty Generating Station.[176] The Department recommends the Council accept the applicant's argument that collocating renewable energy projects allows for efficient use of transmission and other infrastructure while consolidating to agriculture and other uses, and that find that the proposed

[172] BSEAPPDoc92 Final Order with attachments 2018-02-23, p. 92-93; BSPAPPDoc2 Final Order 2020-04-24, p. 112-112; CGSAPPDoc107 2012-06-29 Final Order - Signed, p. 68-69; MSEFAPPDoc4 Final Order (CLEAN) 2021-06-25, p. 101; MWPAMD4Doc23 Final Order (Signed) with Attachments 2019-09-06, p. 98; WESAPPDoc2-2 Final Order on ASC Combined w Attachments Signed 2023-03-24, p. 84; WRWAMD4Doc 24 Final Order on Request for Amendment 4 2019-11-22 (clean), p. 62-63.

[173] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1.1.

[174] CGSAPPDoc107 2012-06-29 Final Order - Signed, p. 69-69; WESAPPDoc2-2 Final Order on ASC Combined w Attachments Signed 2023-03-24, p. 86.

[175] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1.1.

[176] See SSPAPPDoc25-03 ASC Exhibit C Project Location 2024-05-15, Figure C-3.

site's proximity to other energy facilities supports a locational dependence reason to partially justify an exception to Statewide Planning Goal 3.

Consistent with the analysis above, the Department recommends that Council find that the proposed site's proximity to existing transmission and transportation infrastructure, and other energy facilities supports a locational dependence reason. As discussed below, and consistent with the Council's previous findings, the Department recommends the Council find that locational dependence is an appropriate, but not by itself, sufficient reason to justify an exception to the requirements of Statewide Planning Goal 3.

2. The Facility is located on water-challenged land and therefore does not impact irrigated crops and imposes minimal direct impacts to high-value agricultural soils due to lack of available irrigation water.

The facility site is located within the West Subarea of the Butter Creek Critical Groundwater Area (CGWA). The designation of a CGWA is issued by the Oregon Water Resources Department (OWRD) and limits the total amount of water that can be withdrawn under existing water rights, prohibits new water rights from being granted, and establishes a system to request an annual allocation.[177]

As described in the evaluation of MCZO 3.010.C.24 and K.3 above, there are three place-of-use water rights appurtenant to the site: Water Right Certificates 38473, 62326 and 43515. Collectively, the three water right certificates authorize water allocation for irrigation on approximately 3,113 acres of land within the subject property.

Water Right Certificate 38473 authorizes water allocation for irrigation of 36.3 acres of land within Sand Hollow, an area of the site which is excluded from development. While use of the water right would not be precluded by proposed facility construction and operation, the landowner has indicated that the source well is not viable and has not requested or been allocated groundwater since at least 2005.[178]

Water Right Certificate 62326 authorizes water allocation for irrigation of 494.6 acres, half of which are in the site boundary, and is the most junior water right in the Pine City subarea of the CGWA.[179] The water associated with this right was used for pivot irrigation, but lack of water led the landowner to shift to dryland wheat production in the early 1980s and no water has been allocated since 1997.[180] Due to the limited availability of water allocations in the Pine City

[177] OWRD. Critical Groundwater Area Three Year Review. August 25, 2021. Available at: https://www.oregon.gov/owrd/programs/gwwl/gw/pages/adminareasandcriticalgwareas.aspx
[178] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 3.3.1.3.
[179] *Id*.
[180] *Id*.

Subarea, the Council has previously found that use of this water right for irrigated agriculture is "highly unlikely for the foreseeable future."[181]

Because these two water rights have not been allocated water in nearly 20 years, and because the use of any future water allocations under Water Right Certificate 38473 would not be precluded by the construction of the proposed facility, the Department recommends the Council find that use of the proposed site would not have any impacts on irrigated uses associated with Water Rights Certificate 38473 and 62326.

Water Right Certificate 43515 authorizes an annual use of up to 500-acre feet of water for irrigation of approximately 2,832 acres within the site boundary. Water Right Certificate 43515 was historically used to provide supplemental water for dryland wheat crops, but no supplemental water has been applied to crops since at least 2017. Between 2007 and 2023, the landowner has requested an allocation of between 1,000 and 1,300 acre feet of water and has been allocated 500 acre feet per year.[182] In ASC Exhibit K Attachment K-1, the holders of Water Right Certificate 43515 state that the limited water allocations, along with the high costs of installing and operating irrigation equipment, have precluded them from converting their farmland to pivot-irrigation or continuing to apply supplemental water.[183]

While the landowners have only been allocated 500-acre feet of water per year, Water Right Certificate 43515 is the most senior water right in the West Subarea of the Butter Creek CGWA, and as such, the landowners would theoretically be entitled to use the entire 3-acre feet per irrigated acre granted under the water right certificate if they chose to do so. The cost to use the water includes the electricity for pumping and manhours to move the irrigation wheel. The Grieb's stated that the costs impact the ability to use the water, which then impact the ability to increase the allocation, which then impact the ability to get enough water to provide for an economically sustainable irrigation operation. In addition, increasing the allocation would impact more junior water right users.[184] Based on the Grieb's statements provided in the ASC Exhibit K Attachment K-1, the Department recommends Council find that while water may be available under the water right, the availability is not practical or economical..

Finally, the applicant suggests that because none of the soils in the site are considered high-value farmland soils under their non-irrigated NRCS soil capability classification, and because the site as a whole is not predominately made up of high-value farmland soils, regardless of irrigation status, the facility would have minimal impacts to high-value farmland. The Department recommends the Council reject these arguments, in part. Under OAR 660-033-0020(9), an area or tract is considered to be "irrigated" if it is currently watered, or has established rights to use water for irrigation. As such, the soil capability classification of soils

[181] Final Order on Request for Amendment 4 of the Site Certificate for the Wheatridge Wind Energy Facility; WRWAMD4doc 24-1 Final Order on Request for Amendment 4 2019-11-22, p. 41.
[182] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 3.3.1.3.
[183] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Attachment K-2.
[184] SSPAPPDoc19 pASC Reviewing Agency Comments OWRD 2024-02-13.

within the area appurtenant to a water right must be determined using the "irrigated" capability classification. As shown in Table 6, above, the proposed site contains approximately 2,914 acres of high-value farmland soil based on irrigation status. As a result, the Department recommends the Council reject the applicant's argument that the proposed facility would only have minimal impacts on high-value farmland soils. The Department further recommends the Council reject the argument that the facility would only have minimal impacts on high-value farmland. The applicant is correct that none of the subject tracts are predominately made up of high-value farmland soils, and as such, none of the tracts are considered "high-value farmland" under ORS 195.300(10)(a). However, because all land within the place of use of the water right certificates is considered to be high-value farmland under ORS 195.300(10)(c) the proposed facility would still impact approximately 3,115 acres of high-value farmland.

While the Department recommends rejection of the arguments evaluated above, the arguments the Department recommends Council find are valid include that the site is water challenged and that the lack of use of water under the three water rights in 5 to 20 years supports a finding that there are practical and economic limitations of using water under Water Right Certificate 43515, and therefore use of the site would not impact future irrigated crops. The Department recommends Council find that this is a reason that justifies an exception to Goal 3 for the proposed site.

c. The Facility preserves water supply in the Butter Creek CGWA for the benefit of other irrigators who rely on the same limited groundwater resource.

As discussed above, the site is located in the Butter Creek CGWA, a designation which limits the amount of water that can be withdrawn for irrigation under existing water rights, prohibits new water rights from being granted, and establishes a system for irrigators to request an annual water use allocation based on a sustainable annual yield set by OWRD.[185] Also as described above, a portion of the proposed site is appurtenant to Water Right 43515, the most senior water right in the West Subarea of the Butter Creek CGWA. The water right holders have been allocated 500-acre feet of water each year since at least 2007 but have not used any water for irrigation since at least 2017.

The applicant argues that the unused 500-acre foot allocation provides other users in the West subarea with "additional buffer from further reductions in their access to available water" and that the permit holder for Water Right 43515 cannot utilize their water right without adversely affecting more junior rights holders:

> "if water users collectively pump more in any given year than OWRD has accounted for, the agency has authority to curtail all water users in the subarea the following year. Thus, if one water right holder suddenly uses more water than they have in the past (i.e., if Grieb Farms began using its full allocation of 500 AF each year), that use would

[185] OWRD. Critical Groundwater Area Three Year Review. August 25, 2021. Available at: https://www.oregon.gov/owrd/programs/gwwl/gw/pages/adminareasandcriticalgwareas.aspx

> reduce the total physical water supply available for all other water right holders in that year, and it could ultimately reduce the amount of water allocated to other users in the subarea in the future, adversely affecting *all* water users the following year." In short, groundwater use in the CGWA is a zero-sum game and, based on current groundwater levels and recent trends, there is no possible scenario where the Grieb's could suddenly begin withdrawing more groundwater for irrigation *without* potentially adversely affecting other more junior water right holders who are currently irrigating."[186]

The permit holders for Water Right 43515 have indicated that they intend to sell the land in their tract to the applicant and there are no plans to transfer the water right to adjacent lands. Because the construction and operation of the proposed facility would preclude future use of Water Right 43515 for agricultural uses, the applicant is proposing to apply to retire WR 43515. The applicant argues that retiring the Water Right would result in less competition for limited groundwater resources in the West Subarea, which would benefit more junior water right holders in the subarea that are currently putting their groundwater rights to beneficial use by ensuring that their annual allocations are more reliable. The applicant further argues that constructing the facility on this site would concentrate solar development away from more productive, unobstructed farmland with usable irrigation water rights or access to irrigation district surface water diversions.[187]

As noted by the applicant, no water has been used for irrigation under Water Right 43515 since at least 2017 and there is no evidence on the record indicating that the landowners would pursue use of water for irrigation if the proposed facility was not approved. On the contrary, the applicant has argued that the landowners have determined that the high costs of installing and operating irrigation equipment have made use of the water right economically unviable.[188] In addition, data from OWRD indicate that while the full sustainable annual yield of 5,670 acre feet for the West Subarea was allocated each year between 2020 and 2022, only approximately half that amount (2,788 to 3,074 acre feet) was actually pumped in any given year.[189] While additional water may be allocated to junior water rights holders if allocations for Water Right 43515 are no longer requested, it is not clear that this will result in more water being available for agricultural use as the allocations may be simply be transferred to other rights holders who are not using their water.

Because the construction and operation of the proposed facility would not reduce actual water consumption, and because it is not clear that the construction and operation of the facility would result in additional water being made available for current irrigated agricultural users in the West Subarea of the Butter Creek CGWA, the Department recommends the Council reject the preservation of water supply as one of the reasons to justify an exception to Statewide Planning Goal 3.

[186] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1.3.
[187] *Id*.
[188] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1.2.
[189] https://www.oregon.gov/owrd/programs/gwwl/gw/pages/adminareasandcriticalgwareas.aspx

The applicant proposed to voluntarily cancel Water Right 43515 if the Council accepts this reason, and proposed the following condition of approval:

> "Prior to construction, the Applicant will file an application with OWRD to voluntarily cancel WR 43515, to ensure that this water right cannot be used during the Facility's lifespan and thereby further stabilize and ensure increased reliability of ground water supply for existing irrigation water rights in the Butter Creek CGWA."[190]

The Department recommends that such a condition is not necessary to ensure that the water right cannot be used because the water can only be used for agricultural purposes, and it is not clear that any such purposes would be available if the land is converted to an energy use.

d. The Facility creates local economic benefit.

The applicant argues that solar energy generation generally promotes rural economic development by creating jobs, adding to the local tax base, and providing clean energy for commercial and industrial development. The applicant argues that the construction and operation of the proposed facility specifically would provide local economic benefits by creating jobs, providing compensation to landowners, and generating community service fees.

Job creation

The applicant argues that the construction and operation of the facility will generate both direct and indirect economic benefits by creating permanent full-time jobs and temporary construction jobs. The applicant estimates that during construction, approximately 440 workers will be employed on site on average over the assumed 5-year construction period.[191] The applicant acknowledges that construction workers may not be hired locally and does not argue that the Council should consider the wages paid to workers as a direct local economic benefit, but rather, argues that the portion of wages spent by construction workers on accommodations, food, clothing, and other necessities, as well as spending on construction equipment and materials during the construction period will support employment in service industry and construction related sectors.

The applicant provided an Economic Impact Analysis as ASC Exhibit K, Attachment K-2, to support their arguments. The analysis was prepared by ECONorthwest, who used IMPLAN Input/Output economic modelling software to estimate the direct, indirect, and induced economic benefits of construction related spending. The Economic Impact Analysis estimates that construction related spending will support up to 473 FTE (e.g. 2,080 hours of employment, or 40 hours of employment per week for 12 months) in Morrow County, and that the induced and indirect impacts of those jobs would support an additional 69 FTE over the five-year

[190] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1.3.

[191] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Attachment K-2, Section 2

construction period.[192] In total, the analysis estimates the construction of the project will support up to 541 FTE in Morrow County and approximately $28.8 million in labor income with a total economic output of approximately $86.9 million.

The applicant argues that the facility will also support job creation during operations, although on a smaller scale than during construction. The ECONorthwest Economic Impact Analysis assumes that seven full-time employees, including site management, operating technicians and vegetation contractors, will be needed to operate and maintain the facility. The analysis estimates that wages paid to employees and other spending will support an additional 0.8 direct jobs in Morrow County each year of facility operations. In total, the analysis estimates that the operation of the project will support up to 8 FTE and approximately $531,000 in labor income, with total economic output of approximately $3.3 million per year.[193]

Tax revenues and Payment in-lieu of Taxes (PILOT) agreement

In addition to supporting job creation, the applicant argues the construction and operation of the proposed facility will generate economic benefits by generating income for participating landowners and by generating tax revenues and community service fees for Morrow County and other local taxing districts, including school districts and Rural Fire Protection Districts. The applicant notes that the increased revenues will help finance public services including roads, wildland firefighting, law enforcement, public health, public works, land use planning, assessment and taxation, district attorney, juvenile services, and general administration; services which also benefit local agricultural communities.

The applicant has entered into a long-term Payment in-lieu of Taxes (PILOT) agreement with Morrow County. The agreement provides that the applicant will pay the County a flat fee of $7,000 per MW of installed nameplate generating capacity at the site each year for 17 years. In 2022, the total property tax due for the 23 tax lots that make up the site was $40,128. Assuming that assessed values will increase at a rate of 3 percent per year, the ECONorthwest Economic Impact Analysis provided in Exhibit K, Attachment K-2, estimates that if the project was not built, the tax lots would generate approximately $3.3 million over the 40-year estimated life of the facility. The analysis estimates that if the facility is approved and constructed, the taxlots would generate approximately $593.3 million over the same period, resulting in a net increase of approximately $590 million. This estimate assumes that the proposed facility would generate $5.9 million for the first five years of the PILOT agreement as project phases come online, and $8.4 million for the remaining 12 years while the facility is at maximum buildout. Using current taxing mill rates and accounting for the depreciation of

[192] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Attachment K-2, Section 2. As used in the Economic Impact Analysis, an FTE is equivalent to 2,080 hours of employment (e.g. full time employment for 12 months)

[193] The analysis assumes that the seven employees would be needed for operation of just one block of the PV facility, and that with all six blocks and the BESS, operation and maintenance of the facility would require up to 173 workers. As this higher employment estimate is inconsistent with employment projections provided in Exhibit U, and elsewhere in the ASC, we rely on the Phase 1 estimate only here.

facility assets over time, the estimate assumes that the facility would generate approximately $20.1 million per year for the remaining 23 years of the facility's estimated 40-year life.

Using IMPLAN Input/Output economic modelling software, the ECONorthwest analysis also estimates that the increased tax revenue would support approximately 23.3 FTE direct, indirect, and induced jobs and $2.14 million in labor income and $3.1 million in total economic output in Morrow County each year after year 4 of the PILOT agreement, and 106 total jobs in Morrow County and approximately $9.6 million in labor income, with total economic output of approximately $14 million on average each year after the PILOT agreement expires.

Council has recently found that evidence demonstrating a proposed facility will benefit a local economy in *general* – e.g., creation of jobs constructing and operating a facility, generation of tax revenue is not sufficient to serve as an economic benefits reason for granting an exception to Goal 3.[194] Any development will result in some level of job creation and tax revenue. Rather, to justify an economic benefits reason for an exception to Goal 3, an applicant should provide evidence demonstrating how the local agricultural economy will benefit as a result of the proposed facility.

Lease payments

The applicant argues that lease payments paid to participating landowners will help stabilize often fluctuating agricultural income and will make their continued farming on adjacent lands more viable. The Council has accepted lease payments made to landowners as an economic benefits reason justifying a Goal 3 exception when the applicant provides evidence of a direct connection between lease payments and specific benefits to significant agricultural operations.[195] Here, the applicant provided information showing that one landowner indicated that he "could" invest in new agricultural equipment with the lease payments and from another landowner indicating the lease payments won't directly aid his continued agricultural production but will help keep land in the family and provide money to invest in agricultural equipment for continued farming in the Butter Creek area.[196] Conversely, at least one participating landowner will no longer be involved in agricultural activities in the area. [197] Given

[194] Madras Solar Energy Facility - Final Order on Application for Site Certificate; MSEFAPPDoc4-1 Final Order (SIGNED) with Attachments 2021-08-02, p. 104.

[195] See, e.g., Nolin Hills Wind Energy Facility – Final Order on Application for Site Certificate, NHWAPPDoc1 Final Order (clean) 2023-08-30 signed; and ASC Exhibit K, Attachment K-1, letter from landowner stating the lease payments will be used to invest in ongoing agricultural activities on over 73,000 acres of land, specifically, to improve housing for sheep herders and farm employees and possible acquisition and refurbishment of a contiguous agriculture-related business.

[196] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15; Attachment K-1, see Brian Doherty response to Landowner Survey question no. 6 and Shane Matheny response to Landowner Survey question no. 4, respectively; of 1,620 acres Matheny currently farms, 1,280 acres will be part of the proposed solar project, Matheny indicated he will continue to farm 340 acres directly adjacent to the Project.

[197] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15; Attachment K-1 Ken and Carri Grieb response to Landowner Survey, indicating the Grieb's will sell approximately 4,400 acres that had been dedicated to dryland wheat production to the applicant.

these circumstances, the Department does not believe the applicant has provided substantial evidence that lease payments will benefit agricultural operations sufficient to support an exception to Goal 3. Accordingly, the Department recommends the Council reject the applicant's argument that lease payments made to landowners support a local economic benefit as one of the reasons to justify an exception to Statewide Planning Goal 3.

Facilitation of other economic development

The applicant argues that the proposed facility would supply clean energy to support commercial and industrial development, while preserving land zoned for those uses. The applicant notes that only 2.2 percent of Morrow County's land base is zoned for industrial uses, and that siting the proposed facility on EFU land would preserve opportunities for future economic growth and job opportunities. The applicant notes that industrial power consumption has increased by 266 percent since 2016 as existing industrial users and food processing plants have increased demand and a growing number of new data centers have come online in the region.[198]

The Council has previously rejected arguments that the creation of renewable energy for other uses can be relied upon to demonstrate that the construction and operation of a proposed facility will result in local economic development when specific companies that are considering to expand, or move business have not been identified.[199] In this case, the applicant has identified categories of companies, and specific companies, such as Amazon Data Services, Inc., which are currently expanding, but the applicant has not provided evidence or explanation demonstrating that the power from the proposed facility will support this expansion or otherwise be supplied to local uses, as existing transmission infrastructure adjacent to the site allows electric power generated by the facility to be provided to users anywhere in the BPA service territory. Accordingly, the Department recommends the Council reject the applicant's arguments that the electric power generated by the proposed facility will create local economic benefit; however, the Department recommends the Council find that these arguments do support a locational dependence reason, as presented above.

Mitigation of impacts to agricultural economy

Finally, while the applicant acknowledges that the removal of up to 9,400 acres of dryland winter wheat farmland will indirectly impact the local agricultural economy, it proposes to mitigate these impacts by making monetary contributions to an agricultural mitigation fund

[198] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 1.0.

[199] BSPAPPDoc2 Final Order 2020-04-24, p. 112; MWPAMD4Doc23 Final Order (Signed) with Attachments 2019-09-06, p. 98; OSCAPPDoc2 Final Order on ASC 2022-02-25, p. 87-88.

administered by the County.[200] Under ORS 469.502(2)(c) and OAR 345-022-0030(4)(c), to grant a goal exception, Council must find three things:

(A) Reasons justify why the state policy embedded in the applicable goal should not apply.
(B) The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse effects will be mitigated in accordance with rules of the Council applicable to the siting of the proposed facility; and
(C) The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.

As discussed below, the applicant estimates that the facility will cause over $11 million in indirect losses to the agricultural economy and proposes an agricultural mitigation fund in that amount to mitigate those losses. Accordingly, the Department recommends Council find that the proposed contributions to the fund justify a goal exception under ORS 469.502(2)(c)(B) and OAR 345-022-0030(4)(c)(B) – *i.e.*, not as an economic benefit reason but as appropriate mitigation for an anticipated significant adverse effect on the local agricultural economy.

ASC Exhibit K, Attachment K-3 includes the applicant's Agricultural Mitigation Plan (included as Attachment F to this order). In the Agricultural Mitigation Plan, the applicant proposes to make a one-time payment of $1,179 per acre of farmland occupied by the facility, or up to approximately $11.08 million for the anticipated 9,400-acre energy facility footprint. The applicant provided an Economic Impact Analysis in ASC Exhibit K, Attachment K-2, which estimates that winter wheat production at the site has an estimated value of approximately $1.09 to $1.24 million per year. The analysis estimates that the indirect impacts of this loss of agricultural production value in the local agricultural economy would result in the potential reduction of 3.1 FTE, with labor income of approximately $287,834 and a total economic impact of $478,566 or $51/per acre per year.[201] After applying a discount rate of 3 percent, the analysis estimates the net present value of those economic losses to be $1,179 per acre, or $11.08 million, the amount that would be contributed to the mitigation fund.

The goals of the mitigation fund are to improve the long-term viability and resilience of Morrow County's wheat farms and supporting organizations; and minimize the economic impact of lost agricultural land resource productivity due to the construction and operation of the proposed facility. The applicant has identified potential mitigation projects in consultation with stakeholders that operate within Morrow County's local dryland wheat agricultural sector. Since agricultural suppliers like the Morrow County Grain Growers (MCGG) are most likely to be impacted by the loss of dryland wheat production, the Agricultural Mitigation Plan targets them directly to replace lost income or otherwise increase net revenue. The projects were reviewed for applicability to the local farming economy, potential magnitude of impacts, and additional

[200] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15. The applicant also argues that because most of Morrow County is zoned for Exclusive Farm Use, most of the economic benefits generated by the project will also accrue to farm uses; however, this argument does not appear to be supported by the record.
[201] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 3.4.2 and Attachment K-2, Section 3.

benefits. Potential mitigation projects would include a grant program for farmers to purchase precision weed management equipment; funding for MCGG North Lexington grain facility electrical upgrades and liner upgrades; and funding for the construction of a new grain facility.[202] Final selection of mitigation projects would be made by a nine-person advisory committee consisting of local stakeholders and two members selected by the Council to represent statewide or regional agricultural interests.[203] Of note, the Morrow County Board of Commissioners has signed a Memorandum of Agreement with the applicant agreeing to administer the funds and has provided two letters of support for the applicant's proposal.[204]

The intent of Goal 3 is to preserve and maintain agricultural lands for farm uses. The Department recommends Council find that benefits to the agricultural economy that accrue from a compensatory mitigation scheme, rather than from the use itself, are not sufficient to justify an exception based on an economics benefit "reason" but may be considered in determining whether or not a facility's adverse impacts on the local agricultural economy would be sufficiently mitigated to support an exception under ORS 469.502(2)(c)(B)and OAR 345-022-0030(4)(c)(B). Because the applicant has used reasonable methods to estimate the potential adverse economic impacts on local dryland wheat producers that could potentially occur from the conversion of up to 9,442 acres of cultivated dryland wheat fields to an energy use, and because the applicant has proposed funding equivalent to mitigate those potential adverse impacts, the Department recommends the Council find that the applicant's Agricultural Mitigation Plan is appropriate mitigation for an anticipated significant adverse effect on the local agricultural economy and justifies a goal exception under ORS 469.502(2)(c)(B) and OAR 345-022-0030(4)(c)(B).

The Department further recommends the Council impose Land Use Condition 11 and 12 to ensure that the mitigation plan is implemented as proposed:

> **Recommended Land Use Condition 11 (PRE):** Prior to construction of the facility or phase, as applicable, the certificate holder must complete the preconstruction requirements identified in the Memorandum of Agreement for Agricultural Mitigation Fund, as provided in the Final Order on ASC Attachment F.
> [PRE-LU-07; Final Order on ASC]
>
> **Recommended Land Use Condition 12 (GEN):** The certificate holder must adhere to the terms of the Memorandum of Agreement for Agricultural Mitigation Fund included in Attachment F of the Final Order on the ASC. It is the certificate holder's responsibility to ensure that the Council and Department receive all reports and notifications required by the agreement.

[202] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 3.4.3; Attachment K-3.
[203] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Attachment K-3, Attachment 2.
[204] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Attachment K-3, Attachment 2; SSPAPPDoc26-01 Reviewing Agency Comment Morrow County BOC Ag Mitigation Support 2024-03-25; SSPAPPDoc36-06 ASC Reviewing Agency Comment Morrow County 2024-06-18.

[GEN-LU-02]

e. The Facility imposes minimal impacts to resources protected by Council standards.

The applicant argues that the proposed site was selected to avoid sensitive environmental features and that the facility is not anticipated to have any significant adverse impacts to soils, wetlands, protected areas, water resources, fish and wildlife habitat and species, threatened and endangered species, scenic and aesthetic resources, and historic, cultural, and archaeological resources.[205]

The Council has previously accepted a reason this is the site selected results in minimal impacts to other resources protected by Council standards.[206] In this case, the proposed facility footprint avoids all highly erodible soils (Section IV.D); big-game winter range and threatened and endangered species habitat (Section IV.H and IV.I), and wetlands and jurisdictional waters (Section V.B); and the operational facility is not expected to directly or indirectly impact any protected areas (Section IV.F); recreational opportunities (Section IV.L); or scenic resources (Section IV.J). The Department notes that the construction and operation of the proposed facility would permanently impact up to 36.5 acres of Category 4 and 5 habitats, siting the project on agricultural land minimizes the impacts to higher value habitats. The construction and operation of the facility would result in some impacts to cultural resources of significance to the Confederated Tribes of the Umatilla Indian Reservation; however, the applicant has worked with the Tribes to identify appropriate mitigation and the Tribes have indicated that their concerns have been addressed (Section IV.K).

Because the lack of sensitive resources within the proposed energy facility footprint is unique for a site of its size, and because indirect impacts to other sensitive resources have been addressed appropriately, the Department recommends the Council accept the applicant's arguments that the minimal impacts to other resources protected by Council standards is one of the reasons to justify an exception to Statewide Planning Goal 3.

f. The Facility responds to important state and county goals and priorities.

The applicant argues the proposed facility responds to important state and county goals and priorities, including Statewide Planning Goal 13, Morrow County Comprehensive Plan policies implementing Goal 13, and the State's Renewable Portfolio Standards and Clean Energy Targets.[207]

[205] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1.6.
[206] MSEFAPPDoc4 Final Order (CLEAN) 2021-06-25, p. 103; WESAPPDoc2-2 Final Order on ASC Combined w Attachments Signed 2023-03-24, p. 93-94.
[207] SSPAPPDoc25-11 ASC Exhibit K Land Use 2024-05-15, Section 5.5.1.7.

Statewide Planning Goal 13 is an energy conservation goal, and does not require, directly or indirectly, the development of energy facilities on EFU land.[208] The Council has previously rejected reliance on responsiveness to Statewide Planning Goal 13, and local policies implementing the goal, as a reason to justify an exception from the requirement to preserve agricultural land for farm use under Statewide Planning Goal 3. The Council has also previously found that abstract consistency with the states Renewable Portfolio Standard, without evidence that power produced by the proposed facility will be used to meet Oregon's energy goals, cannot be relied upon to justify an exception to Statewide Planning Goal 3.[209]

Consistent with its previous findings, the Department recommends the Council find that responsiveness to state and county energy conservation goals is not an appropriate reason to justify an exception.

Recommended Council findings on Reasons for Exception

The Council has not adopted specific criteria for determining when reasons justify a goal exception under OAR 345-022-0030(4)(c) but has previously found that a combination of reasons related to locational dependence and local economic benefits can be considered adequate reasons when a proposed solar facility would impose minimal impacts to agriculture and other resources.

In this case, the Department recommends that reasons that justify taking an exception to Goal 3 include:

1) The site of the facility is locationally dependent on existing transmission and transportation infrastructure and is collocated with other nearby energy facilities in a manner that allows for efficient use of existing infrastructure.
2) The site is water-challenged and would not impact irrigated crops.
3) Use of the site would result in minimal impacts to other resources protected by Council standards, and the lack of sensitive resources within the proposed energy facility footprint is unique for a site of its size.

As described in the foregoing analysis, the Department recommends the Council reject the applicant's arguments related to state and county goals and priorities as reasons to justify an exception to Statewide Planning Goal 3.

The County has indicated that it generally supports the applicant's exception request.[210] The County has also requested that if the Council grants the exception, a condition be included

[208] 1000 Friends of Oregon v. Jackson County, 292 Or App 173 (2018) at 192.
[209] BSPAPPDoc2 Final Order 2020-04-24, p. 112-113; MSEFAPPDoc4 Final Order (CLEAN) 2021-06-25, p. 103-104; MWPAMD4Doc23 Final Order (Signed) with Attachments 2019-09-06, p. 99; OSCAPPDoc2 Final Order on ASC 2022-02-25, p. 87; WESAPPDoc2-2 Final Order on ASC Combined w Attachments Signed 2023-03-24, p. 82-83.
[210] SSPAPPDoc12 pASC SAG Comment 2023-09-27; SSPAPPDoc26-01 Reviewing Agency Comment Morrow County BOC Ag Mitigation Support 2024-03-25; SSPAPPDoc36-06 ASC Reviewing Agency Comment Morrow County 2024-06-18.

requiring the applicant to file a plan amendment application following approval to ensure the exception is appropriately incorporated into the County Comprehensive Plan.[211] The Department recommends that the Council not impose such a condition, however, because the text of ORS 469.504(7) suggests that when the Council grants an exception it is the affected local government's responsibility to amend its comprehensive plan and land use regulations as necessary to reflect the decision of the Council pertaining to a site certificate, on or before the next periodic review, of the affected local government's comprehensive plan.

Significant Environmental, Economic, Social and Energy Consequences

As described above, the facility would have minimal impacts on resources protected by Council standards in part due to the lack of sensitive soils, habitat, and waterways within the site, and the Department has recommended the Council impose conditions of approval to ensure that the proposed facility will not have significant adverse impacts on other resources protected by Council Standards throughout Section IV of this Order, and subject to compliance with those conditions, has recommended the Council find that the proposed facility will not have significant adverse impacts on protected areas, recreational opportunities, or scenic resources. As discussed in Section IV.K, the Department also notes that potential impacts to Cultural Resources of significance to the Confederated Tribes of the Umatilla Indian Reservation have been mitigated to the Tribes' satisfaction.

Social and economic consequences that could result from the construction and operation of the proposed facility include potential impacts to providers of public services, as well as impacts to the local agricultural economy. As described in Section IV.M, the Department recommends the Council find that, subject to compliance with recommended conditions, the facility will not significantly impact sewers and sewage treatment, water, storm water drainage, solid waste management, housing, traffic safety, police and fire protection, health care or schools. As evaluated above, the Department recommends the Council find that, although the removal of up to 9,400 acres of dryland winter wheat farmland will indirectly impact the local agricultural economy, the applicant would sufficiently mitigate these impacts by making contributions to an agricultural mitigation fund administered by the County in an amount equivalent to the anticipated impacts, as required by recommended Land Use Conditions 11 and 12.

As noted above, the construction and operation of the facility will also have positive effects on the availability of renewable energy for sale to the public and will promote the energy development goals of Morrow County and could support utility efforts to meet Oregon's Renewable Portfolio Standard and clean energy targets.

Consistent with the evaluation above, the Department recommends the Council find that the significant environmental, economic, social and energy consequences anticipated as a result of

[211] SSPAPPDoc12 pASC SAG Comment 2023-09-27.

the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the Council applicable to the siting of the proposed facility.

Compatibility of Adjacent Uses

As described in the section evaluating MCZO 6.025, like the site itself, the majority of lands surrounding the proposed site are cultivated land and are primarily used for dryland winter wheat production. In addition, Tax Lot 01N26E000000800 is owned by North Lex Power and Land, LLC and is currently leased by the OSU Columbia Basin Agricultural Research Center for dryland crop research. As a result of the proposed mitigation to potential adverse impacts through contributions to an agricultural mitigation program managed by the County, as well as in Section IV.D, IV.H, IV.M, and IV.N, facility structures and components located within the site boundary are not likely to interfere with accepted farm practices on surrounding lands; however, activities associated with the construction and operation of the facility could potentially result in adverse impacts from erosion, dust, weeds, and traffic and the Department has recommended that Council impose conditions to address these impacts in compliance with Council Standards and applicant representations. In addition to these Conditions, recommended Land Use Condition 8 would further require the applicant to consult with area landowners during construction and operation of the Facility to determine further measures to reduce or avoid any adverse impacts to farm practices on surrounding lands and to avoid any increase in farming costs and to minimize obstacles to farming in cultivated fields within the subject property.

Subject to compliance with the agricultural mitigation program, recommended Land Use Conditions 2, 4 and 5, and other recommended conditions of approval addressing the potential adverse impacts from erosion, dust, weeds, and traffic that may result from the construction and operation of the proposed facility the Department recommends that Council find that the proposed facility will be compatible with accepted farm or forest practices on surrounding lands devoted to farm or forest use.

IV.E.2. Conclusions of Law

Based on the foregoing recommended findings and the evidence in the record, and subject to compliance with the recommended site certificate conditions, the Department recommends the Council find that the construction and operation of the proposed facility would comply with all applicable land use criteria with the exception of the acreage standards in MCZO 3.010.K.3 and the Resource Zone Standards in MCZO 6.025. Because these standards are directly tied to its implementation, the Department further recommends the Council find that the facility does not comply with the requirements of Statewide Planning Goal 3. After considering reasons presented by the applicant however, the Department recommends the Council find that an exception to Statewide Planning Goal 3, is justified under OAR 345-022-0030(4)(c) and ORS

469.504(2)(c); and as such the Department recommends the Council find that the proposed facility would comply with the Council's Land Use standard.

IV.F. Protected Areas: OAR 345-022-0040

(1) To issue a site certificate, the Council must find:

(a) The proposed facility will not be located within the boundaries of a protected area designated on or before the date the application for site certificate or request for amendment was determined to be complete under OAR 345-015-0190 or 345-027-0363;

(b) The design, construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to a protected area designated on or before the date the application for site certificate or request for amendment was determined to be complete under OAR 345-015-0190 or 345-027-0363.

** * * * *.*[212]

IV.F.1. Findings of Fact

The Project Order established a 12-mile analysis area for impacts to protected areas, which was reduced from 20 miles because protected areas located more than 12 miles from the site are separated from the facility by major roads (Interstate 84, State Highway 74 and 207) and other development, including energy facility development, including wind and solar photovoltaic power generation facilities. Based on distance from the proposed facility site, and the intervening development, the Department recommends the Council find that the construction and operation of the facility is not likely to result in significant adverse impacts to protected areas outside of the 12-mile analysis area.[213] Protected areas within the analysis area that are protected under the Council's standard are evaluated below.

IV.F.1.1 Protected Areas in the Analysis Area

The inventory of protected areas was based on review of best available Geographic Information System data, maps, and the most current information for the categories of protected areas;

[212] Administrative Order EFSC 5-2022, effective December 19, 2022. Sections (2) through (4) provide exceptions and applicability statements that are not relevant to this evaluation.

[213] ESPNOIDoc7 Project Order 2022-09-26, p. 23. In ASC Exhibit L, the applicant provides additional information and analysis to support the conclusion that the construction and operation of the proposed facility would not result in significant adverse impacts to several protected areas that are more than 12 miles from the proposed facility; however, impacts to these areas are not discussed further in this order because they are outside the analysis area.

including data from the Bureau of Land Management, Oregon Department of State Lands, National Park Service, Oregon Parks and Recreation Department, Oregon State University, and the United States Forest Service, Geological Survey, and Fish and Wildlife Service.

Applicant identifies the Boardman/Willow Creek Research Natural Area (RNA), as a protected area in the analysis area. ASC Exhibit L states that this area is also called the Boardman Grassland Conservation Area, managed by Threemile Canyon Farms. In the Department's review of Boardman/Willow Creek/Boardman Grassland Conservation Area, it does not appear that this area is a designated RNA, rather is grassland restoration area managed by the Nature Conservancy for the landowner (Threemile Canyon Farms).[214] As such, this area does not meet the definition of a protected area under OAR 345-001-0010(26).[215] Based on this review, the Department recommends Council find that the Boardman/Willow Creek Research Natural Area/Boardman Grassland Conservation Area, is not an EFSC protected area, and is not further evaluated in this order.

ASC Exhibit L identifies protected areas within 12 miles of the facility site. Table 7 below lists the three EFSC protected areas located within the analysis area. Figure 5 below illustrates the location of protected areas in the analysis area and provides results of the visual impact assessment, discussed further in this section below.

Table 7: Protected Areas within Analysis Area

Protected Area	Distance to Site Boundary (mi)		Direction from Proposed Site/Closest Facility Component
	Transmission Line	Solar Array	
Lindsay Prairie Preserve (SNHA)	2.4	1.3	W
Boardman Research Natural Area (RNA)	4.0	4.0	NW
Oregon Trail Area of Critical Environmental Concern (ACEC), Echo Meadows Interpretive Site	13.5[1]	11.5	NE

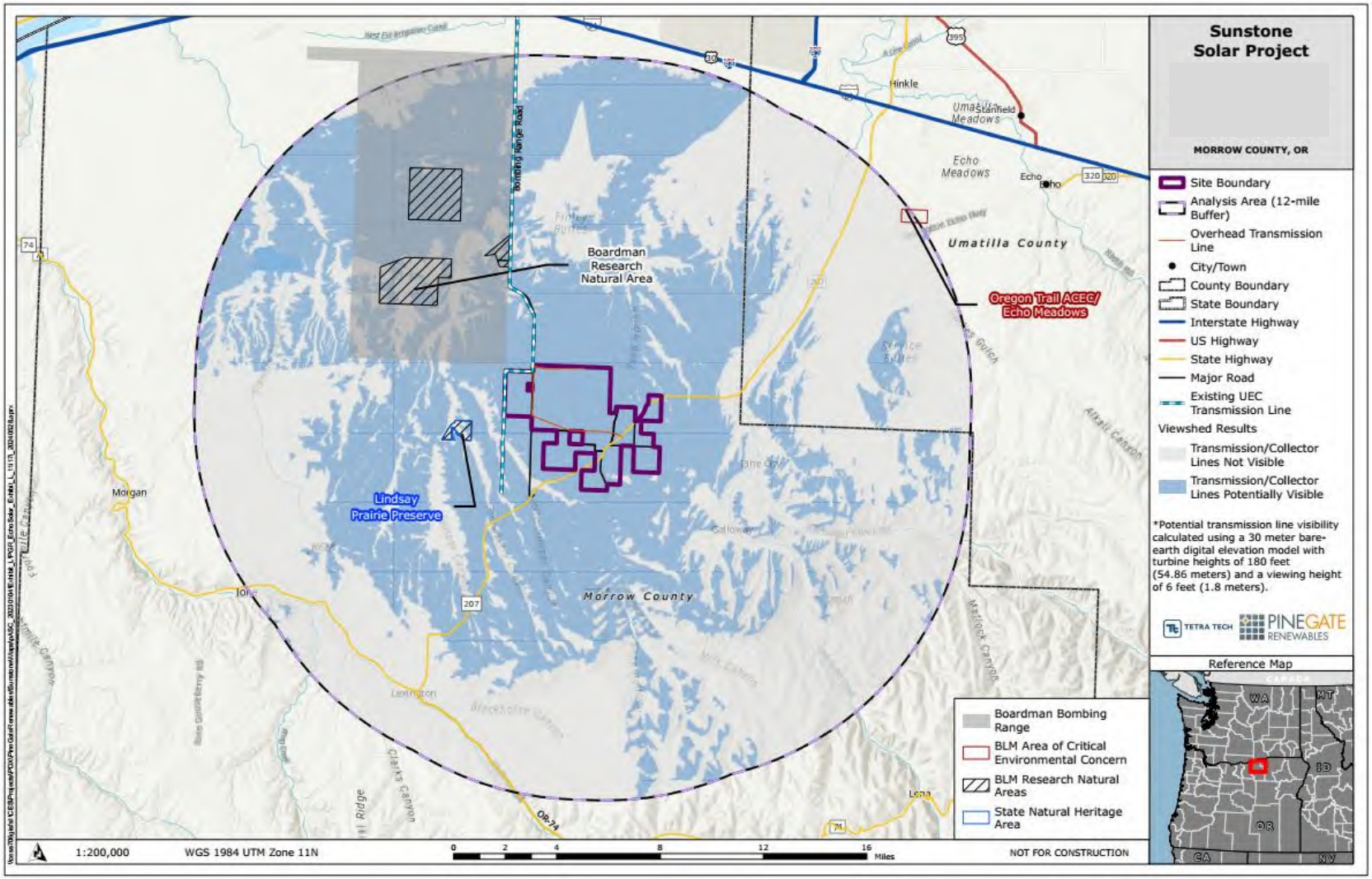
Notes:
1. Proximity provided in ASC Exhibit L, Table L-1 and presented in this Table, proximity to site boundary associated with the transmission line would be outside analysis area.

Source: SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Table L-1.

[214] https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/oregon/deserts/cbg/restoration/Pages/BCA_Restoration.aspx Accessed by Department 05-16-2024.

[215] Department also clarifies that under OAR 345-001-0010(26)(i)(A), EFSC protected areas include land designated in a federal land management plan or by an act of Congress as an Area of Critical Environmental Concern (ACEC), which includes Oregon Trail ACEC. In several locations the ASC identities the Wells Spring Segment of the Oregon National Historic Trail (ONHT) and the Wells Spring Interpretive Site, however, these do not fit under the definition of an EFSC protected area. The ONHT and the Wells Spring Interpretive Site, are discussed in Sections IV.J., *Scenic Resources*, IV.K., *Historic, Cultural, and Archaeological Resources*, and IV.L., *Recreation*, of this order.

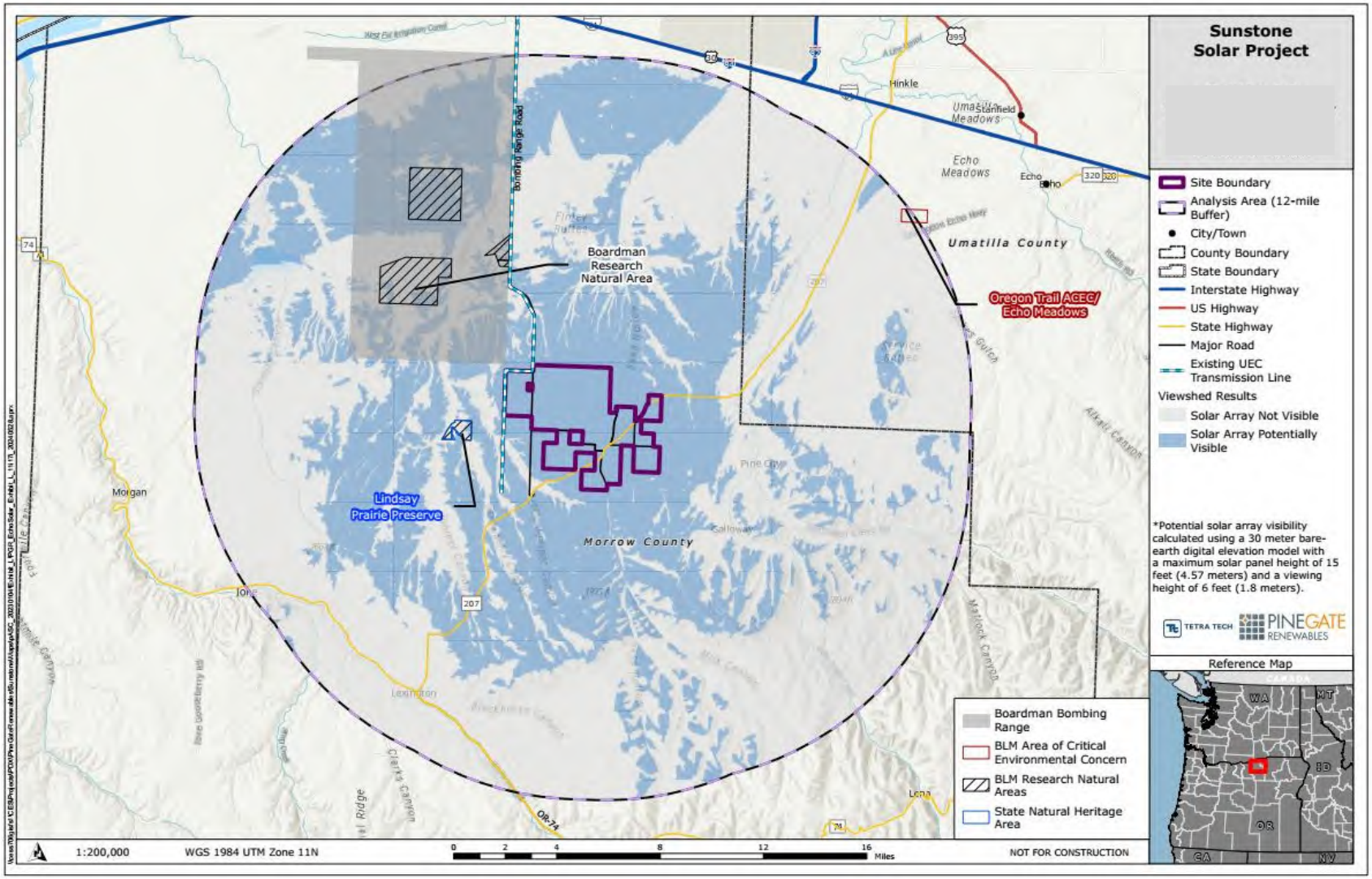
Figure 5: Protected Areas in Analysis Area and ZVI for Aboveground Transmission/Collector Lines



1

Figure 6: Protected Areas in Analysis Area and ZVI for Solar Array

1



Lindsay Prairie Preserve / State Natural Heritage Area (SNHA)

The Lindsay Prairie Preserve/State National Heritage Area is a small preserve owned and managed by the Nature Conservancy (TNC) in Morrow County, south of the NWSTF Boardman. The Lindsay Prairie Preserve includes approximately 376 acres and is dominated by bluebunch wheatgrass and Sandberg's bluegrass, a habitat type that is extremely rare in the Columbia Basin.[216] According to TNC, the Preserve is not managed for scenery, and its purpose is dedicated to preservation of rare grassland habitat. Exiting development on the adjacent landscape includes roads, a gravel quarry, agricultural fields and equipment, energy facilities, highways and roads, an existing 69-kV transmission line along the western border, dispersed rural development. The site is open to the public, however, TNC reports that it receives no known public use and is only occasionally visited by TNC staff.[217]

The Boardman Research Natural Area (RNA)

The Boardman RNA is part of the Umatilla Plateau in the central Columbia River Basin, located south of Boardman, Oregon in Morrow County. The RNA consists of approximately 5,654 acres and was established to preserve examples of Columbia River basin steppe vegetation communities and associated wildlife. The bunchgrass communities and associated shrubs found in the RNA provide valuable foraging, habitat and nesting sites for many species of animals found in the area, including the Washington ground squirrel habitat - WAGS (Urocitellus washingtoni; Oregon Endangered and Federal Species of Concern). [218] The RNA is within the Boardman Bombing Range, owned and operated by the U.S. Department of Defense; otherwise, the RNA is monitored and maintained by TNC. The public is excluded from the Boardman Research Natural Area. Exiting development on the adjacent landscape includes roads, agricultural fields and equipment, energy facilities, highways and roads, an existing 69-kV transmission line along the western border, dispersed rural development.

Echo Meadows Interpretive Site Area of Critical Environmental Concern (BLM ACEC)

The Echo Meadows Interpretive Site is a 320-acre parcel of the BLM designated Oregon Trail ACEC. The site includes a portion of the Oregon National Historic Trail and associated wagon swales, as well as a short walking path and interpretive signage. Existing developments on the adjacent landscape include Lexington Echo Highway, Highway 207, agricultural fields and equipment, transmission lines and rural residential properties. The interpretive site is open to the public.

[216] https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/oregon/deserts/cbg/Pages/Lindsay-Prairie.aspx.

[217] Personal communication between Kristen Gulick, Tetra Tech, and Dalles Field Office representative, TNC, January 24, 2022. SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.4.2.1.

[218] https://www.oregonconservationstrategy.org/conservation-opportunity-area/boardman-area/

IV.F.1.2 Potential Impacts on Protected Areas

IV.F.1.2.a Noise Impacts

The applicant analyzes potential noise impacts during construction and operation of the proposed facility at protected areas within the analysis area by discussing the predicted noise levels, and by discussing the predicted operational noise levels in the context of the ODEQ noise regulations at OAR Chapter 340, Division 35, described in Section V.A., *Noise Control Regulations,* of this order. The ODEQ noise regulations are used to inform the potential operational noise impacts from the proposed transmission line at protected areas, however, compliance with the DEQ noise regulations is not decisive under the Council's Protected Areas standard.

Construction Noise

The use of heavy machinery, such as heavy trucks, bulldozers, graders, and cranes during construction at approximately 50 feet from the site would generate maximum noise levels between 80 and 90 dBA.[219] Composite Maximum Lmax Equipment Noise Level (maximum combined construction equipment operating at the same time) at 1,200 feet from the site would be approximately 63 dBA. For comparison, a large store air conditioner operating 20 feet away is approximately 60 dBA and a passenger car driving at 65 mph is 65 dBA. Further, existing noise impacts from the nearby Boardman Bombing Range found that lands to the west (conservation lands and agricultural lands) and east (agricultural lands) have community day and night levels between 60 and 70 dBA as a result of military training activities.[220] Jet flyovers associated with the Boardman Bombing Range are reported to reach 90 to 115 dBA, and frequently occur in the vicinity of the facility and the Lindsay Prairie Preserve and Boardman RNA. Noise attenuates with distance, topography, and vegetative screening so construction noise at protected areas near the facility may be lower during actual facility construction. Noise associated with construction of the facility would also be temporary.

The Lindsay Prairie Preserve is about 1.3 miles or 6,864 feet away from the facility, as noted above and indicated in Table 23: *Predicted Construction Noise Levels* in this order, at 1,200 feet the loudest composite noise levels would be approximately 63 dBA. [221] The Department estimates, given attenuation, that the noise levels at the Preserve would be approximately 48 dBA.[222]

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[219] SSPAPPDoc25-25 ASC Exhibit Y Noise 2024-05-15, Section 5.1.

[220] FAA 2016; SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.1.

[221] Per the Centers for Disease Control and Prevention, a whisper is about 30 dB, normal conversation is about 60 dB, and a motorcycle engine running is about 95 dBA. Noise above 70 dBA over a prolonged period of time may start to damage a person's hearing. Loud noise above 120 dB can cause immediate harm to your ears. What Noises Cause Hearing Loss? | NCEH | CDC

[222] ASC Exhibit L, applicant states that construction noise levels at the Lindsay Prairie would be approximate 56 dBA. The Department estimates this to be a higher than likely noise level. https://www.wkcgroup.com/tools-room/inverse-square-law-sound-calculator/

As noted above, the site is open to the public, however, there is no known public use, therefore the Department recommends Council find that noise impacts to users of the site are not likely and less than significant. The Preserve is managed for the protection rare grassland habitat and the applicant indicates this type of habitat may be suitable for special status species such as WAGS, golden eagles, burrowing owls, and other raptors; long-billed curlews; bull trout and Chinook salmon; and California mountain kingsnakes, etc.[223]

Applicant provides a summary of potential noise impact studies for certain types of animals, indicating that most research focuses on wildlife reaction to more constant noise generated by roads and high-volume traffic, for instance, the U.S. Department of Transportation summarized numerous studies and literature that reported the effects of noise on wildlife, specifically focusing on noise associated with roads (typically 70 to 80 dB at 50 feet). Overall, existing information suggests bird numbers and breeding can be strongly affected by the proximity of roads; large mammals can be repelled by road/vehicle noise; and small mammals do not appear to be adversely affected.[224]

As indicated above, the area surrounding the Lindsay Prairie Preserve already experiences consistent and intermittent loud noises throughout the day and night. Department recommends Council find that noise from construction of the facility would be less than significant and not likely impact the wildlife at the Lindsay Prairie Preserve because of the existing noise at the Preserve, the distance from the facility site and noise attenuation, lack of literature about specific wildlife at the area and noise impacts to that wildlife, and construction noise would be temporary.

Construction noise levels at the Boardman RNA would be significantly less than 56 dBA due to their increased distance from the site boundary (4 miles) and noise attenuation, therefore, impacts from facility construction noise at the Boardman RNA would be difficult to distinguish with the exiting ambient noise at the RNA. Applicant estimates that construction noise would be indistinguishable from the background ambient noise levels at approximately 10.2 miles from the site boundary, so no noise impacts are expected at the Echo Meadows interpretive site.[225] Finally, noise associated with construction of the facility would be temporary and would not interfere with the management goals of nearby protected areas. For these reasons, the Department recommends Council find that construction-related noise would not adversely impact any protected areas.

Operational Noise

[223] ASC Exhibit L identifies 3 potential EFSC protected areas within the analysis area that are managed for preservation of habitat and wildlife and lists the species that are known or likely to occur in these areas, however, it does not specifically say which species are associated with each preservation site. SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.1.

[224] SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.1.

[225] SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.1.

As summarized in Section V.A.1., *Noise Control Regulations* of this order, operational noise is evaluated in the context of compliance with the DEQ Noise Control Regulations. The noise limits apply at measurement points on noise sensitive properties or noise sensitive receptors (NSRs), such as dwellings, schools, churches, hospitals, or public libraries. Based on the applicant's noise assessment NSR-5, located near Doherty Road approximately 800 feet from noise sources at the facility, would have an operational noise level of 33 dBA.[226] Given that noise attenuates and the existing ambient noise levels mask noise and that the closest protected area is 6,864 feet (1.3 miles) away, there would not be audible noise from the operation of the facility.

Because construction noise levels are expected to attenuate to levels less than or equal to the sound level of a normal conversation at the closest protected areas, and no audible operational noise is expected at protected areas, the Department recommends Council find that noise generated during construction and operation of the proposed facility would not result in significant adverse impacts to any protected areas in the analysis area.

Potential Traffic Impacts

The protected areas in the analysis area may experience access disruptions, delays, or congestion for brief periods due to delivery of facility materials, construction equipment, deliveries, and construction personnel.

Construction related traffic impacts would be intermittent and temporary and not anticipated to impact users of the protected areas, and traffic levels would return to normal following construction. Further, the Boardman RNA is closed to the public and Lindsay Prairie does not experience significant public usage and is visited infrequently by management staff, and therefore these protected areas are not likely to be impacted by construction traffic. The Echo Meadows protected area located approximately 11.5 miles from the site, would not likely be impacted by construction-related traffic due to the location, access and use of different roads and highways to both sites.

As described in Section IV.M., *Public Services*, of this order, the Department recommends that the Council adopt Public Services Conditions 1 and 2, requiring the applicant to execute and adhere to the terms and condition of a Road Use Agreement, overseen by the Morrow County Public Works Department, in combination with additional traffic safety measures of a final Traffic Management Plan.

During operations, the facility will permanently employ only approximately 10 on-site employees, including seasonal vegetation maintenance personnel, and operational traffic

[226] See Section V.A.1., *Noise Control Regulations*, of this order, the maximum sound level (Lmax) can be used to quantify the maximum instantaneous sound pressure level over a given measurement period or maximum sound generated by a source. This is done on a logarithmic scale, which incorporates the existing ambient noise levels and the project noise levels of a noise source.

impacts are expected to be minimal unless significant repairs or replacement of facility components are needed, in which case a temporary increase in traffic levels could occur.

The Department recommends Council find that construction and operation of the facility would not likely cause impacts from traffic to any protected areas.

IV.F.1.2.b Water Use and Wastewater Disposal

Water use

During construction, the applicant would obtain water from a municipal provider or other source with an existing water right appropriate for construction use.[227] During operation, the facility would obtain water from exempt wells at the operations and maintenance buildings or through another licensed water source. Because no new water rights, or withdrawals of ground water or surface waters that feed into a protected area are needed, the Department recommends Council find that construction and operation of the proposed facility are not likely to have a significant adverse impact on water availability or use at protected areas.

Wastewater

During construction, wastewater generated by the facility would include sanitary wastewater, stormwater, equipment wash water and concrete washout water. Small amounts of wastewater will be generated from washdown of concrete trucks and their chutes after concrete loads have been emptied. Washdown methods will be determined by the contractor in compliance with the concrete washout requirements in the Oregon Department of Environmental Quality National Pollutant Discharge Elimination System (NPDES) 1200-C Construction Stormwater Discharge General permit, required under recommended Soil Protection Conditions 3 and 4. No wastewater from the facility will be discharged into any protected area.

During operations, sanitary waste will be disposed of through an on-site septic system within the O&M building. Operation wastewater generated during periodic washing of the solar modules is not expected to require off-site disposal due to high evaporation rates and expected infiltration into the ground at the site.

For these reasons, the Department recommends Council find the wastewater that would be generated during construction and operation of the proposed facility would not have a significant adverse impact on protected areas.

IV.F.1.2.c Visual Impacts

[227] SSPAPPDoc25-15 ASC Exhibit O Water Req 2024-05-15, section 3.1.

The proposed facility will not generate or result in any air emissions or plumes. While fugitive dust during construction may cause some temporary visual impacts, these will be minimized through the implementation of dust control measures required in the NPDES 1200-C permit and its accompanying best management practices (BMPs). Visual impacts from facility components will occur but will attenuate and become less noticeable with the existing landscape with distance from the facility. The two most potentially visible components are the solar arrays at a maximum height of 15 feet and the aboveground 230-kV transmission lines, assumed to have a maximum height of 180 feet.[228]

The applicant's visual assessment of facility components at protected areas included the assumed maximum height of infrastructure as well as a "bare-earth" modeling approach, based only on the effects of terrain on visibility, which does not account for distance, lighting, weather, and atmospheric attenuation factors that diminish visibility under actual field conditions. A bare-earth analysis also does not account for the effects of vegetation or buildings, which would block or screen views and visual impacts in some places. Visibility of proposed facility infrastructure was defined by visible or not visible, indicated by color coding (see Figure L-2), and by proximity, i.e., foreground (less than 0.5 mile), middleground (0.5 to 5 miles), or background distances (more than 5 miles).[229] Depending on the viewing distance, viewers at sites higher in elevation may have views of the panels, especially if the view direction is toward the angle at which the panel is tilted toward the sun. Other factors that may impact the visibility of the facility at protected areas are the existing visual context, particularly other sources of visual contrast present within the view; the likely number and nature of visitors to a protected area; and whether there is any management direction related to preservation of scenic quality, either within the protected area or outside of it.

The Oregon Trail ACEC Echo Meadows Interpretive Site is 11.5 from the site boundary. Applicant indicates that protected areas with a background distance of 6.0 to 19.5[230] miles from the site boundary any views of the facility will be highly unlikely to detect or identify the low-profile solar arrays and the solar array would occupy a limited portion of the total viewshed. As described in this section, many protected areas currently have views of wind farms, transmission lines, and urban and industrial development so the facility would not introduce a new or unusual feature to the view. In addition, potential facility views from some of the protected areas would be partially to fully screened by vegetation, terrain, and human-made structures, therefore, the Department recommends Council find that visual impacts from the facility at these protected areas would not be likely and therefore less than significant.

[228] All other Facility infrastructure was assumed by the applicant to be less visually impactful (due to height, being dispersed throughout the site boundary or adjacent to taller infrastructure).

[229] SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.4.1.

[230] Applicant evaluates protected areas within 20 miles of the site boundary, however as indicated in this section, the analysis area under the protected area standard for this facility is 12 miles, therefore, one protected area (Echo Meadows Interpretive Site) applies to this statement as it is a protected areas further than 6 to miles from the site.

The applicant's analysis indicated potential foreground or middleground visibility of the proposed facility from portions of the Lindsay Prairie Preserve/SNHA and the Boardman RNA.

Lindsay Prairie Preserve/SNHA

The site boundary associated with the solar arrays is 1.3 miles from the protected area and the site boundary associated with the location of the transmission line is 2.4 miles away. The solar arrays would not appear as a prominent feature to viewers at this distance because of existing development on the landscape (e.g. transmission lines, wind energy facility, and buildings), and because topography and vegetation would also screen views. Any visibility would appear as a dark line on the horizon and would create minimal visual contrast.[231] The proposed transmission line may also be visible at 2.4 miles or greater from portions of the Preserve, primarily in the northeastern section. If visible, the transmission lines would introduce vertical structures that would create minimal visual contrast in context with substantially taller existing wind turbines as well as other existing similar electrical infrastructure in the viewshed. Therefore, visual impacts from the facility to Lindsay Prairie Preserve/SNHA are low and less than significant. Further, the Preserve is managed for the preservation of habitat and wildlife with minimal public access and the area is not managed for its scenic values, therefore, any views would be less than significant because they would not interfere with the designated management of the area.

Boardman RNA

The site boundary associated with the solar arrays and transmission lines is 4 miles from the protected area. There would be potential visibility of the solar arrays at 4.0 miles from portions of the RNA, primarily within the southeastern half. The solar arrays would not appear as a prominent feature to viewers at this distance because of existing development on the landscape (e.g. transmission lines, wind energy facility, and buildings), and because topography and vegetation would also screen views. Any visibility would appear as a dark line on the horizon and would create minimal visual contrast.[232] The proposed transmission line may also be visible from portions of the RNA, primarily in the northeastern section. If visible, the transmission lines would introduce vertical structures that would create minimal visual contrast in context within the existing viewshed. Therefore, visual impacts from the facility to Bordman RNA are low and less than significant. Further, the RNA is managed for research and the preservation wildlife with no public access and the area is not managed for its scenic values, therefore, any views would be less than significant because they would not interfere with the designated management of the area.

Because the potential visibility of facility components would be limited or eliminated by distance or topography, and that any views would be in contrast with an already developed landscape, as well as the are being managed for the preservation of wildlife and not scenic

[231] SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.4.2.1.

[232] SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.4.2.2.

values, the Department recommends the Council find that construction and operation of the facility would not result in significant adverse visual impacts to the protected areas in the analysis area.

IV.F.2. Conclusions of Law

Based on the foregoing recommended findings, the Department recommends the Council conclude that the design, construction and operation of the proposed facility would not be likely to result in significant adverse impacts to any protected areas, in compliance with the Council's Protected Area standard.

IV.G. Retirement and Financial Assurance: OAR 345-022-0050

To issue a site certificate, the Council must find that:

(1) The site, taking into account mitigation, can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility.

(2) The applicant has a reasonable likelihood of obtaining a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition.[233]

IV.G.1. Findings of Fact

The estimated useful life of the proposed facility is 40 years. The applicant represents that, while the life of the facility could be extended through routine maintenance and replacement of facility components, it is likely that the facility would either be repowered or decommissioned after 40 years of operation. [234]

IV.G.1.1 Restoration of the Site Following Cessation of Construction or Operation

At the time of decommissioning, all aboveground facility components would be removed including solar and battery components, the O&M buildings, transmission and overhead collector lines, inverter pads, the substations, and perimeter fencing. Underground electrical cable would be removed to its lateral depth; buried lateral runs are assumed to be a minimum of 3 feet deep, and would be abandoned in place. Concrete foundations for transformers, inverters, battery storage system, substations, O&M building, and switchyard will be removed to at least 4 feet below grade, then filled with soil or gravel as part of site restoration.[235] Roads will be regraded to restore the surface soil to a useful condition consistent with site zoning, on

[233] Administrative Order EFSC 1-2002, April 3, 2002.
[234] SSPAPPDoc25-24 ASC Exhibit X Retirement 2024-05-15, Section 2.0.
[235] SSPAPPDoc25-24 ASC Exhibit X Retirement 2024-05-15, Section 4.2.

private lands, roads will be restored at the request of the current landowner. All disturbance areas would be restored to a useful, non-hazardous condition suitable for agricultural use and revegetated in a manner compatible with surrounding uses. Vegetation will be restored to the maximum extent practicable in accordance with landowner wishes, and all areas disturbed by decommissioning construction may be regraded and reseeded with seed mixes, consistent with the Draft Revegetation Plan.

As described in Section IV.D, the Department recommends the Council impose conditions of approval to minimize adverse impacts to soils from erosion or contamination by spills, and, subject to compliance with these conditions, significant remediation of soil conditions is not expected to be required to restore the site.

Because the construction and operation of the facility will not generate or require significant amounts of hazardous materials to be stored at the site, and will not create other conditions that are likely to preclude site restoration, the Department recommends the Council find that compliance with the mandatory condition is sufficient to ensure that the site can be restored to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility.

Under OAR 345-025-0006(7), the Council must impose a condition in every site certificate that requires the applicant to prevent the development of any conditions that would preclude site restoration. Accordingly, the Department recommends the Council impose Retirement and Financial Assurance Condition 1, as presented below.

> **Retirement and Financial Assurance Condition 1 (GEN):** The certificate holder shall prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder.
> [Mandatory Condition OAR 345-025-0006(7); GEN-RF-01]

Under OAR 345-025-0006(9) the Council must impose a condition in each site certificate requiring the applicant retire the facility at the end of its useful life and restore the site to a useful, non-hazardous condition according to a Council-approved final retirement plan. The Council must also impose a condition establishing procedures for the retirement of the site if the applicant fails to meet these obligations, as provided under OAR 345-025-0006(16). Accordingly, the Department recommends the Council impose Retirement and Financial Assurance Condition 1 and 2, as presented below:

> **Retirement and Financial Assurance Condition 2 (RET):** The certificate holder must retire the facility if the certificate holder permanently ceases construction or operation of the facility. The certificate holder must retire the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0410. The certificate holder must pay the actual cost to restore the site to a useful, non-hazardous

condition at the time of retirement, notwithstanding the Council's approval in the site certificate of an estimated amount required to restore the site.
[Mandatory Condition OAR 345-025-0006(9); RET-RF-01]

Retirement and Financial Assurance Condition 3 (RET): If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0410, the Council must notify the certificate holder and request that the certificate holder submit a proposed final retirement plan to the Department within a reasonable time not to exceed 90 days. If the certificate holder does not submit a proposed final retirement plan by the specified date, the Council may direct the Department to prepare a proposed final retirement plan for the Council's approval. Upon the Council's approval of the final retirement plan, the Council may draw on the bond or letter of credit described in Condition PRE-RT-01 to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR chapter 345, division 29. If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder must pay any additional cost necessary to restore the site to a useful, non-hazardous condition. After completion of site restoration, the Council must issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan.
[Mandatory Condition OAR 345-025-0006(16); RET-RF-02]

IV.G.1.2 Retirement Cost Estimate

The applicant estimates that the total cost of retirement and restoration of the facility would be approximately $115.530 million.[236] The estimate includes the costs of the labor and equipment needed for removal of facility components and restoration activities as well as site mobilization and demobilization, site support, contractor markups, and contingencies.

The applicant prepared the retirement cost estimate based on its prior experience and consultation with engineering staff and contractors, and use of data and estimating software published by RS Means.[237] The methods and assumptions used to produce the estimate are summarized below:

- All costs were estimated in Q1 2023 dollars.
- Production rates, equipment and crew needs, and unit costs for individual tasks were developed using RS Means and the applicant's prior experience. [238]
- Labor costs were based on U.S. Department of Labor wage determinations. The applicant estimated hourly wage rates for decommissioning activities based on an

[236] SSPAPPDoc25-24 ASC Exhibit X Retirement 2024-05-15, Attachment X-1.
[237] SSPAPPDoc25-24 ASC Exhibit X Retirement 2024-05-15, Section 4.2.
[238] A production rate is used to determine the number of worker hours needed to complete individual tasks.

assumed 50-hour work week that included 40 hours of standard time and 10 hours of overtime pay. The total labor cost includes wages, benefits, and payroll tax liability.

- Equipment rates assume use of rental equipment and include fuel and maintenance costs.
- Mobilization and demobilization costs reflect the actual costs to mobilize equipment, provide facilities including an office trailer, storage units, and portable toilets, and to staff the site with workers and field management personnel. Mobilization costs do not include front loaded costs from other tasks.
- Unit costs include the estimated costs of labor and equipment, and miscellaneous costs including permits, engineering, signage, fencing, traffic control, and utility disconnects.
- Steel components, including conductors, transmission support structures, solar racking systems and posts will be removed and transported off site for sale as scrap. The costs of loadout and hauling are included in the estimate. No disposal fees or scrap value are included in the estimate.
- Disposal fees for transformer oil were estimated at $4 per gallon. Disposal fees for batteries were estimated at $200 per ton. Disposal fees for other universal wastes, including solar panels, were estimated at $55 per ton.
- Reseeding is assumed to be required for the substation and switchyard areas, and 35 percent of the solar array footprint (3,304 acres). For cost estimating purposes, it is assumed that final seeding will utilize a mix of native grasses.

The applicant applied a 5 percent contractor markup for home office and project management to the total retirement and restoration cost estimate and a 15 percent markup for Overhead and Fees. The applicant also applied contingencies for costs that would be incurred by the state if the applicant defaults on its obligation to retire the facility and restore the site were applied to the total cost with contractor markups, this included a 1 percent contingency for the costs of performance bonding, a 10 percent contingency for administrative and project management costs, and a 10 percent contingency for adverse future development at the site. Department recommendations for applied contingencies are discussed directly below.

The Department recommends the Council find that the applicant used reasonable methods and assumptions to develop the cost estimate, with the adjustments described below. An adjusted estimate is provided as Table 8, below.

The applicant proposes to store up to 204,720 spare solar panels in up to 50 Conex containers installed at the site.[239] The applicant included amounts needed to remove and restore the 50 Conex containers but did not include amounts needed to dispose of their contents because the applicant assumes all stored panels would be used by the time decommissioning starts.[240] Because the decommissioning cost estimate is intended to reflect the full costs that would be incurred by the state if the applicant permanently ceased construction or operation of the facility prior to and without decommissioning the facility, the Department recommends the

[239] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.4.

[240] SSPAPPDoc22-03 pASC RAI2-3 RAI Response Transmittal 2024-04-19.

Council find that the cost estimate should cover the costs of what is installed at the site, not what is expected to remain at the site at the end of the facility's design life. Accordingly, the Department recommends the Council include the costs required to transport and dispose of spare modules in the estimate. The Department recommends the Council find that $3.48 per panel is adequate to account for the transport and disposal of the spare module. This amount is equivalent to the applicant's estimated cost for Solar Panel Removal and Disposal (Line Item 1.9.2), less the amount required for removal (Line Item 1.9.2.1), as the uninstalled spare modules would not need to be removed from racks prior to disposal. An additional $712,425 has been included in the estimate to reflect the total estimated cost of disposing the spare panels off site.

The applicant's 1% performance bond contingency was applied to the total decommissioning cost before Contractor markup, however, Council typically imposes that cost on the total cost with markup, this is reflected in Table 8 below.[241] The 10 percent contingency for administrative and management expenses would cover the anticipated direct costs borne by the State in the course of managing site restoration and would include the preparation and approval of a final retirement plan, obtaining legal permission to proceed with demolition of the facility, legal expenses for protecting the State's interest, preparing specification bid documents and contracts for demolition work, managing the bidding process, negotiations of contracts, and other tasks. Consistent with recommended conditions below, the Council reserves the right to adjust the contingencies, as appropriate and necessary to ensure that costs to restore the site are adequate to maintain health and safety of the public and environment, consistent with Council standards. In addition, the Council has imposed a 20% future development contingency on costs associated with battery energy storage system components given the additional uncertainty and potential environmental hazards associated with battery technologies.[242]

Table 8: Decommissioning Tasks and Cost Estimate

Task or Component	Quantity	Unit[1]	Unit Cost ($)	Estimate ($)
1.1 Mobilization / Demobilization				
1.1.1 Equipment Mob	1	Lump Sum	162,700.00	162,700.00
1.1.2 Site Facilities	1	Lump Sum	5,600.00	5,600.00
1.1.3 Crew - Mob & Site Setup	5	Day	36,347.12	181,735.58
1.1.4 Crew - Demob & Site Cleanup	5	Day	36,347.12	181,735.58
			Subtotal	***531,771.16***
1.2 Project Site Support				
1.2.1 Site Facilities	18	Month	8,220.00	147,960.00
1.2.2 Field Management	18	Month	107,894.57	1,942,102.19

[241] For all types of energy facilities, the subtotal of line-item costs, including contractor's overhead, profit and insurance costs, and specialty contract costs is increased by one percent to account for the cost of a performance bond that would be posted by the contractor as assurance that the work would be completed as agreed, if the facility needed to be retired absent the applicant.

[242] OSCAPPDoc1-4 Final Order on ASC w Attachments 2022-02-25, p. 109-110.

Table 8: Decommissioning Tasks and Cost Estimate

Task or Component	Quantity	Unit[1]	Unit Cost ($)	Estimate ($)
			Subtotal	***2,090,062.19***
1.3. Substation Retirement				
1.3.1 Fence Removal	6	Day	1,354.33	8,125.96
1.3.2 Transformer Removal	6	Each	102,049.58	612,297.48
1.3.3 Control Building Removal	6	Each	2,508.66	15,051.98
1.3.4 UG Utility & Ground Removal	6	Day	1,354.33	8,125.96
1.3.5 Remove Foundations	6,000	Cubic Yard	27.85	167,080.08
1.3.6 Misc. Material Disposal	6	Each	2,475.00	14,850.00
1.3.7 Restore Yard	6	Each	39,971.63	239,829.77
			Subtotal	***1,065,361.22***
1.4. Switchyard Retirement				
1.4.1 Fence Removal	2	Day	1,354.33	2,708.65
1.4.2 UG Utility & Ground Removal	2	Day	1,354.33	2,708.65
1.4.3 Dismantle/Loadout	2	Each	13,481.28	26,962.56
1.4.4 Remove Foundations to Subgrade	568	Cubic Yard	27.85	15,816.91
1.4.5 Misc. Material Disposal	2	Each	2,475.00	4,950.00
1.4.6 Restore Yard	2	Each	31,233.04	62,466.07
			Subtotal	***115,612.85***
1.5 230kV Transmission Line Retirement				
1.5.1 Remove Structures & Conductor	200	Each	4,978.95	995,789.70
1.5.2 Remove Foundations to Subgrade	200	Each	4,925.29	985,058.91
			Subtotal	***2,336,984.61***
1.6 34.5kV Overhead Collector Line Removal				
1.6.1 Conductor Removal	22,704	Feet	1.99	45,119.55
1.6.2 Utility Pole Removal	101	Each	1,118.59	112,977.88
			Subtotal	***158,097.44***
1.7 O&M Building Removal				
1.7.1 Structure Demo	160	Ton	514.43	82,308.05
1.7.2 Remove Foundations To Subgrade	200	Cubic Yard	35.74	7,147.53
1.7.3 Material T&D	160	Ton	95.00	15,200.00
			Subtotal	***104,655.58***
1.8 BESS Removal				
1.8.1 Battery Removal & Disposal	1,745	MW	1,984.59	3,463,111.34
1.8.2 Structure & Components Removal	1,745	MW	1,116.76	1,948,740.79
			Subtotal	***5,411,852.14***
1.9 Solar Array Retirement				
1.9.1 Fence Removal	306,240	Feet	1.31	399,882.09
1.9.2 Solar Panel Removal & Disposal	3,937,536	Panels	6.54	25,749,571.62

Table 8: Decommissioning Tasks and Cost Estimate

Task or Component	Quantity	Unit[1]	Unit Cost ($)	Estimate ($)
1.9.3.1 Solar Rack & Post Removal	65,625	Posts	257.21	16,879,406.25
1.9.3.2 Solar Rack & Post Trans. & Disp.	1,459	Truck Loads	1,375.00	2,006,125.00
1.9.4 Spare Module Disposal	204,720	Panels	3.48	712,425.60
			Subtotal	***45,747,410.55***
1.10 Inverter/Transformer Removal				
1.10.1 Disconnect Electrical	318	Each	1,203.06	382,572.13
1.10.2 Loadout Inverter & Transformer	318	Each	3,038.11	966,117.55
1.10.3 Trucking - Per Load	318	Each	1,375.00	437,250.00
			Subtotal	***1,785,939.68***
1.11 Inverter/Transformer/BESS Foundation Removal				
1.11.1 Excavate/Remove Foundations	633,990	Cubic Yard	15.87	10,063,481.77
1.11.2 Concrete Transport and Disposal	633,990	Each	11.97	7,591,034.89
			Subtotal	***17,654,516.65***
1.12 Site Restoration				
1.12.1 Site Roads - Removal and Restoration	290,400	Feet	1.71	497,524.00
1.12.2 Remove Conex and Gravel Pads	50	Each	760.05	38,002.50
1.12.3 Spot Grade Disturbed Areas	3,304	Acre	287.72	950,629.77
1.12.4 Re-Seed Disturbed Areas	3,304	Acre	500.00	1,652,000.00
			Subtotal	***3,138,156.27***
Total Decommissioning Cost				***80,140,420.33***
Contractor Markups				
Home Office, Project Management			5%	4,007,021.02
Contractor OH & Fee			15%	12,622,116.20
			Subtotal	***16,629,137.22***
Total Decommissioning & Markup Cost				***96,769,557.55***
1.13 Contingencies				
Performance Bond			1%	967,695.58
Total Gross Cost				***97,737,253.12***
	Basis (%)	**Basis ($)**	**Contingency**	**Estimate ($)**
Admin. and Project Management	100%	96,868,396.67	10%	9,773,725.31
Future Development (no BESS)	93%	90,268,237.10	10%	9,113,709.36
Future Development (BESS Only)	7%	6,600,159.57	20%	1,320,031.91
			Subtotal	***20,207,466.58***
TOTAL ESTIMATED COST ($Q1 2023)				**117,944,719.70**

Notes:

1. See ASC Exhibit X Attachment X-1 for detailed breakdown of tasks, actions and unit costs for the sum total costs presented in this Table.

Table 8: Decommissioning Tasks and Cost Estimate

Task or Component	Quantity	Unit[1]	Unit Cost ($)	Estimate ($)
2. To allow continued use of the land for agricultural or other purposes deemed appropriate at the time of decommissioning purposes, all subsurface features including underground collector lines and concrete foundations associated with the O&M, Substation, Solar, Battery, Transmission Line, and Met towers will be removed under the Final Order on ASC, or as agreed with the landowner, in a final Retirement Plan. 3. Tasks associated with a Lump Sum unit cost may be calculated using a fraction (in decimal form) of the actual quantities constructed or by using the more detailed breakdown of unit costs associated with the Lump Sum task identified in the cost estimating worksheet in ASC Exhibit X, Attachment X-1.				

IV.G.1.3 Ability of the Applicant to Obtain a Bond or Letter of Credit

As shown in Table 8, above, the Department recommends the Council find that the cost that would be incurred by the state if the applicant defaulted on its obligation to retire the facility and restore the site following the permanent cessation of construction or operation of the facility is estimated to be approximately $117.945 million, in Q1 2023 dollars.

In a letter dated May 10, 2023, Fred Zeleya, Managing Director of Project Finance for the Americas for MUFG Bank, Ltd., states that the applicant has an ongoing relationship with the bank that includes including issuing letters of credit to support the contractual obligations of the applicant's renewable energy projects. While the letter does not provide a binding commitment from the bank, it indicates that the bank would be comfortable with potentially providing a letter of credit in the amount of up to $120 million dollars to the applicant.[243] MUFG Bank, Ltd. is the parent bank of MUFG Bank, N.A., which the Council has previously approved to provide letters of credit.[244]

The applicant intends to construct the facility in six phases, with each phase including an approximately 200 MW block of solar arrays and related or supporting facilities. The applicant indicates that it may provide separate financial assurance instruments for each phase.[245]

Under OAR 345-25-0006(8), the Council must impost a condition in each site certificate requiring the applicant to submit and maintain a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition. As described above, based on maximum buildout of the proposed facility, facility retirement and site restoration are estimated to cost approximately $117.945 million in Q1 2023 dollars, imposed under Recommended Retirement and Financial Assurance Condition 4 as follows:

> **Recommended Retirement and Financial Assurance Condition 4 (PRE)**: Prior to construction of the facility or phase, as applicable, the certificate holder shall submit to the State of Oregon, through the Council, a bond or letter of credit naming the State of Oregon, acting by and through the Council, as beneficiary or payee. The approved bond

[243] SSPAPPDoc25-13 ASC Exhibit M Financial Capability 2024-05-15, Attachment M-2.

[244] Energy Facility Siting Council 2023 Financial Institution List.

[245] SSPAPPDoc25-24 ASC Exhibit X Retirement 2024-05-15, Section 5.0.

or letter of credit amount of $117,945,000 (Q1 2023 dollars) may be adjusted based on the design configuration of the facility, or phase of the facility, as provided in Sub(a) and adjusted to the year and quarter of issuance as provided under Sub(b).

a. The bond or letter of credit amount may be adjusted based on actual design/number of components of the facility or phase, as applicable, and shall use the same unit costs and contingencies presented in the Final Order on the ASC Table 8.
b. Adjust the amount of the bond or letter of credit using the U.S. Gross Domestic Product Implicit Price Deflator, Chain Weight, as published in the Oregon Department of Administrative Services' "Oregon Economic and Revenue Forecast" or by any successor agency by using the index value for the year and quarter of the nominal value and the quarterly index value for the date of issuance of the new bond or letter of credit. If at any time the index is no longer published, the Council shall select a comparable calculation to adjust the amount for inflation.
c. The bond or letter of credit must be issued by a financial institution that is included on the Council's pre-approved financial institution list. The certificate holder may request to have a financial institution added to the list at any time.
d. The bond or letter of credit must be prepared using the most recent Council-approved template.

[PRE-RF-01]

Recommended Retirement and Financial Assurance Condition 5 (CON): During construction, the certificate holder shall:

a. Describe the status of the bond or letter of credit in the semi-annual report submitted to the Department pursuant to OAR 345-026-0080.
b. If construction extends for more than 12 months, the certificate holder shall adjust the amount of the bond or letter of credit on an annual basis thereafter as described in Condition PRE-RF-01.
c. The Department and Council reserve the right to adjust the contingencies, as necessary to ensure that costs to restore the site are adequate.

[CON-RF-01]

Recommended Retirement and Financial Assurance Condition 6 (OPR): During operation, the certificate holder shall:

a. Annually adjust the amount of the bond or letter of credit using the U.S. Gross Domestic Product Implicit Price Deflator, Chain Weight, as published in the Oregon Department of Administrative Services' "Oregon Economic and Revenue Forecast" or by any successor agency by using the index value for the year and quarter of the nominal value and the quarterly index value for the date of issuance of the new bond or letter of credit. If at any time the index is no longer published, the Council shall select a comparable calculation to adjust the amount for inflation.

b. Any changes to the template made by the Council must be incorporated into the bond or letter or letter of credit whenever the amount is adjusted under Sub(a).
c. The Department and Council reserve the right to adjust the contingencies, as necessary to ensure that costs to restore the site are adequate.

[OPR-RF-01]

IV.G.2. Conclusions of Law

Based on the foregoing recommended findings of fact, and subject to compliance with the recommended conditions, the Department recommends that the Council find that the proposed facility can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility.

IV.H. Fish and Wildlife Habitat: OAR 345-022-0060

To issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are consistent with:

*(1) The general fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025(1) through (6) in effect as of February 24, 2017****[246]

IV.H.1. Findings of Fact

The analysis area for potential impacts to fish and wildlife habitat, as defined in the Project Order, is the area within and extending 0.5 miles from the site boundary. [247]

Evaluation of Applicant's Methodology

Literature review and field studies were conducted in 2021-2022, based on consultation with ODFW, and review of state (ODFW, ORBIC), federal (USFWS) and regional wildlife databases. Surveys were conducted in 2022, including protocol-level Washington Ground Squirrel (WAGS) surveys,[248] special-status wildlife species surveys, raptor nest surveys, habitat categorization, botanical and wetland surveys.

WAGS surveys were conducted between April 3, 6, 7, and 15, 2022 and May 3, 4, and 5, 2022. The fish and wildlife habitat analysis area includes 755 acres of potentially suitable WAGS

[246] Administrative Order EFSC 1-2017, effective March 8, 2017.

[247] ESPNOIDoc7 Project Order 2022-09-26, p. 40.

[248] SSPAPPDoc40-05 ASC Exhibit P Fish and Wildlife 2024-06-18. Attachment P-1. Protocol-survey methods generally followed Morgan, R.L., and M. Nugent. 1999. Status and Habitat Use of the Washington Ground Squirrel (Spermophilus washingtoni) on State of Oregon Lands, South Boeing, Oregon in 1999. Report to the Oregon Department of Fish and Wildlife.

habitat. Of the suitable habitat, 724 acres were surveyed. The approximately 31 acres of unsurveyed suitable WAGS habitat has been reviewed via desktop sources and confirmed unlikely to support WAGS.[249] Ground-based (vehicle and on foot) raptor nest surveys were conducted between May 3, 4, 5 and 6, 2022. The raptor nest survey area encompassed the entirety of the analysis area, equivalent to 19,799 acres. The WAGS and raptor nest survey area is presented in ASC Exhibit P Figure P-1.

During the 2022 WAGS surveys, there were no observations of active WAGS burrows or colonies. During the 2022 raptor nest surveys, 14 nests were detected including three in-use Swainson's hawk nests, one in-use great horned owl nests, two in-use common raven nests, two in-use American crow nests, one great horned owl nest of unknown status, and five small inactive nests with unknown species determinations. Six of the nests were located within the proposed site boundary, including two in-use Swainson's hawk nests, one in-use common raven nest, one great horned owl nest of unknown status, and two small inactive nests with unknown species determination.[250]

Habitat categorization surveys included desktop review of USFWS, 2022 National Wetlands Inventory data, 2018 National Hydrography Dataset, 2019 National Land Cover Database, 2016 Oregon Conservation Strategy, 2021 Oregon Biodiversity Information Center data. Based on the results of the literature review, habitat categorization surveys were conducted on June 20 and 21, 2022. Biologists delineated areas of relatively homogenous vegetation and characterized the composition and structure of habitat, with a minimum mapping unit of 1-acre. Each delineated vegetation polygon was assigned a habitat type, subtype and habitat category.

Wetland surveys were conducted within the 10,992 acre site boundary on March 21 and 22, 2022. The results of these surveys are described below as they were used to inform habitat categories within the analysis area. Botanical surveys were conducted within the 10,992 acre site boundary on June 20 and 21, 2022 using intuitive controlled transect methodology.

The Department recommends Council find that the above-described databases, references and field surveys were conducted in accordance with ODFW and ODAg recommendations and other available guidance are appropriate for informing habitat categorization at the site and potential impacts to state sensitive wildlife species.

Habitat Categories within the Analysis Area

This standard creates requirements for mitigating impacts to fish and wildlife habitat, based on the functional quantity and quality of the habitat impacted as well as the nature, extent, and duration of the impact. Functional quality is presented using a habitat classification system based on the function and value of the habitat it would provide to a species or group of species

[249] SSPAPPDoc36-04 ASC Reviewing Agency Comment ODFW 2024-06-18.

[250] SSPAPPDoc40-05 ASC Exhibit P Fish and Wildlife 2024-06-18. Attachment P-1. Section 4.3

likely to use it. ODFW policy identifies six habitat categories, with Category 1 being the most valuable, and Category 6 the least valuable.

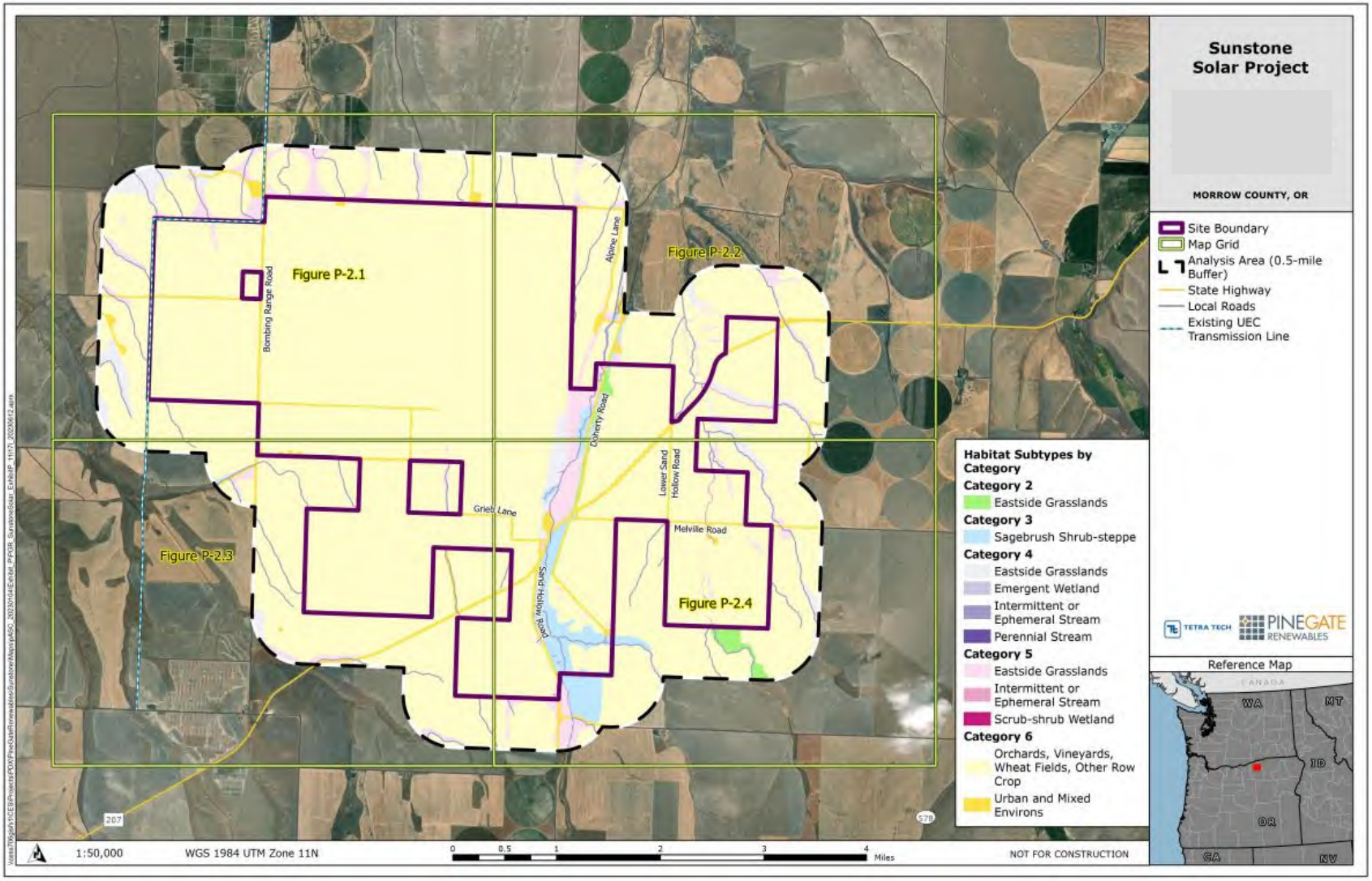
As described above, the analysis area includes the area within and extending ½-mile from the site boundary. When an analysis area extends beyond the area that could be directly impacted, as is the case under the Fish and Wildlife Habitat standard, the purpose is to identify whether there are adjacent sensitive habitat areas, such as WAGS Category 1 habitat, that would inform habitat categorization within the area of potential impact.

Habitat categorization, based on habitat subtype, within the analysis area includes the following:

- Category 2 habitat:
  - Eastside grasslands (Upland Grassland, Shrub-Steppe and Shrubland)
- Category 4 habitat:
  - Eastside grasslands (Upland Grassland, Shrub-Steppe and Shrubland)
  - Intermittent or Ephemeral Streams (Open Water – Lakes, Rivers, Streams)
- Category 5 habitat:
  - Eastside grasslands (Upland Grassland, Shrub-Steppe and Shrubland)
- Category 6 habitat:
  - Orchards, Vineyards, Wheat Fields, Other Row Crops (Agriculture, Pasture and Mixed Environs)
  - Urban and mixed environs

The Department consulted with ODFW on the adequacy of the desktop and field surveys conducted to inform the habitat categorization for the analysis area. Based on this consultation, the Department recommends Council find that the habitat categorization may be relied upon to establish the applicable mitigation goals under the standard. The results of the habitat categorization surveys are presented in Figure 7: Habitat Categories within the Analysis Area below.

Figure 7: Habitat Categories within the Analysis Area



1

Habitat Impacts and Mitigation

Habitat impacts can be temporary, temporal or permanent depending on whether the impact can be restored within 3-5 years, 5-10 years or is not recoverable and therefore considered permanent due to siting of facility structures. For this proposed facility, approximately 5.4 acres of Category 2, 4 and 5 habitats would be temporarily impacted during transmission line construction. Approximately 36.5 acres of Category 2, 4 and 5 habitats would be within the perimeter fenceline of the facility and therefore considered a permanent habitat impact. Habitat impacts, based on full facility build-out, by category and acres are presented in Table 9 below.

Table 9: Summary of Habitat Impacts by Category/Acres

Habitat Type	Habitat Subtype	Impacts (Acres)	
		Permanent	Temporary
Category 2			
Upland Grassland, Shrub-Steppe and Shrubland	Eastside Grasslands	< 0.1	0.4
Category 4			
Open Water – Lakes, Rivers, Streams	Intermittent or Ephemeral Streams	--	< 0.1
Upland Grassland, Shrub-Steppe and Shrubland	Eastside Grasslands	17.9	2.7
Category 5			
Upland Grassland, Shrub-Steppe and Shrubland	Eastside Grasslands	18.5	2.2
Category 6			
Agriculture, Pasture and Mixed Environs	Orchards, Vineyards, Wheat Fields, Other Row Crops	9,397.4	51.3
Urban and Mixed Environs	--	7.7	1.2
Total Habitat Impacts, Category 2, 4 and 5 =		36.5	5.4

"Habitat Category 2" is essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population or unique assemblage.

The mitigation goal for Category 2 habitat is no net loss and a net benefit in habitat quantity or quality. The Council interprets this to mean that both habitat quantity and quality must be preserved and enhanced. The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts through reliable "in-kind, in-proximity" habitat mitigation to achieve no net loss and a net benefit in either pre-development habitat quantity or quality.

"Habitat Category 4" is important habitat for fish and wildlife species.

Like Category 3, the mitigation goal for Category 4 habitat is no net loss in either existing habitat quantity or quality. The Council interprets this to mean that both existing habitat quantity and quality must be preserved. The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts. In contrast to Category 3, mitigation options are less constrained and may involve reliable "in-kind or out-of-kind, in-proximity or off-proximity" habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.

> *"Habitat Category 5" is habitat for fish and wildlife having high potential to become either essential or important habitat*.

If impacts are unavoidable, the mitigation goal for Category 5 habitat is to provide a net benefit in habitat quantity or quality. The Council has previously interpreted this to mean that there must be some improvement in either habitat quality or quantity. To clarify the "net benefit" goal, ODFW has advised: "The improvement in habitat quantity or quality achieved need not rise to the level of improvement required to meet a goal of 'no net loss' (i.e. the level required or recommended in the Mitigation Policy for Habitat Categories 2, 3, and 4)." The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts through "actions that contribute to essential or important habitat."

> *"Habitat Category 6" is habitat that has low potential to become essential or important habitat for fish and wildlife.*

Impacts to Category 6 habitat does not require mitigation under the standard.

To achieve the mitigation goals for the approximately 5.6 acres of temporary habitat impacts, a Revegetation Plan will be implemented. The draft Revegetation Plan includes requirements for habitat restoration through reseeding with taller native species of grasses and pollinator-friendly forbs. Seeding methods may include one or a combination of the following seeding methods: broadcast seeding, hydroseeding and drill seeding. The final seed mix will be determined based on consultation with Department, ODFW and Morrow County Weed Control. Success of habitat restoration will be determined through short- and long-term monitoring at the site, combined with long-term noxious weed monitoring. The applicant will be required to establish a paired monitoring and reference sites for each habitat subtype temporarily impacted during construction. Reference sites will be of similar habitat quality to impacted habitat areas.

The success of habitat restoration will be evaluated against the following criteria:

- Cover of native and desirable forbs will be at least 75% of the reference sites within 5 years
- Cover and richness of native and desirable grass species should be at least 85% similar to reference sites within 5 years; and,
- Presence and cover of noxious weeds is 75% or less that of the reference site.

The above-described monitoring approach, with paired monitoring and reference sites, and success criteria represent a robust, quantitative approach consistent with ODFW guidance for evaluating the success of temporary habitat restoration. The Department therefore recommends Council find that the revegetation methods, monitoring and success criteria are adequate to achieve restoration success, consistent with habitat Categories 2, 4 and 5.

The Department recommends Council impose the following condition requiring that, prior to construction, the applicant submit to the Department, for review and approval, a draft Final Revegetation Plan. The finalization of the draft Revegetation Plan includes determining final estimated temporary habitat disturbance based on final facility design or phase, by habitat type and category. Based on the final estimated temporary habitat impacts, plan finalization then includes establishing the number and location of reference sites to be utilized during short- and long-term monitoring and conducting preconstruction surveys for collection of baseline quantitative data (vascular plant species present, native/non-native species present, percent cover of dominant species, percent cover of state and county listed noxious weed, and evidence of disturbance) for the reference sites. The recommended condition is as follows:

> **Recommended Fish and Wildlife Habitat Condition 1 [PRE]:** Prior to construction of the facility, facility component or phase as applicable, the certificate holder shall finalize the Revegetation and Reclamation Plan, based on Attachment G of the Final Order on the ASC, and submit to the Department for review and approval.
> [PRE-FW-01; Final Order on ASC]

The Department recommends Council impose the following two conditions requiring that the Revegetation Plan, as finalized per the recommended condition above, be implemented and adhered to during construction, as applicable, and during operations.

> **Recommended Fish and Wildlife Habitat Condition 2 [CON]:** During construction, the certificate holder shall implement and adhere to the Revegetation and Reclamation Plan, as applicable.
> [CON-FW-01; Final Order on ASC]

> **Recommended Fish and Wildlife Habitat Condition 3 [OPR]:** During operation, the certificate holder shall implement and adhere to the Revegetation and Reclamation Plan, as applicable.
> [OPR-FW-01; Final Order on ASC]

To achieve the mitigation goals for permanent habitat impacts to Categories 2, 4 and 5, the applicant proposes a “third-party payment to provide” mitigation approach under the Habitat Mitigation Plan (HMP). A “third-party payment to provide” approach includes providing a lump sum payment to a third-party land trust entity to support short- and long-term treatment, monitoring and conservation into perpetuity via the terms and requirements of an executed memorandum of understanding, or similar, between applicant and third-party. The land would

be secured from future development through a long-term easement and property rights held by the third-party land management entity.

The draft HMP offers to contribute funding to supplement ongoing conservation work being conducted by The Nature Conservancy (TNC) at the Lindsay Prairie Preserve in Morrow County. Lindsay Prairie Preserve is located less than 2 miles west of the proposed site boundary. A proposed habitat mitigation area (HMA) has been identified. The proposed HMA includes 27-acres within a larger, 376-acre preserve, Lindsay Prairie Preserve, currently managed and protected by TNC.

The size of the HMA is based on a mitigation ratio – for every acre of habitat impacted, an acre or more would be protected within a mitigation area. To achieve consistency with the Category 2 habitat quantity goal of no net loss and a net benefit, the proposed ratio is 1.5 to 1; to achieve consistency with the Category 4 habitat quantity goal of no net loss, the proposed ratio is 1:1; and, to achieve consistency with the Category 5 habitat quantity goal of a net benefit, the proposed ratio is 0.5:1, as presented in Table 10 below.

Table 10: Habitat Mitigation Ratio and Acreage Summary

Habitat Category	Acreage Mitigation Ratio	Permanent Impact (Acres)	Mitigation Acres	Does it meet mitigation goal for quantity?
2	1.5:1	< 0.1	0.15	Yes
4	1:1	17.9	17.9	Yes
5	0.5:1	18.5	9.25	Yes
Habitat Mitigation Area, Max. Size =			**27.3**	

As presented in Table 10, based on the acreage mitigation ratios applied to acres permanently impacted, the Department recommends that Council find the approach for quantifying the habitat mitigation area needed to meet the mitigation goals is satisfactory.

To meet the mitigation goal for habitat quality, the applicant proposes to provide sufficient payments for chemical purchase and 3 rounds of chemical application for annual grass treatment and shrub plug planting on 27 acres within the HMA. The chemical application is expected to provide up to 30 years of benefit in controlling annual grasses. The draft HMP includes monitoring during the growing seasons for the first 5-years post treatment; the monitoring is intended to evaluate the efficacy of the treatment.

The draft plan does not include reporting nor sufficient details on the requirements of the legal instrument that would be secured to ensure that the terms include monitoring and conservation into perpetuity. Based on consultation with ODFW, the Department recommends Council require long-term monitoring and proof of durability in the plan. The Department has revised the draft HMP to include the following:[251]

[251] SSPAPP Complete ASC ODOE and ODFW Consultation 2024-06-13, 2024-06-18.

- Monitoring of the proposed enhancement actions to ensure long term success.
- Submittal of an agreement of durability between The Nature Conservancy and the Applicant.
- A map of the specific dedicated acres within The Nature Conservancy's property to be used for mitigation.
- After initial monitoring of treatments is complete in Year 5 or 6, the Applicant shall continue to monitor the site at 5-year intervals to confirm the site is being maintained at the same habitat category or better as compared to the baseline condition of the mitigation area. This will serve to demonstrate mitigation needs are being met throughout the life of the proposed facility.

The Department recommends Council impose a condition requiring that, prior to construction, the applicant provide the draft HMP to the Department, for review and approval. The finalization of the draft HMP includes determining final estimated permanent habitat disturbance based on final facility design or phase, by habitat type and category; finalization of the management plan to be implemented by TNC at the HMA; and execution of the legal instrument, following review and approval by the Department of the form to be used. The legal mechanism must provide assurance of durability for the life of the proposed facility to ensure the mitigation property will remain habitat if TNC ceases to own or manage the land prior to facility decommissioning. The legal instrument shall also contain an assurance that the land covered under the agreement will not be used to satisfy any other mitigation obligations other than those pertaining to this facility.

Recommended Fish and Wildlife Condition 4 (PRE): Prior to construction, the certificate holder shall submit the draft legal agreement for review and approval by the Department, in consultation with ODFW. The legal agreement shall ensure that payment provided for long-term management and enhancement of the mitigation area is adequate to cover the permanent habitat loss from the facility.
[PRE-FW-02; Final Order on ASC]

Recommended Fish and Wildlife Condition 5 (PRE): Prior to construction, the certificate holder shall finalize the Habitat Mitigation Plan, as provided in Attachment H of the Final Order on ASC, based on the impacts associated with the final facility design and the legal agreement, as approved by the Department.
[PRE-FW-03; Final Order on ASC]

Recommended Fish and Wildlife Condition 6 (OPR): During operation, the certificate holder shall provide reports from The Nature Conservancy on the status of long-term management and enhancement of the habitat mitigation area, consistent with the Habitat Mitigation Plan.
[OPR-FW-02; Final Order on ASC]

Based on this evidence and the evaluation of habitat, habitat categorization and applicable mitigation goals, and compliance with the above-proposed conditions, the Department

recommends Council find that the applicant has demonstrated that permanent impacts to wildlife habitat will be mitigated in a manner consistent with ODFW's fish and wildlife habitat mitigation policy.

Wildlife Impacts and Mitigation

The proposed site boundary contains suitable habitat for 5 state sensitive bats, 10 state sensitive birds, two protected eagle species and 1 state sensitive reptile, as presented in Table 11: *State Sensitive Species with the Potential to Occur within the Analysis Area* below.

1

Table 11: State Sensitive Species with the Potential to Occur within the Analysis Area

Common Name *(Scientific Name)*	ODFW Status in Columbia Plateau[1]	Expected Habitat	Observed (including Quantity) or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Bats				
hoary bat (Lasiurus cinereus)	S	Found in forested upland habitats, including junipers. Long-distance migrant.	None	Limited foraging habitat available. Probable transient during migration periods
pallid bat (Antrozous pallidis)	S	Caves/karst, desert scrub, grassland, and shrubland. Non-migratory	None	Limited potential summer and winter habitat available, including roosting habitat in karst formations present within rock outcrops and cliffs
silver-haired bat (Lasionycteris noctivagans)	S	Associated with older Douglas-fir/western hemlock and ponderosa pine forests as well as juniper woodland habitat near streams, ponds and lakes. Roosts in tree cavities, under loose bark, caves, mines and in abandoned buildings. Long-distance migrant	None	Limited foraging habitat available. Probable transient during migration periods
spotted bat (Euderma maculatum)	S	Uses crevices in cliffs, caves and canyon walls for day and nights roosts. Will also roost in trees at night and typically forage in	None	Limited foraging habitat available. Potential roosting habitat in karst formations present within

Table 11: State Sensitive Species with the Potential to Occur within the Analysis Area

Common Name *(Scientific Name)*	ODFW Status in Columbia Plateau[1]	Expected Habitat	Observed (including Quantity) or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
		meadows, shrub-steppe, or water sources. Regional migrant		rock outcrops and cliffs. Potential transient
Townsend's bigeared bat (Corynorhinus townsendii)	S	Found in natural caves, mines, and buildings in the summer. Hibernates October to April in caves and mines. Regional migrant	None	Limited foraging habitat available. Potential transient
Birds				
bald eagle (Haliaeetus leucocephalus)	None	Nests in forested areas adjacent to large bodies of water. Nests in trees, rarely on cliff faces and ground nests in treeless areas. Known to scavenge opportunistically on carcasses in otherwise unsuitable habitat particularly during migration	None	Potential scavenging habitat available. Potential transient
Brewer's sparrow (Spizella breweri)	S	Abundant east of the Cascades in sagebrush communities	Observed during Wildlife Surveys (April-May 2022)	Sagebrush habitat available within the analysis area
burrowing owl (Western) (Athene cunicularia hypugaea)	SC	Nests in earthen burrows in open shrub-steppe regions and grasslands.	Observed during Wildlife Surveys (April-May 2022)	Nesting and foraging habitat available within the analysis area

Table 11: State Sensitive Species with the Potential to Occur within the Analysis Area

Common Name *(Scientific Name)*	ODFW Status in Columbia Plateau[1]	Expected Habitat	Observed (including Quantity) or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
common nighthawk (Chordeiles minor)	S	Nests and roosts on gravel or sparsely vegetated grasslands. Forages for insects in all habitats, including sagebrush and rock scablands of eastern Oregon as well as urban and developed environments	None	Limited nesting habitat and suitable foraging habitat available within the analysis area.
ferruginous hawk (Buteo regalis)	SC	Occurs in the open landscapes east of the Cascades, most common in the foothills of the Blue Mountains. Nests on the ground or in lone or peripheral trees.	None	Limited to moderate nesting and foraging habitat available. Potential transient
golden eagle (Aquila chrysaetos)	None	Usually nests on cliffs but also can nest in trees. Breeds in open and semi-open habitats at a variety of elevations, in tundra, shrublands, grasslands, woodland-brushlands, and coniferous forests, farmland and riparian areas. Typically forages in open habitats like grasslands, areas with steppelike vegetation	None	Potential scavenging habitat available. Potential transient

Table 11: State Sensitive Species with the Potential to Occur within the Analysis Area

Common Name *(Scientific Name)*	ODFW Status in Columbia Plateau[1]	Expected Habitat	Observed (including Quantity) or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
grasshopper sparrow (Ammodramus savannarum)	S	Large areas of dry grassland habitat with low to moderate height and low shrub cover	None	Nesting and foraging habitat available within the analysis area
Lewis' woodpecker (Melanerpes lewis)	SC	Formerly widespread in Oregon, it is currently common year-round only in the white oakponderosa pine belt east of Mt. Hood. It also breeds in low numbers in open habitat along east Oregon river and stream valleys	High	Observed during Wildlife Surveys (April-May 2022)
loggerhead shrike (Lanius ludovicianus)	S	Breeds in open habitats east of the Cascades	High	Observed during Wildlife Surveys (April-May 2022)
long-billed curlew (Numenius americanus)	SC	Locally common breeder in open grassland areas east of the Cascades. It is most abundant in the Columbia River basin	High	Observed during Wildlife and Habitat Surveys (April-June 2022)
sagebrush sparrow (Artemisiospiza nevadensis)	SC	Widespread throughout the extensive shrub-steppe of eastern Oregon. Usually associated with big sagebrush	Moderate	None

Table 11: State Sensitive Species with the Potential to Occur within the Analysis Area

Common Name *(Scientific Name)*	ODFW Status in Columbia Plateau[1]	Expected Habitat	Observed (including Quantity) or Expected Occurrence within Analysis Area	Potential Use of Habitat within Analysis Area
Swainson's hawk (Buteo swainsoni)	S	Prefers bunchgrass prairies of eastern Oregon and common in the foothills of the Blue Mountains. Nests typically in solitary tree, bush, or small grove	High	Observed during Wildlife and Habitat Surveys (April-June 2022)
Reptiles				
sagebrush lizard (Sceloporus graciosus graciosus)	S	Found in sagebrush habitat, but also chaparral, juniper woodlands, and coniferous forests.	None	None

Notes:
ODFW Status: S = Sensitive Species, SC = Critical Sensitive Species
Source: SSPAPPDoc25-16 ASC Exhibit P Fish and Wildlife 2024-05-15, Table P-5.

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Potential impacts to state-sensitive species from proposed facility construction include injury to or loss (fatality) due to collision with or crushing from construction equipment vehicles; and, general disturbance (noise and visual), which can interrupt wildlife behavior. In addition, there are risks to wildlife species during proposed facility operations from structure collision, vehicle collisions, disturbance related to artificial lighting and introduction or spread of noxious weeds. To minimize impacts to wildlife species, the applicant proposes to implement numerous design measures, construction restrictions and a long-term wildlife monitoring plan.

All of the applicant's proposed construction minimization measures are presented in ASC Exhibit P Section 9.1.2, which have been converted into measures that can be evaluated by the Department and included in a Construction Wildlife Monitoring Plan provided as Attachment I of this order. In the draft Construction Wildlife Monitoring Plan, additional wildlife protection measures are recommended based on the Department's consultation with ODFW. These additional measures include:

- 20 mile per hour speed limit imposed within the facility fence line.
- Site specific worker environmental training for sensitive biological resources.
- If construction will occur between March 1 and August 15 the certificate holder shall complete raptor nest occupancy surveys and submit a construction plan (schedule) that demonstrates construction activities will not occur within the buffer zones during the sensitive nesting and breeding season.
- Flag and avoid, or develop constraints mapping to ensure avoidance, of ground-disturbing activities within the buffer of any active nest site.

The applicant proposes long-term monitoring of raptor nest activity within the facility fence line per ODFW recommendation. Through consultation with ODFW, the Department revised the applicant's draft plan to include more detailed and repeatable monitoring methods. The Department also replaced the collection of nest success data with nest occupancy at the recommendation of ODFW. ODFW considers nest occupancy data more appropriate for the purposes of this monitoring plan. As indicated in the plan, the following measures will be implemented during long-term wildlife monitoring at the facility:

- Raptor nest monitoring will occur during a baseline pre-construction survey, in the first full raptor nesting season after the commercial operating date, and every 5 years thereafter in years divisible by five for the life of the Facility.
- Monitoring will document nest occupancy data.
- No WAGS were detected during baseline surveys, but any new colonies that are detected incidentally during other surveys, such as raptor nest monitoring, will be documented and the extent of those colonies delineated and included in future WAGS monitoring and reporting activities. If activity is found monitoring of the colony will be initiated
- The applicant will incidentally document fatalities found during routine maintenance activities and any other incidentally detected fatalities. No fatality monitoring is proposed.

- The Applicant will report wildlife monitoring methods, data, and data analysis to ODOE for each calendar year in which wildlife monitoring occurs.

Based on the recommendations provided above, the Department recommends Council impose the following conditions:

Recommended Fish and Wildlife Condition 7 (PRE): Prior to construction of the facility or phase, as applicable, the certificate holder shall provide evidence to the Department that the design measures included in the Construction Wildlife Monitoring Plan (Final Order on ASC Attachment I) have been included in the final facility design and construction contractor contracts, as applicable.
[PRE-FW-04; Final Order on ASC]

Recommended Fish and Wildlife Condition 8 (CON): During construction, the certificate holder shall adhere to the requirements of the Construction Wildlife Monitoring Plan (Attachment I of the Final Order on the ASC). Monitoring records shall be maintained throughout construction and included in the semi-annual report submitted to the Department pursuant to OAR 345-026-0080.
[CON-FW-02; Final Order on ASC]

Recommended Fish and Wildlife Condition 9 (OPR): During operation, the certificate holder shall adhere to the requirements of the Operational Wildlife Monitoring Plan (Attachment J of the Final Order on the ASC). Monitoring records shall be maintained throughout operation and included in the annual report submitted to the Department pursuant to OAR 345-026-0080.
[OPR-FW-03; Final Order on ASC]

IV.H.2. Conclusions of Law

Based on the foregoing analysis, and subject to compliance with the recommended site certificate conditions described above, the Department recommends the Council find that the design, construction and operation of the proposed facility are consistent with the mitigation goals and requirements of the Oregon Department of Fish and Wildlife's Fish and Wildlife Habitat Mitigation Policy under OAR 635-415-0025.

IV.I. Threatened and Endangered Species: OAR 345-022-0070

To issue a site certificate, the Council, after consultation with appropriate state agencies, must find that:

(1) For plant species that the Oregon Department of Agriculture has listed as threatened or endangered under ORS 564.105(2), the design, construction and operation of the proposed facility, taking into account mitigation:

(a) Are consistent with the protection and conservation program, if any, that the Oregon Department of Agriculture has adopted under ORS 564.105(3); or

(b) If the Oregon Department of Agriculture has not adopted a protection and conservation program, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species; and

(2) For wildlife species that the Oregon Fish and Wildlife Commission has listed as threatened or endangered under ORS 496.172(2), the design, construction and operation of the proposed facility, taking into account mitigation, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species.[252]

IV.I.1. Findings of Fact

Per OAR 345-001-0010(35)(a) and as set forth in the Project Order, the analysis area for threatened or endangered (T&E) plant and wildlife species is the area within and extending 5-miles from the proposed site boundary.

Evaluation of Applicant's Methodology

To evaluate the potential for state-listed T&E plant and wildlife species to occur within the analysis area, agency consultation, literature review and field surveys were conducted. An initial desktop survey was completed in 2021; a follow-up review was completed in 2022. Sources reviewed include:

- Oregon Department of Fish and Wildlife's (ODFW) 2021 T&E and Candidate Species List
- Oregon Biodiversity Information Center's (ORBIC) 2022 Element Occurrence Record Digital Data Set for rare, threatened or endangered species for the state of Oregon from
- Oregon Department of Agriculture's (ODAg) 2022 Plant Conservation Species Information
- Morrow County's 2022 Wildlife Explorer (Oregon Wildlife Species via Wildlife Viewer)
- Oregon Flora's 2023 Mapping Tool
- StreamNet's 2023 Fish Distribution Data
- U.S. Geological Survey Data (July 2020, Version 2.0) National Land Cover Database
- U.S. Fish and Wildlife Service's (USFWS) 2021 Information for Planning and Consultation database query
- USFWS's 2022 Threatened, Endangered and Candidate Species List for Oregon
- Natural Resource Conservation Service's 2006 Websoil Survey Data

[252] Administrative Order EFSC 1-2007, effective May 15, 2007.

Consultation between the applicant, ODFW and ODOE on potential T&E wildlife species occurred on March 24, 2022.[253] Consultation between ODOE and ODFW occurred on June 18, 2024.[254] Consultation between ODOE and ODAg occurred on June 17, 2024.[255]

The literature review of ORBIC identified two state-listed T&E species with the potential to occur within the analysis area, based on their known ranges, presence of suitable habitats in the area, and known/historical occurrences in the ORBIC database - Washington ground squirrel ("WAGS" a state-listed endangered species) and Laurence's milkvetch (state threatened, federal species of concern). The ORBIC database showed 5 historical records for WAGS within the site boundary and one record for Laurence's milkvetch north of the site boundary. No state-listed fish have the potential to occur within the analysis area.

Field surveys were conducted for WAGS and rare plants, including state-listed T&E and candidate plant species. Because candidate species are not covered under the standard, this section evaluates the methods and results for the state-listed T&E plant species, Lawrence's milkvetch.

Washington Ground Squirrels

The site boundary includes 755 acres of suitable WAGS habitat, which includes a 1,000 foot buffer from areas of potential disturbance. Of the 755 acres, 724 acres were surveyed between April 3, 6, 7, and 15, 2022 and May 3, 4, and 5, 2022, which corresponds to the time when juvenile WAGs typically emerge from their burrows and are most active. The biologists did not observe any active WAGS colonies.

The unsurveyed area includes 31 acres and was not surveyed due to access restrictions. Areas not surveyed due to access restrictions included an area in between crop circles northwest of the site boundary, an area between crop circles south of the site boundary, and an area owned by the State of Oregon adjacent to Highway 207 within the site boundary that abuts an aggregate quarry and existing substation. While these 31 acres were not surveyed for this ASC, the area has been surveyed by the applicant's consultant for another EFSC facility (Boardman to Hemingway). Based on review of those survey results, the Department and ODFW concur that these acres are unlikely to contain WAGS colonies.[256]

Because WAGS routinely expand their habitat area, it is possible that before the applicant commences construction, WAGS may be present in areas where they were not present when the applicant conducted its field surveys. Therefore, the Department and ODFW recommend Council impose the following condition to ensure that WAGs have not expanded to areas where

[253] SSPAPPDoc25-17 ASC Exhibit Q TE Species 2024-05-15.
[254] SSPAPPDoc36-04 ASC Reviewing Agency Comment ODFW 2024-06-18.
[255] SSPAPPDoc36-03 ASC Reviewing Agency Comment ODAg 2024-06-17.
[256] SSPAPPDoc36-04 ASC Reviewing Agency Comment ODFW 2024-06-18.

facility components are to be constructed and that no WAGS colonies are in areas where surveys were limited by access issues.[257]

Recommended Threatened & Endangered Species Condition 1 (PRE): If construction commences after April 2025, certificate holder shall, prior to construction of the facility or phase, as applicable, conduct protocol-level Washington ground squirrel (WAGS) surveys within areas of planned facility construction that are within suitable WAGS habitat. The certificate holder shall:

a. Submit a protocol-level survey plan for surveys to be conducted within suitable WAGS habitat, for review and approval by the Department in consultation with ODFW. At a minimum, the survey plan shall specify the survey area (all areas of suitable habitat within 1,000 feet of ground disturbing activities except where there is a habitat barrier (e.g., a paved road) or access restrictions); and survey timing (February 15 to May 31, unless otherwise approved by ODFW).
b. Complete protocol-level WAGS surveys based on the protocol approved per (a).
c. Submit survey reports to the Department and ODFW. The certificate holder shall not begin construction within 1,000 feet of Category 1 or Category 2 WAGS habitat until the identified boundaries of Category 1 WAGS habitat have been approved by the Department, in consultation with ODFW. Category 1 habitat includes a 785-foot buffer from an identified active burrow, and the area within the perimeter of multiple active burrows. Category 2 WAGS habitat consists of a 4,136 foot buffer from the exterior boundary of all Category 1 WAGS habitat. The survey results are valid for 3-years.
d. Develop maps and worker training materials to inform of sensitive Category 1 and Category 2 habitat. Submit to the Department final facility design maps demonstrating that Category 1 habitat, including 785-buffer from any colonies identified per (b), is avoided.
e. Install flagging or other demarcation, as appropriate, to inform workers of sensitive WGS habitat and of avoidance requirement.

[PRE-TE-01]

<u>Laurence's milkvetch</u>

Botanical surveys within the entirety of the site boundary were conducted on June 20 and 21, 2022 using intuitive controlled transect methodology. The literature review and 2022 field surveys were adequately designed and conducted to properly detect listed plants with the potential to occur within the proposed site boundary.[258] Of the 42 vascular plant species observed, 22 (52 percent) were non-native species. No Laurence's milkvetch plants were observed within the site boundary.

[257] SSPAPPDoc36-04 ASC Reviewing Agency Comment ODFW 2024-06-18.
[258] SSPAPPDoc36-03 ASC Reviewing Agency Comment ODAg 2024-06-17.

Approximately 2 acres within the site boundary were not accessible at the time of surveys. Based on review of aerial photos and observations from adjacent, accessible areas, there is a low likelihood that the 2 acres not surveyed would support Laurence's milkvetch, due to an abundance of non-native species and lack of typical suitable habitat. The Department, in consultation with ODAg Native Plant Conservation Program staff, recommend Council concur that the 2 unsurveyed acres are unlikely to be areas where Laurence's milkvetch would be identified later; and the likelihood of future Laurence's milkvetch occurrences within the surveyed areas is low.[259] Based on the results of the 2022 rare plant surveys, there is a very low likelihood of Laurence's milkvetch occurrences within the proposed site boundary. Preconstruction surveys are unnecessary. Because these species were not observed during initial surveys, the Department recommends Council find that the design, construction and operation of the facility would not be likely to cause a significant reduction in the likelihood of survival or recovery of the species. For any incidental occurrences, the Department recommends Council impose the following condition:

> **Recommended Threatened and Endangered Species Condition 2 (CON):** Prior to and during construction of the facility, facility component or phase, as applicable, any incidentally identified occurrence(s) of Lawrence's milkvetch shall be avoided using a 100-foot buffer via mapping and flagging.
> [CON-TE-01]

IV.I.2. Conclusions of Law

Based on the foregoing analysis, and subject to compliance with the recommended site certificate condition(s) described above, the Department recommends the Council find that the design, construction and operation of the proposed facility is not likely to cause a significant reduction in the likelihood of survival or recovery of species listed as threatened or endangered by the Oregon Department of Agriculture or Oregon Fish and Wildlife Commission and, therefore meets Council's Threatened and Endangered Species standard in OAR 345-022-0070.

IV.J. Scenic Resources: OAR 345-022-0080

> *(1) To issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse visual impacts to significant or important scenic resources.*
>
> ** * **
>
> *(3) A scenic resource is considered to be significant or important if it is identified as significant or important in a current land use management plan*

[259] *Id*.

adopted by one or more local, tribal, state, regional, or federal government or agency.

** * * [260]*

IV.J.1. Findings of Fact

OAR 345-022-0080 requires the Council to determine that the design, construction and operation of the facility, taking into account mitigation, will not be likely to have a significant adverse impact to any significant or important scenic resources and values in the analysis area. In applying the standard in OAR 345-022-0080(1), the Council assesses the visual impacts of facility structures on significant or important scenic resources described in local land use plans, tribal land management plans and federal land management plans for any lands located within the analysis area described in the project order; "local" land use plans include state, county, and city planning documents or inventories.[261, 262]

The analysis area for the Scenic Resources standard is the area within and extending 10-miles from the proposed site boundary. The analysis area for the proposed facility includes parts of two Oregon counties (Morrow and Umatilla), one Oregon municipality (Lexington), and lands administrated by federal agencies (Bureau of Land Management (BLM), National Park Service (NPS), Department of Defense, and U.S. Forest Service (USFS). As summarized in Table 12, below, the applicant and Department evaluated several land use management and other plans to determine whether significant or important scenic resources were identified in the analysis area. Table 12 reflects the Department's recommendations for important or significant resources, discussed in this section.

[260] Administrative Order EFSC 5-2022, effective December 19, 2022.

[261] ESPNOIDoc7 Project Order 2022-09-26, p. 29.

[262] The evaluation for compliance under the Scenic Resources standard (OAR 345-022-0080) is informed by OAR 345-021-0010(1)(r), which establishes the information requirements for ASC Exhibit R. The terms "significant" and "important" (related to scenic resources) are not defined in Council rules or statutes, however, OAR 345-021-0010(1)(r) provides clarity including that scenic resources identified as "significant or important" in a land management plan should be 1) specifically identified as significant or important, with a description of the resource, and 2) have a portion of the management plan specific to the resource. These references are consistent with LCDC administrative rules that implement Statewide Planning Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces. B2HAPPDoc631 SR-1 OAH_Ruling and Order on MSD_2021-07-14.
If a there is a potential adverse impact to a Council protected Scenic resource, the management or development measures or criteria for protection of the resource as designated in the management plan would be applied to avoid, minimize or mitigate impacts to the resource.

Table 12: Management Plans Reviewed and Identified Scenic Resources

Jurisdiction	Plan	Scenic Resources Specified in Plan	Important or Significant Scenic Resources Identified in Analysis Area	Name of Scenic Resource	Location Scenic Resources Discussed in Plan
Counties					
Morrow County	Morrow County Comprehensive Plan and Zoning Ordinance (2013)	No	No	N/A	Natural Resources Element, p 96
Umatilla County	Umatilla County Comprehensive Plan (2010)	Yes	No	N/A	Chapter 8, Technical Report Map D-108
Municipalities					
City of Lexington	City of Lexington Comprehensive Plan (1979)	No	No	N/A	Section IV
State					
Oregon Department of Transportation	1999 Oregon Highway Plan*	Yes	Yes	Blue Mountain Scenic Byway	Policy Element, Policy 1D.
Federal					
BLM, Vale District, Baker Resource Area	Baker Resource Management Plan (BLM 1989)	Yes	No	N/A	Chapter 2, Visual Resources; Management Guidance for applicable Geographic Units; Map 5
NPS	Comprehensive Management and Use Plan Update Final Environmental Impact Statement, Oregon National Historic Trail, etc.	Yes	Yes	ONHT High Potential Sites and Segments (Well Spring)	Page 42 and 307

Table 12: Management Plans Reviewed and Identified Scenic Resources

Jurisdiction	Plan	Scenic Resources Specified in Plan	Important or Significant Scenic Resources Identified in Analysis Area	Name of Scenic Resource	Location Scenic Resources Discussed in Plan
DoD	Integrated Natural Resource Management Plan and Integrated Cultural Resource Management Plan for Boardman Bombing Range (Naval Weapons System Training Facility), 2012	No	No	N/A	N/A; scenic resources not addressed in plan
USDA	Umatilla National Forest Land Management Plan*	Yes	Yes	Blue Mountain Scenic Byway	Page 70; 112
USFS/ ODOT	Blue Mountain Scenic Byway Interpretive Management Plan	Yes	Yes	Blue Mountain Scenic Byway	Section II Resource Inventory
Notes: * Reviewed and added by Department					

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IV.J.1.1 Important or Significant Scenic Resources in the Analysis Area

The Department accessed and reviewed the applicable portions of the plans listed in Table 12 above, and consistent with the applicant's evaluation in ASC Exhibit R, the Department recommends the Council find that the Morrow County Comprehensive Plan, City of Lexington Comprehensive Plan, and the Department of Defense Integrated Natural Resource Management Plan for Boardman Bombing Range do not identify specific scenic resources.[263]

As indicated in Table 12 above and described below, the Department recommends Council find that the Oregon National Historic Trail Well Spring High Potential Site and Segment and the Blue Mountain Scenic Byway are important scenic resources, however, also as discussed below, the facility would not have an adverse visual impact to these resources.

The applicant evaluated the National Park Service's Comprehensive Management and Use Plan Update (NPS CMP) for the Oregon National Historic Trail and maintains that the NPS CMP does not identify scenic resources. The applicant cites the Council's finding in its Final Order on the Application for Site Certificate for the Shepherds Flat Wind Farm that "federal land segments of the Oregon Trail are managed for their historical significance and not primarily as scenic resources" to support its position.[264] The Department reviewed the NPS CMP, and while scenic values may not be the primary reason for preservation of Oregon Trail segments and sites, the NPS CMP identifies high-potential trail sites and segments based on a number of characteristics, including scenic quality and relative freedom from intrusion.[265] The NPS CMP identifies the Well Spring Segment and Interpretive Site (or known as the Boardman Bombing Range Segment), as a NRHP eligible ONHT segment.[266] High-potential segments are those segments of a trail that afford high quality recreational experiences along a portion of the route having greater than average scenic values.[267] Therefore, the Department recommends the Council find that the Well Spring Site and Segment constitute important scenic resources. The Well Spring Site and Segment are also evaluated in Section IV.L., *Recreation* in this order.

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[263] The Umatilla County Comprehensive Plan and BLM Baker Resource Area Management Plan do identify important or significant scenic resources, the resources (Wallula Gap, Elephant Rock, and VRM Class I and II resources) are located outside of the analysis area, therefore are not impacted or associated with this facility.

[264] SSPAPPDoc25-18 ASC Exhibit R Scenic 2024-05-15, Section 3.5.2.

[265] Well Spring (No. 114) identified in Appendix G. Oregon National Historic Trail: High-Potential Segments p. 307; Scenic values described on page 42; Updated Comprehensive Management and Use Plan for National historic Trails (ONHT) https://www.nps.gov/cali/learn/management/upload/CALI-CMP-SM-updated.pdf

[266] NRHP Nomination Form September 13, 1978. https://npgallery.nps.gov/AssetDetail/NRIS/78002305 Access by Department 05-21-2024; and https://npgallery.nps.gov/NRHP/GetAsset/NRHP/78002305_text

[267] This trail segment extends from the eastern edge of the Boardman Bombing Range in a southwest direction to Immigrant Lane and then parallels to road to the western edge of the range and continues to the west. Physical evidence of the trail, i.e., wagon ruts, is still present in much of this 12-mile corridor. However, approximately 7 miles of this segment are within the Boardman Bombing Range and inaccessible to the public except for a small area surrounding the Oregon Trail Well Spring Interpretive Site; the remainder of the high potential segment is on private lands to the west of the Bombing Range (most of which is managed by The Nature Conservancy as part of the Boardman Conservation Area) and is also not open to the public. SSPAPPDoc25-20 ASC Exhibit T Recreation 2024-05-15, Section 4.4.2.1.

The applicant reviewed Blue Mountain Scenic Byway Interpretive Management Plan and states that the Blue Mountain Scenic Byway is not a significant or important scenic resource because management plan is focused on means to enhance wayfinding and visitor experience in the many towns along the tour route. Applicant asserts the Plan is not a land management plan, a transportation plan, or a highway management plan, but is instead a plan for enhancing tourism, nor does the Plan does grant authority for land management outside of the Umatilla National Forest, which is outside of the analysis area. The Department also reviewed the Blue Mountain Scenic Byway Interpretive Management Plan, as well as the 1999 Oregon Highway Plan and the Umatilla National Forest Land Management Plan. While ODOT has not adopted a corridor management plan specific to the Blue Mountain Scenic Byway, the 1999 Oregon Highway Plan identifies the Blue Mountain Scenic Byway and states that the Oregon Transportation Commission designates Scenic Byways for having "exceptional scenic value." The 1999 Oregon Highway Plan outlines its policy for Scenic Byways and indicates priorities for the development of guidelines to preserve and enhance the scenic value while accommodating critical safety and performance needs and to develop management priorities for Scenic Byways in management plans and corridor plans.[268] The Blue Mountain Scenic Byway Interpretive Management Plan also states that the Plan meets the intent and guiding policies of the Umatilla National Forest Land Management Plan. While the Umatilla National Forest maybe outside the analysis area, the Umatilla National Forest Land Management Plan identifies the Blue Mountain Scenic Byway and states that the scenic integrity of scenic byways is high; corridor management plans provide a frame of reference for meeting scenic integrity objectives and for protecting and enhancing the intrinsic qualities for which byways were designated. [269] Based on the review and connectivity of these applicable management and interpretive plans, the Department recommends the Council find the Blue Mountain Scenic Byway constitutes an important scenic resource under OAR 345-022-0080(3).

IV.J.1.2 Visual Impacts on Important Scenic Resources

The applicant used the same visual impact assessment methodology that was performed for the visual impact assessment for protected areas, discussed in detail in Section IV.F., *Protected Areas*, which includes viewshed modeling assuming a bare earth model, which produces a Zone of Visual Influence indicating the likelihood of visibility of facility structures. The two most potentially visible components are the solar arrays at a maximum height of 15 feet and the aboveground 230-kV transmission lines, assumed to have a maximum height of 180 feet.[270] Factors that may impact the visibility of the facility are the existing visual context, particularly other sources of development or visual contrast present within the view; the distance of the site to the facility, and whether or not the area may be accessed by the public.

ONHT Well Spring Segment and Well Spring Interpretive Site

[268] https://www.oregon.gov/odot/Planning/Documents/OHP.pdf page 65-67. Accessed by Department 05-20-2024.
[269] https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd584608.pdf. Table 27 and pp. 112-114. Accessed by Department 05-20-2024.
[270] All other Facility infrastructure was assumed by the applicant to be less visually impactful (due to height, being dispersed throughout the site boundary or adjacent to taller infrastructure).

The facility's closest point to the Oregon National Historic Trail (ONHT) Segment is approximately 1.72 miles from the transmission line and solar arrays at the norther portion of the facility site boundary.[271] The area of the trail segment closest to the facility is located on privately-owned agricultural lands. Applicant indicates that the closest point to the site boundary is a middleground distance of approximately 1.7 miles (solar array) and 1.8 miles (transmission line), it is not likely that these facility components would be noticeable to a viewer. Any views of the facility from the trail segment would be anticipated to be less than the visual impacts at the Lindsay Prairie (1.3 miles away – as discussed in Protected Areas of this order). If a part of the facility were visible, the visual impact would be negligible because this portion of the high-potential trail segment is not accessible to viewers and existing wind turbines and other industrial infrastructure would dominate any visual contrast that might be created by the solar facility or associated transmission lines.[272] The applicant also explains that existing development on the landscape includes a Umatilla Electric Cooperative transmission line which is closer to the ONHT segment than the facility, which would further lessen any potential views of the facility. Because the facility would be 1.7 miles away from the ONHT segment, the trail segment in this area is on private lands or lands owned by the Navy so access is restricted, and because of existing development in the viewshed, the Department recommends Council find that any views of the facility from the ONHT segment would be less than significant.

The facility is approximately 4.2 miles from the remote Well Springs Interpretive Site, located west of the northern solar arrays and transmission line area at the facility.[273] Because the facility would be 2.5 miles further away than the closest ONHT Well Spring Segment described above, and that potential views of the facility attenuate with distance, vegetative and topographical screening, and views would also be blocked by intervening development, the Department recommends Council find that it would not be likely that there would be views of the facility at the Well Spring Interpretive Site and therefore, less than significant.

Blue Mountain National Scenic Byway

The portion of the Blue Mountain National Scenic Byway (OR-74) within the analysis area is an approximately 5.5 mile segment of OR-74 beginning at Lexington and continuing northwest. Portions of this segment that are closest to the facility are approximately 9.97 miles to 10.14 miles from the southwest corner of the facility. Applicant indicates, and the Department concurs, that the results of the ZVI indicate that visual impacts are considered to be none.[274] The Scenic Highway only has fragments of the highway that are actually in the analysis area, and at a distance of 10 miles, views of the facility with intervening topography and vegetative screening would not be likely. Therefore, the Department recommends Council find that the facility would not have visual impacts from Blue Mountain National Scenic Byway.

[271] https://tools.oregonexplorer.info/OE_HtmlViewer/index.html?viewer=renewable&layerTheme=efsc. Accessed by Department 05-20-2024 and SSPAPPDoc25-20 ASC Exhibit T Recreation 2024-05-15, Section 4.2.2.1.
[272] SSPAPPDoc25-20 ASC Exhibit T Recreation 2024-05-15, Section 4.2.2.1.
[273] SSPAPPDoc25-18 ASC Exhibit R Scenic 2024-05-15, Section 4.2.2.
[274] SSPAPPDoc25-18 ASC Exhibit R Scenic 2024-05-15, Figure R-2.2, and Section 4.2.1.

IV.J.2. Conclusion of Law

Based on the foregoing findings of fact, the Department recommends the Council conclude that the design, construction, and operation of the proposed facility would not be likely to result in significant adverse impacts to any scenic resource identified as significant or important in a local, tribal, or federal land or resource management plan, in compliance with Council's Scenic Resources standard.

IV.K. Historic, Cultural, and Archaeological Resources: OAR 345-022-0090

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:

(a) Historic, cultural or archaeological resources that have been listed on, or would likely be listed on the National Register of Historic Places;

(b) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in 358.905(1)(c); and

(c) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

IV.K.1. Findings of Fact

Resources protected under the standard include archeological sites (ORS 358.905(1)(c)), archeological objects (ORS 358.905(1)(a)) and any historic, cultural or archeological resource listed or likely eligible for listing on the National Register of Historic Places (NRHP). Information concerning the location of archaeological sites or objects may be exempt from public disclosure under ORS 192.502(4) or 192.501(11).

The analysis area for direct impacts to archeologic sites and objects is the area within the site boundary. For indirect impacts to aboveground resources, including Traditional Cultural Properties

(TCPs) or Historic Properties of Religions and Cultural Significance to Indian Tribes (HPRCSITs), the analysis area is the area within and extending 2 miles from the site boundary. The entire analysis area is located on private land. On January 17, 2022, the applicant consulted with the Legislative Commission on Indian Services (LCIS), requesting assistance in identifying appropriate tribes to consult with regarding tribal historic, and cultural resources in the vicinity of the Facility. LCIS identified the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO) and Burns Paiute Tribe.

The Department also provided its consultant, Historic Research Associates (HRA), with ASC Exhibit S and the draft Cultural Resources Pedestrian Survey Report (confidential Attachment S-1), for their review of the technical report, site forms for completeness as well as review of the applicant's recommendations for listing on the National Register of Historic Places (NRHP) for compliance under the standard. HRA has been trained by SHPO on their policies, procedures, and standards and has assisted the Department and Council in their review of historic, cultural, and archaeological resources since 2017.

Discovery Measures

In preparation of the ASC, the applicant coordinated with affected Tribal governments and from 2022 to 2023, held ongoing meetings with the CTUIR and provided them the draft Cultural Resources Pedestrian Survey Report, and responded to their comments.[275] The Department sent review requests to the Tribal Governments as described in Section II., of this order, the comments from the CTUIR are described below. Discovery measures to evaluate the presence of protected resources within the analysis area may include surveys, inventories and limited subsurface testing. An applicant's discovery measures must be based on recommendations from SHPO or the National Park Service (NPS) of the U.S. Department of Interior (OAR 345-021-0010(1)(s)(D)(i)); if the discovery measures are not based on the recommendations of SHPO or NPS, an applicant must provide an explanation (OAR 345-021-0010(1)(s)(D)(ii)). SHPO recommendations on discovery measures are provided in its *2011 Guidelines for Historic Resources Surveys in Oregon* and *2011 (with a Minor Update in 2016) Guidelines for Conducting Field Archeology in Oregon*.[276] If applicant's discovery measures follow SHPO's published guidelines, it can be applied that their discovery measures for historic and archaeological resources are based on SHPO recommendations, unless applicant seeks, or SHPO provides, more specific recommendations through the EFSC process.

Different discovery measures apply to the investigation of archeological sites, archeological objects, aboveground historic resources and tribal resources. For all of these resource types, an initial inventory was completed through literature/database review. The following databases and

[275] SSPAPPDoc25-19 ASC Exhibit S Cultural 2024-05-15, Section 4.1.1.

[276] In July 2023, SHPO created an "Updating the Archaeological Field Guidelines Placeholder" for the Guidelines for Conducting Field Archaeology in Oregon 2013 (Minor Revision January 2016). As of the date of this order, SHPO has not revised, published, or formally issued updated Guidelines for Conducting Field Archaeology in Oregon. https://www.oregon.gov/oprd/OH/Documents/FieldGuidelines.pdf Page 9 of 153. Accessed by Department 01-09-2024.

resources were reviewed to identify previous surveys and recorded resources within the analysis area:

- SHPO's Oregon Archeological Records Remote Access
- SHPO's Oregon Historic Sites Database
- Historic maps and aerial photographs

The above-referenced databases, sources and availability of TUS/oral history interviews are consistent with SHPO's guidance for background research, per its *2016 Guidelines for Conducting Field Archeology in Oregon*.[277]

The applicant's professional historic and archaeologist consultants, Tetra Tech, conducted a "non-collection" cultural resources field inventory survey of the entire direct analysis area (10,989 acres) between May 8 and November 3, 2022, following the *SHPO Guidelines for Conducting Field Archaeology in Oregon 2013 (Minor Revision January 2016)*, that was in place at the time during surveys. The survey consisted of a pedestrian survey as well as subsurface probes. During the pedestrian survey, survey personnel walked and observed the ground, spread out in a line at 20-meter intervals (i.e., transects). Systematic shovel probes were utilized in areas determined to have less than 30 percent ground surface visibility and in areas judged to have a higher potential for subsurface resources. Shovel probes were also excavated around the boundaries of archaeological sites and isolated finds to ensure that subsurface deposits did not extend farther horizontally than the surface artifacts. Tetra Tech recorded all historic buildings, structures, and objects within indirect analysis area that were visible from the public right-of-way.

The Department and its consultant, HRA, reviewed the information submitted with Exhibit S and recommends that the Council find that the applicant followed applicable SHPO guidelines, in place at the time surveys were conducted, for the identification of known or previously recorded NRHP listed resources, archaeological sites, isolates and objects, historic-era sites and built environment resources, and important tribal cultural resources within the analysis area.[278]

IV.K.1.1 Historic and Cultural Resources in the Analysis Area

[277] SHPO's guidelines establish that background research should include a search of the Oregon Archeological Resources, relevant past relevant past archaeological study reports, Oregon Historic Sites and Structures Survey, National Register files, relevant historic contexts, historic maps and photographs (including General Land Office Survey maps and notes and Sanborn insurance maps) and any other pertinent publications, documents, records, and files. Accessed on May 1, 2024 by the Department: https://www.oregon.gov/oprd/OH/Documents/FieldGuidelines.pdf

[278] The HRA memo states, "Two of the isolated resources recorded during the survey would now be considered archaeological sites based on SHPO guidance as of July 1, 2023. The survey was completed prior to this guidance, but Exhibit S was completed and submitted after. As such, Exhibit S should state that there are 10 sites and 1 isolate in the direct analysis area and explain that two of these were recorded as isolates based on SHPO guidance at that time. This does not affect the results, since EFSC guidance treats sites and objects on private lands the same." SSPAPPDoc41 HRA Consultant Review Exhibit S Hist and Arch 2024-07-09.

The full inventory, including 2022 field surveys conducted within the analysis area, identified a total of 29 cultural resources: 8 archaeological sites, 3 isolated finds, 2 HPRCSITs, and 16 historic-era sites. These resources are presented in Table 13 below. Table 13 includes the resource description, the applicant's s recommendations and the recommendations from HRA and the Department review of the materials. The Department elaborates on its recommendations below the Table.

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2

Table 13: Results of Cultural Resources Inventory within Analysis Areas

Resource ID	General Description	Applicant's NRHP Recommendation	HRA / Department Recommendations
Archeological Sites			
EO-BB-01	Historic Refuse	Not Likely Eligible (Criteria A – D)	Concurs archaeological site is Not Eligible for listing in the NRHP.
EO-BB-02	Historic Refuse and Windmill Feature	Not Likely Eligible (Criteria A – D)	Concurs archaeological site is Not Eligible for listing in the NRHP.
EO-BB-03	Historic Refuse	Not Likely Eligible (Criteria A – D)	Concurs archaeological site is Not Eligible for listing in the NRHP.
EO-BB-04	Abandoned Historic Well	Not Likely Eligible (Criteria A – D)	Concurs archaeological site is Not Eligible for listing in the NRHP.
EO-BB-05	Historic Refuse	Not Likely Eligible (Criteria A – D)	Concurs archaeological site is Not Eligible for listing in the NRHP.
EO-MK-01	Historic Refuse and Agricultural Equipment	Not Likely Eligible (Criteria A – D)	Concurs archaeological site is Not Eligible for listing in the NRHP.
EO-MK-03	Historic Agricultural Equipment	Not Likely Eligible (Criteria A – D)	Concurs archaeological site is Not Eligible for listing in the NRHP.
Archeological/Historic Sites			
EO-BB-06	Historic Agricultural Structures	Not Likely Eligible (Criteria A – D)	Concurs archaeological site is Not Eligible for listing in the NRHP.
Isolated Finds			
EO-BB-ISO-01	Historic Refuse	Not Likely Eligible (Criteria A – D)	Concurs Not Eligible. Historic isolate/object, not feature.
EO-BB-ISO-02	Historic Agricultural Refuse	Not Likely Eligible (Criteria A – D)	Concurs archaeological isolates are Not Eligible for listing in the NRHP.
8B2H-JS-ISO-09	Chert Lithic Flake	Not Likely Eligible (Criteria A – D)	Concurs archaeological isolates are Not Eligible for listing in the NRHP.
Historic Sites			
ES-KB-01	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs with the conclusion that the resources associated with the Doherty

Table 13: Results of Cultural Resources Inventory within Analysis Areas

Resource ID	General Description	Applicant's NRHP Recommendation	HRA / Department Recommendations
			family are unlikely to be a NRHP-eligible historic district.
ES-KB-02	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-KB-03	Barn	Eligible (Criterion C)	Concurs that historic resource is eligible for listing inthe NRHP and, provided that it is avoided, and that topography will prevent visibility, there will be nosignificant adverse impacts to this resource. No mitigation needed.
ES-KB-04	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-KB-05	Barns	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-KB-06	Barns	Not Likely Eligible (Criteria A – D)	Concurs Not Eligible. because ubiquitous prefabricated storage buildings lack sufficient significance or integrity.
ES-KB-07	Farmstead	Eligible (Criterion A)	Not Eligible. less than 50 years old and not historic. If Quonset hut was moved, it would no longer retain integrity of location.
ES-KB-10	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-KB-11	Barns	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.

Table 13: Results of Cultural Resources Inventory within Analysis Areas

Resource ID	General Description	Applicant's NRHP Recommendation	HRA / Department Recommendations
ES-KB-12	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs Not Eligible. Ubiquitous prefabricated storage buildings lack sufficient significance or integrity.
ES-KB-13	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-KB-14	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-KB-15	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-KB-17	Residence	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-EF-01	Farmstead	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
ES-EF-02	Barns	Not Likely Eligible (Criteria A – D)	Concurs that the historic-period architectural resource is Not Eligible for listing in the NRHP.
Historic Properties of Religious and Cultural Significance to Indian Tribes			
	Sand Hollow Battleground	Eligible (Criteria A, B, D)	Adverse impacts to the two HPRCSITs are likely, but that those impacts are mitigated per Agreement with CTUIR
	Sisupa	Eligible (Criteria A, B, D)	Adverse impacts to the two HPRCSITs are likely, but that those impacts are mitigated per Agreement with CTUIR

1

NRHP Eligibility and Impact Assessment under OAR 345-022-0090(1)(a)

Table 13 above provides a summary of the conclusion provided by HRA and the Department's review. The highlighted rows indicate where there is an eligible for listing on the NRHP resource, and where HRA disagreed with an applicant recommendation that a resource is eligible.

Site ES-KB-03 is a Dutch barn that was constructed in the late 19th to early 20th century and was recommended eligible for listing on the NRHP under Criterion C, located within the direct analysis area. HRA concurs and the Department recommends Council find that this historic resource is eligible for listing in the NRHP and, provided that it is avoided, and that topography will prevent visibility, as indicated by the applicant, there will be no significant adverse impacts to this resource.

Site ES-KB-07 is a residence, outbuilding and Quonset hut. The Quonset hut is recommended eligible for listing on the NRHP, under Criterion A, for its association with military history., however, this Quonset hut is not located within the direct analysis area. HRA describes that both the house and the second storage building were "constructed between 1971 and 1981, meaning that it is less than 50 years old and not historic." As the survey was conducted in 2022, anything constructed in 1972 or earlier should have been assessed as a potential historic property within the NRHP's general 50-year threshold for eligibility. The applicant's technical report indicates that the potentially eligible Quonset Hut may have been moved. HRA indicates that this is relevant, as the evaluation purports that the resource "retains all seven aspects of integrity." However, if it was moved, it would no longer retain integrity of location. Further, as the resource is no longer associated with the military, regardless of its original location, it would also no longer retain integrity of association and feeling. HRA does not concur and the Department recommends Council find that that the subject Quonset Hut is not individually eligible for listing.

Two HPRCSITs were identified that are NRHP eligible and are significant to the CTUIR: Sisupa and Sand Hollow Battleground. Sisupa is a network of important cultural sites and resources and includes archaeological resources. Sand Hollow Battleground is the site of the largest battle of the Cayuse War. Both sites cover a portion of the indirect and direct analysis areas, and both are NRHP-eligible under Criterion A for its association with the history of the CTUIR, and under Criterion D for the archaeological potential to yield significant data toward our understanding of the past. HRA agrees that significant adverse impacts to the two HPRCSITs are likely, but that those impacts can be mitigated as described in ASC Exhibit S and as described by the CTUIR in their comment letter. In their 2024 comment letter, the CTUIR confirmed the presence of HPRCSITs and stated that their concerns about potential impacts to these HPRCSITs have been

addressed and mitigated through the execution of a confidential mitigation agreement between the Tribe and the applicant. [279, 280]

HRA concurs and the Department recommends Council find that the identified archaeological isolates and sites are not eligible for listing in the NRHP; thus, impacts to these resources will not be significant adverse impacts; and that no mitigation is needed; and that the 14 historic-period architectural resources (historic resources per OAR 345-022-0090) recommended not eligible for listing in the NRHP are not eligible and thus any impacts on them would not be significant adverse impacts.

Evaluation and Impact Assessment under OAR 345-022-0090(1)(b)

Under OAR 345-022-0090(1)(b), for a proposed facility located on private land, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to archaeological objects, as defined in ORS 358.905(1)(a)[281], or archaeological sites, as defined in 358.905(1)(c).[282]

NRHP-ineligible archaeological sites and objects are not considered significant archaeological resources as they do not meet the NRHP-eligibility criteria. The NRHP recordings and evaluations conclude and recommend that resources cannot be significantly associated with the prominent historic themes, persons, or events that have been identified for the area, nor are they representative of a unique type, period, or method of construction. The evaluation conducted for NRHP eligibility supports the evaluation and conclusions under the state's definition of a "site of archaeological significance" under ORS 358.905(1)(b).[283] Because these

[279] SSPAPPDoc27-01 Tribal Government Comment CTUIR 2024-03-25; ESPNOIDoc5-5 Reviewing Agency Comment Engum CTUIR 2022-08-05.

[280] When an EFSC energy facility may impact resources of significance for Tribes including archaeological resources, TCPs and HPRCSITs, Council has relied upon letters from the Government indicating their concerns area addressed and that confidential mitigation agreements between an applicant and Tribal Government have been agreed upon. These letters satisfy the impact assessment and mitigation to resources protected under the standard and Council does not require further details for the resources or mitigation, unless disclosed by the Tribe. Information concerning the location of archaeological sites or objects, including any information provided by Tribes regarding the location and potential uses of locations are maintained confidentially and are exempt from public disclosure under ORS 192.502(4) or 192.501(11).

[281] ORS 358.905(1)(a) states ""Archaeological object" means an object that: (A) Is at least 75 years old; (B) Is part of the physical record of an indigenous or other culture found in the state or waters of the state; and (C) Is material remains of past human life or activity that are of archaeological significance including, but not limited to, monuments, symbols, tools, facilities, technological by-products and dietary by-products."

[282] ORS 358.905(1)(c) states "(A) "Archaeological site" means a geographic locality in Oregon, including but not limited to submerged and submersible lands and the bed of the sea within the state's jurisdiction, that contains archaeological objects and the contextual associations of the archaeological objects with: (i) Each other; or (ii) Biotic or geological remains or deposits. (B) Examples of archaeological sites described in subparagraph (A) of this paragraph include but are not limited to shipwrecks, lithic quarries, house pit villages, camps, burials, lithic scatters, homesteads and townsites.

[283] ORS 358.905(1)(b): Site of archaeological significance" means:

resources are not eligible for listing on the NRHP and cannot provide significant information pertaining to national or local prehistory or history, beyond that already documented in the associated survey reports, the resources would not be considered of "archaeological significance," and thus not protected under Council's standard. The Department recommends that, based on this reasoning, impacts on NRHP-ineligible archaeological sites and objects protected by OAR 345-022-0090(1)(b) would not be considered significant impacts, no mitigation of these nonsignificant resources would be necessary, and the resources may be impacted. Further, if a resource was determined to be ineligible for listing on the NRHP but would be protected OAR 345-022-0090(1)(b), the recordation and evaluation of NRHP status is sufficient mitigation for potential impacts to resources under the Council's standard.

Applicant includes a Draft Inadvertent Discovery Plan or IDP in ASC Exhibit S as Attachment S-2, and is also attached to this order as Attachment K. The IDP is a plan outlining the procedures for inadvertent discoveries during construction or operation. The Department recommends Council impose Historic, Cultural, and Archaeological Resources Condition 1 to require that, prior to construction, the applicant submit to the Department the final IPD with the most current agency and tribal government contacts at the time as well as using the most current version of the SHPO template at that time. Further, to ensure that the IDP is implemented during construction and during any ground disturbing operational activities, the Council also imposes Historic, Cultural, and Archaeological Resources Conditions 2 and 3.

> **Recommended Historic, Cultural and Archeological Condition 1 (PRE)**: Prior to construction of the facility, or phase, as applicable, the certificate holder shall update the contact information provided in the Final Order on ASC Attachment K, Inadvertent Discovery Plan.
> [PRE-HC-01]
>
> **Recommended Historic, Cultural and Archeological Condition 2 (CON)**: During construction, the certificate holder shall require all onsite employees and contractors to implement and adhere to the requirements of the Inadvertent Discovery Plan, as submitted to the Department under Condition PRE-HC-01.
> [CON-HC-01]
>
> **Recommended Historic, Cultural and Archeological Condition 3 (OPR)**: During operations, the certificate holder shall require all onsite employees and contractors to implement and adhere to the requirements of the Inadvertent Discovery Plan (IDP), as provided for Condition PRE-HC-01. The IDP shall be reviewed and updated annually for current contact information.
> [OPR-HC-01]

(A)Any archaeological site on, or eligible for inclusion on, the National Register of Historic Places as determined in writing by the State Historic Preservation Officer; or
(B)Any archaeological site that has been determined significant in writing by an Indian tribe.

IV.K.2. Conclusions of Law

Based on the foregoing analysis, and subject to compliance with the recommended site certificate conditions described above, the Department recommends the Council find construction and operation of the facility, is not likely to result in significant adverse impacts to historic, cultural or archaeological resources that have been listed on, or would likely be listed on the National Register of Historic Places or other archaeological objects or sites identified under OAR 345-022-0090.

IV.L. Recreation: OAR 345-022-0100

(1) To issue a site certificate, the Council must find that the design, construction and operation of a facility, taking into account mitigation, are not likely to result in a significant adverse impact to important recreational opportunities.

(2) The Council must consider the following factors in judging the importance of a recreational opportunity:

(a) Any special designation or management of the location;

(b) The degree of demand;

(c) Outstanding or unusual qualities;

(d) Availability or rareness;

(e) Irreplaceability or irretrievability of the opportunity.[284]

IV.L.1. Findings of Fact

The Recreation standard requires the Council to find that the design, construction and operation of a facility are not likely to result in significant adverse impacts to 'important' recreational opportunities. Therefore, the Recreation standard applies to only those recreation areas that the Council finds "important" using the factors listed in the sub-paragraphs of section (2) of the standard. The assessment of potential impacts to important recreational opportunities from the construction or operation of the facility includes an evaluation of direct or indirect loss of a recreational opportunities, noise, increased traffic; and visual impacts of facility structures including but not limited to, changes in landscape character or quality.[285] The

[284] Administrative Order EFSC 5-2022, effective December 19, 2022.
[285] OAR 345-021-0010(1)(t)(B).

analysis area for recreational opportunities is the area within and extending 5 miles from the site boundary.[286]

IV.L.1.1 Recreational Opportunities within the Analysis Area

The applicant identified recreational opportunities within the analysis area through collection and review of existing published and unpublished information available from desktop research sources commonly used for recreation inventory efforts. Resources the applicant and the Department reviewed for the inventory include:

- Geographic Information System files documenting recreational resources obtained from key recreation provider agencies, *e.g.*, the Bureau of Land Management (BLM 2018), Oregon Department of Fish and Wildlife (ODFW 2021), United States Forest Service (USFS 2022a, USFS 2022b), United States Geological Survey (USGS 2020), and Oregon Parks and Recreation Department (OPRD; OPRD 2018);
- Land management agency planning documents;
- Comprehensive plans, park and recreation plans, and individual park master plans prepared by OPRD and by counties and municipal governments within the analysis area;
- Internet sites maintained by recreation provider agencies, including OPRD, ODFW, and county and city park departments (Morrow County 2022; ODFW 2022; OPRD 2022); and
- Internet sites maintained by various commercial entities, including sites providing general recreation and tourism information and sites applicable to specific private-sector recreation opportunities (Google Earth 2022; ORBIC 2020).

Based on the above review, the applicant identified two recreational opportunities within the analysis area – a portion of the Oregon National Historic Trail (ONHT) – the Well Spring Segment and the Oregon Trail Well Spring Interpretive Site. The applicant proposes, and the Department concurs based on the reasons provided below, that both the ONHT Segment and the Oregon Trail Well Spring Interpretive Site are important recreational opportunities.

Table 14: Important Recreational Opportunities in Analysis Area

Recreational Opportunity	Distance from Site Boundary (miles)
Oregon NationalHistoric Trail (ONHT) Segments	1.72
ONHT Well Spring Interpretive Site	4.08

<u>Importance Assessment</u>

ONHT Well Spring Segment

The ONHT is one of nineteen national historic trails in the United States. National historic trails recognize original trails or routes of travel of national historic significance including past routes of exploration, migration, and military action. The ONHT marks the route of one of the nation's

[286] ESPNOIDoc7 Project Order 2022-09-26.

largest mass migrations. According to historians, from 300,000 to 400,000 travelers used the 2,000-mile overland route to reach destinations in present-day Oregon, Washington, Utah, and California between 1840 and 1860. In Oregon, the trail passed through the Powder River and Grande Ronde Valleys, over the Blue Mountains, and down the Columbia River to The Dalles.[287]

As discussed in Section IV.J., *Sceinic Resources*, the National Park Service (1999) Comprehensive Management and Use Plan (NPS CMP) identifies a 12-mile Well Spring Segment of the ONHT in Morrow County (also known as the Boardman Bombing Range Segment) as a high-potential trail segment. High potential route segments are portions of a trail route that afford high-quality recreational experiences in areas that have greater than average scenic values or afford the opportunity to vicariously share the experience of the original trail users, while high-potential historic sites are specific locations which provide opportunity to interpret the historic significance of the trail during the period of its major use.[288] This ONHT segment stretches from the eastern edge of the Boardman Bombing Range in a southwest direction to Immigrant Lane and includes traces of the Oregon Trail (*i.e.*, wagon ruts).[289] This segment of the ONHT is registered as eligible for the National Register of Historic Places (NRHP).[290]

However, approximately 7 miles of this segment are within the Boardman Bombing Range and inaccessible to the public except for a small area surrounding the Oregon Trail Well Spring Interpretive Site; the remainder of the high potential segment is on private lands to the west of the Bombing Range (most of which is managed by The Nature Conservancy as part of the Boardman Conservation Area) and is also not open to the public. The applicant explains that it is questionable whether this should be considered an important resource for recreation; however, its federal protection status, irreplaceability, rareness, and historical importance should qualify it as an important resource.

Because of access issues with property ownership and usage of the underlaying lands on the parcels where most of the trail segment is located, the Department recommends Council find that the degree of demand is low for this segment. Nevertheless, based on the above description, the Department recommends Council find that the Well Spring Segment of the ONHT in Morrow County is an important recreational opportunity because of its special designation (NRHP listing and high-potential trail segment); its outstanding or unusual qualities (finite historical resource); its rareness (limited ONHT segments remain on the landscape); and the irreplaceability or irretrievability of the trail segment (additional or new trail segments within this area are not likely to be found and cannot be created).

[287] This description of the ONHT is taken from a Bureau of Land Management website: Oregon National Historic Trail | Oregon-Washington Bureau of Land Management (blm.gov)

[288] 16 U.S.C. §1251(1) and (2).

[289] U.S. Department of Interior Comprehensive Management and Use Plan / Final Environmental Impact Statement for the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails, Map 9, p. 19 and Appendix G, p. 287. Comprehensive Management Plan (nps.gov)

[290] NRHP Nomination Form September 13, 1978. https://npgallery.nps.gov/AssetDetail/NRIS/78002305 Access by Department 05-21-2024.

Well Spring Interpretive Site

The facility is approximately 4.2 miles from the Well Springs Interpretive Site, located west of the northern solar arrays and transmission line area at the facility.[291] As described further in Section IV.L., *Recreation*, and in this section of this order, the Well Springs Interpretive Site is located at the southern end of the Boardman Bombing Range, connected to the seven-mile Well Spring ONHT Segment located on Navy-owned Bombing Range land. The NPS CMP identifies the Well Spring Interpretive Site as a high potential site, noting it was "an important emigrant campsite and water source, made travel possible for weary emigrants and their worn-out teams across this dry stretch of the Columbia Plateau" and that "remains of a stage station, a graveyard which dates from the emigration era, and trail ruts can be found nearby."[292] The site is associated with the NRHP listing for the Well Spring ONHT Segment.[293] The Well Spring Interpretive Site is remote and can be accessed from the east on OR-207 and/or Bombing Range Road to Well Spring Road and then to Immigrant Lane (gravel road), or from the west, via OR-74 via Immigrant Lane. The interpretive site includes an interpretive shelter with signage, a parking area, and is fenced.[294]

Because of the rural location of the resource, the Department recommends Council find that the degree of demand is low for this segment. Nevertheless, based on the above description, the Department recommends Council find that the Well Spring Interpretive Site in Morrow County is an important recreational opportunity because of its special designation (NRHP listing and high-potential trail site); its outstanding or unusual qualities (resource has documented historical significance); its rareness (limited publicly accessible ONHT segments remain on the landscape); and the irreplaceability or irretrievability of the trail segment (additional or new trail segments within this area are not likely to be found and cannot be created).

Impact Assessment

Direct and Indirect Loss of Recreational Opportunities

The proposed facility would not directly impact any of the identified recreational opportunities because it would not be located within the boundaries or physically disturb them. Energy facilities can indirectly impact recreational resources through noise, traffic and visual impacts. The Department evaluates the potential impacts on these recreational opportunities below.

Noise Impacts

[291] SSPAPPDoc25-18 ASC Exhibit R Scenic 2024-05-15, Section 4.2.2.
[292] https://www.nps.gov/cali/learn/management/upload/CALI-CMP-SM-updated.pdf Map 9, p. 19 and Appendix I, p. 307.
[293] NRHP Nomination Form September 13, 1978. https://npgallery.nps.gov/AssetDetail/NRIS/78002305 Access by Department 05-21-2024.
[294] Applicant did not provide and Department could not locate data on how many visitors the site receives.

Noise associated with construction of the proposed facility would be temporary and would result from the use of heavy construction equipment on site and heavy trucking from material deliveries. As indicated in Table 23: *Predicted Construction Noise Levels* in this order, the loudest construction equipment would be equipment installation by pile drivers and would generate sound levels of 95 dBA at 50 feet from the source. The loudest composite (combined) construction noise at 1,200 feet would be 63 dBA. The closest recreational opportunity to the site are portions of the ONHT Well Spring Segment at 1.7 miles away, located on privately-owned lands, where the ambient (or baseline) noise includes road traffic, Naval activities, and agricultural activities.[295] Applicant indicates that both recreation areas (ONHT Segment and Interpretive Site) are projected to receive up to 37 dBA from construction noise. 37 dBA at portions of the ONHT segment are plausible and considered very low noise levels, which would not likely be perceivable with background noise. The Well Spring Interpretive Site is located approximately 4 miles from the site, where noise levels would likely be less than 37 and not audible. The Department recommends, based on noise attenuation from distance and vegetative screening, that noise generated from construction of the facility would be less than significant at ONHT Segments on privately-owned lands (inaccessible to recreators) and would not be audible at the Well Spring Interpretive Site.

As summarized in Section III.R.1., *Noise Control Regulations* of this order, operational noise is evaluated in the context of compliance with the DEQ Noise Control Regulations. The noise limits apply at measurement points on noise sensitive properties or noise sensitive receptors (NSRs), such as dwellings, schools, churches, hospitals, or public libraries. Based on the applicant's noise assessment NSR-5, located near Doherty Road approximately 800 feet from noise sources at the facility, would have an operational noise level of 33 dBA.[296] Given that noise attenuates with distance and vegetation, the existing ambient noise levels mask noise, and that the closest recreational opportunity is 1.7 miles away, the Department recommends Council find that there would not be audible noise from the operation of the facility at the ONHT Well Spring Segment and the Well Spring Interpretive Site.

Traffic Impacts

As discussed in Section I.V.M.1.5., *Traffic Safety*, major transportation corridors to the facility site include Interstate 84 and Oregon Route 207 (Lexington-Echo Highway). Other county and state roads in the immediate vicinity include Bombing Range Road, Doherty Road, Sand Hollow Road, Melville Road, and Grieb Lane.[297]

[295] As described in this order, the majority of the Well Spring ONHT Segment is on privately-owned lands or property owned by the Navy, so limited recreational access is available to these portions of the ONHT.
[296] See Section III.R.1., *Noise Control Regulations*, of this order, the maximum sound level (Lmax) can be used to quantify the maximum instantaneous sound pressure level over a given measurement period or maximum sound generated by a source. This is done on a logarithmic scale, which incorporates the existing ambient noise levels and the project noise levels of a noise source.
[297] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 3.6.

The assumed primary route to the facility site would be Bombing Range Road via Interstate Highway 84 (I-84) at the I-84/Irrigon Junction. Alternate routes would be via OR-207 via I-84 south of Hermiston. Southwest bound traffic on OR-207 would exit onto Lower Sand Hollow Road, Melville Road, or Sand Hollow Road to access the portion of the site boundary south of OR-207; or onto Doherty Road or Grieb Lane to access the portion of the site boundary north of OR-207. Some workers and deliveries driving to the site from Heppner or other communities to the south may also access the site from OR-207 via OR-74.[298] Applicant indicates that the portions of haul routes to the facility and roads that would carry recreators to the two sites would most likely be OR-207 and/or Bombing Range Road. Section IV.M, in this order, describes the Daily Traffic Volumes and Pavement Conditions for the larger transportation routes to the facility, such as I-84, OR-207 and OR-74. It is not anticipated that traffic flows or road conditions on these larger roads will be impacted from construction of the facility, therefore, construction-related traffic would be indistinguishable from other traffic for users of the recreational opportunities. ASC Exhibit U describes that most recent version of the Morrow County Transportation System Plan is from 2012 which provides traffic counts on some roads from 2005, however, traffic volumes on Morrow County roadways are anticipated to be low, with some heavier traffic during the summer months and harvesting season. Recreational travelers to the Well Spring Interpretive Site who use Bombing Range Road to get to Well Spring Road, may experience some overlap and congestion from facility-related construction traffic. It is not anticipated that there would be any impacts on Immigrant Lane and Well Spring Road from facility traffic. Further, because the ONHT Well Spring Segment is primarily on private and Navy-owned land, it is not anticipated that there would recreational visitors to these areas to be impacted by traffic. Also, discussed in Section *Traffic Safety*, and requested under Recommended Public Services Conditions 1 and 2, the applicant would be requested to execute a road use agreement with the county which would ensure road conditions are maintained and repaired and that Best Management Practices to minimize impacts from construction traffic (timing restrictions, flaggers, pilot cars, etc.). The Department recommends Council find that construction-related traffic would not impact the recreational opportunities in the analysis area due to different route and road options to the sites, low usage and access to the sites, and that mitigation measures to reduce traffic impacts would be required and further reduce any impacts to less than significant.

Visual Impacts

The applicant used the same visual impact assessment methodology that was performed for the visual impact assessment for protected areas, discussed in detail in Section IV.F., *Protected Areas*, which includes viewshed modeling assuming a bare earth model, which produces a Zone of Visual Influence indicating the likelihood of visibility of facility structures. The two most potentially visible components are the solar arrays at a maximum height of 15 feet and the aboveground 230-kV transmission lines, assumed to have a maximum height of 180 feet.[299]

[298] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.2.3.1.

[299] All other Facility infrastructure was assumed by the applicant to be less visually impactful (due to height, being dispersed throughout the site boundary or adjacent to taller infrastructure).

Factors that may impact the visibility of the facility are the existing visual context, particularly other sources of development or visual contrast present within the view; the distance of the site to the facility, and whether or not the area may be accessed by the public.

The facility's closest point to the ONHT Well Spring Segment is approximately 1.72 miles from the transmission line and solar arrays at the norther portion of the facility site boundary.[300] The area of the trail segment closest to the facility is located on privately-owned agricultural lands. Applicant indicates that the closest point to the site boundary is a middleground distance of approximately 1.7 miles (solar array) and 1.8 miles (transmission line), it is not likely that these facility components would be noticeable to a viewer. Any views of the facility from the trail segment would be anticipated to be less than the visual impacts at the Lindsay Prairie (1.3 miles away – as discussed in Protected Areas of this order). If a part of the facility were visible, the visual impact would be negligible because this portion of the high-potential trail segment is not accessible to viewers and existing wind turbines and other industrial infrastructure would dominate any visual contrast that might be created by the solar facility or associated transmission lines.[301] The applicant also explains that existing development on the landscape include an existing Umatilla Electric Cooperative transmission line which is closer to the ONHT segment than the facility, which would further lessen any potential views of the facility. Because the facility would be 1.7 miles away from the ONHT segment, the trail segment in this area is on private lands or lands owned by the Navy so access is restricted, and because of existing development in the viewshed, the Department recommends Council find that any impacts to views of the facility to the ONHT segment would be less than significant.

The facility is approximately 4.2 miles from the remote Well Springs Interpretive Site, located west of the northern solar arrays and transmission line area at the facility.[302] Because the facility would be 2.5 miles further away than the closest ONHT Well Spring Segment described above, and that potential views of the facility attenuate with distance, vegetative and topographical screening, and views would also be blocked by intervening development, the Department recommends Council find that it would not be likely that there would be views of the facility at the Well Spring Interpretive Site and therefore, less than significant.

IV.L.2. **Conclusions of Law**

Based on the foregoing recommended findings of fact, the Department recommends that the Council find that the design, construction and operation of the proposed facility would not be likely to result in a significant adverse impact to any important recreational opportunities in the analysis area and therefore the proposed facility would comply with the Council's Recreation standard.

[300] https://tools.oregonexplorer.info/OE_HtmlViewer/index.html?viewer=renewable&layerTheme=efsc. Accessed by Department 05-20-2024 and SSPAPPDoc25-20 ASC Exhibit T Recreation 2024-05-15, Section 4.2.2.1.
[301] SSPAPPDoc25-20 ASC Exhibit T Recreation 2024-05-15, Section 4.2.2.1.
[302] SSPAPPDoc25-18 ASC Exhibit R Scenic 2024-05-15, Section 4.2.2.

IV.M. Public Services: OAR 345-022-0110

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to the ability of public and private providers within the analysis area described in the project order to provide: sewers and sewage treatment, water, storm water drainage, solid waste management, housing, traffic safety, police and fire protection, health care and schools.

*(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility. ****[303]

IV.M.2. Findings of Fact

The Council's Public Services standard requires the Council to find that the proposed facility is not likely to result in significant adverse impacts on the ability of public and private service providers to supply sewer and sewage treatment, water, stormwater drainage, solid waste management, housing, traffic safety, police and fire protection, health care, and schools. Pursuant to OAR 345-022-0110(2), the Council may issue a site certificate for a facility that would produce power from solar energy without making findings regarding the Public Services standard; however, the Council may impose site certificate conditions based upon the requirements of the standard.

The analysis area for the evaluation under the Public Services standard, as established in the Project Order, is the area within and extending 15-miles from the site boundary.[304] The analysis area includes portions of Morrow and Umatilla counties and the communities of Boardman, Heppner, Ione, and Lexington. The applicant also considered communities within 60 minutes travel by car to estimate housing availability and traffic impacts.

Impact Assessment Assumptions

Construction Assumptions[305]

[303] Administrative Order EFSC 1-2002, effective April 3, 2002

[304] ESPNOIDoc7 Project Order 2022-09-26, p. 40.

[305] While the impact analyses in this order assume that all workers would be hired from outside of the area, the applicant represents that that its policy will be to local hire locally to the extent practicable and the workforce availability analysis provided by the applicant suggests that the regional labor market, made up of communities within an approximately 60 minute commute from the site, may support over half of the required workforce. The Department notes that these assumptions do not guarantee the assumptions are correct.

- There would be an average of 682 workers on site each day, with up to 950 workers during peak construction periods when multiple phases overlap. If the BESS is not constructed, the number of average daily workers would decrease to 542, with a maximum of 670 during the peak months of construction.[306]
- Most workers would be employees of construction and equipment manufacturing companies under contract to the applicant, with some specialty laborers would be required for installation of the solar components and BESS.
- On average, the construction will generate 910 commuting trips and 250 truck trips per day, for a total of 1,160. At the peak of construction, an estimated maximum of approximately 1,266 commuting trips per day and 250 truck trips per day would occur, for a total of 1,516.[307]

Operation Assumptions

- 10 permanent staff may be employed during operation of the facility for vegetation maintenance, facility maintenance, and other related activities.
- All permanent employees would live locally, and that, with the conservative assumption that 50 percent of the workers are hired from outside the analysis area and the average household size is three, that up to approximately 15 new permanent residents could be added to the local population.

IV.M.2.1 Sewers and Sewage Treatment

During construction, sanitary waste will be collected on-site in portable toilets that will be provided and maintained by a licensed subcontractor. During operation, sanitary waste will be limited to domestic wastewater from the O&M buildings, which will be discharged to licensed on-site septic systems located within the site boundary. [308]

Because the proposed facility will not connect to a public sewer or sewage disposal system, the Department recommends the Council find that the construction and operation of the proposed facility are not likely to result in significant adverse impact to the ability of any public or private sewage providers to provide sewer and sewage treatment services.

IV.M.2.2 Water Service

During construction, water will be used for dust suppression, road compaction, site preparation, mixing concrete for foundations, fire prevention, and on-site worker drinking and sanitation use. Facility construction is anticipated to require up to 186.5 million gallons of water

[306] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.1, 3.1; SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Attachment U-1.
[307] All trips are one way (e.g. 910 commuter trips include 455 worker vehicles travelling to and from the site.) SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.2.3.2; 2.4.7.1.
[308] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.1, 2.4.2.

if the entire facility is constructed.[309] No developed public water system serves the site, and on-site water sources are limited to private landowner wells. Construction-related water will be obtained from local service providers such as Stanfield Public Works, Boardman Public Works, and the Port of Morrow. Water from these providers would be delivered to the site by truck.[310] ASC Exhibit U and O provide record of correspondence with Stanfield Public Works, Boardman Public Works, and the Port of Morrow indicating that those providers have sufficient capacity to provide the needed water.[311] To ensure that the applicant has secured an adequate water supply for construction, recommended Water Rights Condition 1 requires the applicant to provide an updated water usage estimate and evidence of a contract with a licensed provider to meet the anticipated water needs before construction.

During operation and maintenance, up to 109,200 gallons of water per year will be required for drinking and sanitation. Water will be supplied via up to 4 exempt onsite wells, with total use not to exceed 5,000 gallons per day. In addition, up to 790,000 gallons of water per year will be needed to wash solar modules.[312] Water for solar-panel washing would be obtained from local service providers such as Stanfield Public Works, Boardman Public Works, and the Port of Morrow. Water from these providers would be delivered to the site by truck.[313] ASC Exhibit U and O provide record of correspondence with Stanfield Public Works, Boardman Public Works, and the Port of Morrow indicating that those providers have sufficient capacity to provide the needed water.[314]

Because the applicant has demonstrated that it can obtain adequate water supply for the construction and operation of the proposed facility, the Department recommends the Council find that the construction and operation of the proposed facility are not likely to result in significant adverse impact to the ability of any public or private water providers to provide services.

IV.M.2.3 *Stormwater Drainage*

No drainage district or developed stormwater drainage facilities serve the site except those associated with public roads maintained by Morrow County.[315] As discussed in Section IV.D, recommended Soil Protection Conditions 3 and 4 would require all construction activities to be conducted in compliance with a National Pollutant Discharge Elimination System Construction Stormwater Discharge General Permit 1200-C which would require the applicant to prevent

[309] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.3; SSPAPPDoc25-15 ASC Exhibit O Water Req 2024-05-15, Section 2.0, Table O-1.

[310] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.2.

[311] SSPAPPDoc25-15 ASC Exhibit O Water Req 2024-05-15, Attachment O-1, O-2, O-3.

[312] SSPAPPDoc25-15 ASC Exhibit O Water Req 2024-05-15, Section 2.2, Table O-1. Note that this appears to represent a worst case scenario, and under average conditions the applicant estimates that water need during operations would be approximately 170 gallons per day, or 44,200 gallons per gallons per year.

[313] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.2.

[314] SSPAPPDoc25-15 ASC Exhibit O Water Req 2024-05-15, Attachment O-1, O-2, O-3.

[315] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.3.

discharges of stormwater runoff into waters of the state. Recommended Waste Minimization Condition 6 would require the applicant to ensure that water from panel washing evaporates or permeates into soil on-site.

Because the proposed facility will not connect to any developed stormwater drainage system, will not be located within the boundaries of a drainage district, and because no discharges of stormwater or other wastewater to drainage facilities or waters of the state are expected to occur during construction or operations, the Department recommends the Council find that the facility is not likely to result in adverse impacts on the ability of any community to provide stormwater drainage services.

IV.M.2.4 Solid Waste Management

During construction, up to approximately 14,400 cubic yards of nonhazardous solid waste will be generated. During operations, up to approximately 562 cubic yards of waste per month will be generated. Solid waste disposal will be provided by private contract with one or more local commercial haulers.[316] The Finley Buttes Regional Landfill is the nearest landfill to the site and is the most likely destination for solid waste from the site.[317] Finley Buttes Regional Landfill has sufficient capacity to accommodate the facility's solid waste needs and has projected that 180 years are left in landfill's current footprint.[318]

Because the applicant has identified an appropriate provider with adequate capacity to accept solid waste and recyclable materials from the site, the Department recommends the Council find that the construction and operation of the proposed facility are not likely to result in significant adverse impact to the ability of any public or private solid waste providers to provide services.

IV.M.2.5 Traffic Safety

During construction, haul routes will include Interstate Highway 84 (I-84) to Bombing Range Road at the I-84/Irrigon Junction; I-84 to OR 207 south of Hermiston, continuing southwest on to OR-207 to exit onto Lower Sand Hollow Road, Melville Road, or Sand Hollow Road to access the portion of the site boundary south of OR-207; and, southwest to exit onto Doherty Road or Grieb Lane to access the portion of the site boundary north of OR-207.

Oregon Department of Transportation (ODOT) 2022 Pavement Condition Data shows that the affected sections of I-84 and state highways are in good condition, with the exception of I-84 between Mile Post 167.58 to 179.45, which is listed as in fair condition. Local county roadways

[316] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.4, 2.4.5.
[317] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.4, 2.4.5.
[318] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Attachment U-2.

are either paved or graveled, with Bombing Range Road being paved, and all of the remaining county roads being graveled.[319]

ASC Exhibit U Attachment U-6 includes a Traffic Impact Analysis (TIA). The TIA shows that estimated peak construction levels are expected to increase Average Daily Trip (ADT) volumes on I-84 by approximately 6.3 percent.[320] The TIA shows that ADT volumes on Bombing Range Road could increase by as much 1,520 trips during peak construction; however, the magnitude of impact was not estimated due to lack of recent ADT data. The TIA estimates that peak construction trips would increase ADT volumes on the majority of OR-207 (between I-84 and Lexington) by an average of 140 percent if all of the construction traffic used the alternative route. On the alternate workforce traffic route along OR-74 between Heppner and Lexington, ADT volumes are expected to increase by 3.4 to 11.3 percent on average, based on the assumption that only 10 percent of the workforce would come from south of the site. The OR-74 road segment with the greatest potential for impact is the section just northwest of the Lexington-Echo Highway (milepost 36.40), which could see as much as a 15 percent ADT increase with peak construction.

The TIA also provided an analysis of expected Level of Service (LOS) impacts on roadways and intersections anticipated to be impacted by construction of the proposed facility using methods based on the National Academies of Sciences, Engineering, and Medicine's Highway Capacity Manual 7th Edition. During peak construction periods, LOS during peak hour traffic would not be affected at the majority of affected roads and intersections, but that LOS at the intersection of OR-207 and Grieb Lane could be reduced from LOS A to LOS B during both the AM and PM peak commuting hours. In addition, the TIA raises concerns that the high volume of traffic and workforce commuters traveling south on Bombing Range Road could increase the potential for rearend collisions due to slowing and left-turning vehicles at the intersection with Grieb Lane, but notes that this risk can be mitigated by posting appropriate warning signage to notify road users of the construction area and also by reducing speeds.[321] The Morrow County Board of Commissioners also highlight in their comment letter that the increased left-hand turn traffic onto Bombing Range Road, especially during winter months with inclement weather, could create safety issues and they encourage the applicant to coordinate with the County's Public Works Department with implementing safety measures. The County supports the Road Use Agreement included in ASC Exhibit U, which is recommended below in Public Services Conditions 1 and 2.[322]

Traffic impacts are anticipated to be temporary, intermittent, and minimal on most affected roadways, but some short-term traffic delays are expected during large component deliveries and some significant impacts could occur on OR-207, bombing range road, and Grieb Lane due

[319] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.6.

[320] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.7.1; Attachment U-6.

[321] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Attachment U-6, Section 4.1. See also SSPAPPDoc12 pASC SAG Comment 2023-09-27.

[322] SSPAPPDoc12 pASC SAG Comment 2023-09-27.

to high-volumes of commuter related traffic. The applicant provided a Draft Construction Traffic Management Plan as Attachment U-7 of ASC Exhibit U, which is included with Attachment N to this order, and is prepared to meet the requirements of Morrow County and to be included in the development of a Road Use Agreement (addressed below) which provides the measures to further minimize traffic impacts, these include:

- Coordinating the timing and locations of road closures or oversize load movements with ODOT and local officials to minimize impacts on emergency and essential service providers.
- Maintaining emergency vehicle access to private property.
- Minimize movements of normal heavy trucks (dump trucks, concrete trucks, standard size tractor-trailers or flatbeds, etc.; essential deliveries only) and prohibit movements of oversize trucks, to the extent practicable, during peak traffic times.
- Develop plans as required by county or state permit to accommodate traffic where construction would require closures of state- or county-maintained roads for longer periods.
- Consulting with and notifying the landowners prior to the start of construction to minimize disruptions to ranching and farming operations (e.g., harvest time activities requiring tractor movement between fields or trucks delivering agricultural products to market) due to construction activities.
- Posting signs on county- and state-maintained roads, where appropriate, to alert motorists of construction and warn them of slow, merging, or oversize traffic.
- Maintaining at least one travel lane at all times so that roadways will not be closed to traffic due to construction vehicles entering or exiting public roads.

As noted above, a draft Road Use Agreement is included in ASC Exhibit U Attachment U-8 to address potential impacts on road conditions, address traffic safety measures, and satisfy the requirements of the Morrow County Public Works Policy on Renewable Energy Development. The Draft Road Use Agreement and Draft Construction Management Plan are included as Attachment N to this order. The agreement requires the applicant to assess road conditions prior to construction, complete any road improvements or maintenance as needed to maintain compliance with County Standards, and to ensure that all roads used for construction are returned to at least their pre-construction condition following the completion of construction. The applicant developed the agreement in coordination with the Morrow County Public Works Department, and the County has requested that implementation of the RUA be required as a condition of approval.[323] To ensure that the Road Use Agreement is executed with the County and adhered to during construction, the Department recommends the Council impose Public Services Condition 1 and 2, as shown below:

> **Recommended Public Services Condition 1 (PRE):** Prior to construction of the facility or phase, as applicable, the certificate holder shall execute a final Road Use Agreement, based on Final Order on ASC Attachment N, and provide copy to the Department.

[323] SSPAPPDoc36-06 ASC Reviewing Agency Comment Morrow County 2024-06-18.

[PRE-PS-01; Final Order on ASC]

Recommended Public Services Condition 2 (CON): During construction of the facility or phase, as applicable, the certificate holder shall adhere to the terms and conditions of the Road Use Agreement executed under PRE-PS-01.
[CON-PS-01; Final Order on ASC]

The Department recommends the Council find that subject to compliance with recommended Public Services conditions, proposed facility construction is not likely to have a significant adverse impact on traffic safety or local transportation infrastructure.

The primary and alternate routes used to access the site during operations will be the same as those used during construction. Facility operations and maintenance will generate approximately 10 round-trip commuter trips per day, with occasional deliveries. Larger amounts of traffic may be generated if facility components need significant repairs or replacement, but this would only occur for limited durations on an occasional basis.[324]

Because operational traffic volumes would be minimal, with only temporary or intermittent increases during significant maintenance activities or repairs, the Department recommends the Council find that proposed facility operations are not likely to have a significant adverse impact on traffic safety or local transportation infrastructure.

IV.M.2.6 Air Traffic

The tallest facility component would be the transmission poles extending up to 180 feet in height. The aviation facilities nearest to the site include the West Buttercreek Airport, a private airfield located 6.55 miles NE of the site boundary; and the Lexington Airport, a public airport located 11 miles SW of the site boundary.[325] The Department of Navy has confirmed that the proposed site is outside of military training routes used for low altitude maneuvers.[326]

The proposed facility does not meet the notice criteria based on FAA-identified impact areas, and therefore formal submission of a Form 7460-1 to the FAA under Code of Federal Regulations Title 14 Part 77.9 (Safe, Efficient Use, and Preservation of the Navigable Airspace) is not anticipated. The proposed facility does not meet the first threshold for notice. No public airports (or their adjoined runways) are within 3.8 miles of the site boundary (per the second threshold for notice to the FAA, 14 Code of Federal Regulations Subpart B Section 77.9).

The Department recommends the Council find that the construction and operation of the proposed facility, is not likely to result in significant adverse impact to the ability of any public or private air navigation providers within the analysis area to provide air traffic safety.

[324] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.7.2.
[325] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.6.
[326] SSPAPPDoc9 pASC Reviewing Agency Comments Navy 2023-08-29.

IV.M.2.7 Police and Fire Protection

Proposed facility construction could result in impacts to police protection providers due to the increased possibility of theft at the proposed site, safety issues associated with the increased population from temporary workers, and increased traffic on roads around the proposed facility. The Morrow County Sheriff's Office is the primary law enforcement agency for the site. Additional law enforcement service is available through the Oregon State Police, with offices in Hermiston and Pendleton. ASC Exhibit U Attachment U-3 includes a record of correspondence indicating the Sheriff's Office would respond to complaints at the site and did not expect the construction and operation of the facility to adversely affect services in the area.[327]

While no significant public safety impacts are expected to result from the construction and operation of the proposed facility, the applicant indicates that it will provide 24-hour on-site security such as cameras with remote monitoring during construction and effective communications will be established between on-site security personnel and the Morrow County Sheriff's Office.[328]

The site is within the boundaries of the Ione Rural Fire Protection District, and the Boardman Fire Rescue District provides fire response services to areas immediately north of the site. ASC Exhibit U Attachment U-3 includes records of correspondence with both providers indicating that they would provide firefighting services at the site.[329]

As discussed in Section IV.N, *Wildfire Prevention and Risk Mitigation*, the Department recommends Council find that the wildfire risk within the analysis area is low, except in areas where there are agricultural fields, residential structures, and transmission and transportation corridors. For these areas, the Department recommends Council find that the wildfire risk in these areas is moderate.

In addition to hazards from construction equipment and electrical components, the proposed Battery Energy Storage System presents some fire hazards, particularly if lithium-ion batteries are selected. The design considerations and actions and procedures intended to minimize fire hazard proposed by the applicant are evaluated in Section IV.N. Recommended Wildfire Prevention and Risk Mitigation Conditions 1, 2, 3, and 4 would require the applicant to finalize the draft Wildfire Mitigation Plans for construction and operation, as presented in Attachments L and M of this order. Because the Wildfire Mitigation Plans required under recommended Wildfire Prevention and Risk Mitigation Conditions 1, 2, 3, and 4 would address fire hazards associated with the facility, and would require coordination with local fire and emergency service providers, the Department recommends the Council find that, subject to compliance with recommended conditions, the construction and operation of the proposed facility is not

[327] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.7, Attachment U-3.
[328] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.8.
[329] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.8, Attachment U-4, U-5.

likely to result in significant adverse impact to the ability of any public or private policy or fire providers within the analysis area to provide fire or emergency services.

IV.M.2.8 Housing

Temporary housing could be required for up to 950 workers during the peak construction period and up to about 535 workers on average during the anticipated 47-month construction period; this assumes that no construction workers will be hired locally. Housing availability was evaluated within a 60-mile commuting distance to the site. The analysis relied on online data for three housing types: rental housing, hotel/motel lodging, and RV parks.[330] Applicant indicates that there would be approximately 1,458 rental units available, however, the Department emphasizes that typical construction working temporary housing is within RV parks or hotel/motels; there are approximately 1,621 vacancies of this housing type available.[331]

The applicant's analysis concludes although sufficient housing supply is projected to meet peak project demand within the region, the housing markets closest to the Facility (i.e., Morrow and Umatilla counties) have the potential to be constrained as a result of the facility-related housing demand. Further, Morrow County raised concerns about potential impacts of increased demand for housing generally, and RV parking facilities in particular. [332] Therefore, the applicant indicates it would deploy several measures to minimize and mitigate potential impacts to local housing, including developing a housing plan, hiring a housing coordinator, and coordinating with local officials to find solutions for housing construction workers. [333] The Department recommends Council adopt Public Services Conditions 3 and 4, below, in a manner that would best suit implementation, coordination with the County, and would assist in mitigating unauthorized RV camping to reduce potential impacts to local housing.

Recommended Public Services Condition 3 (PRE): At least 180-days prior to construction of any phase, the certificate holder shall provide to the Department and Morrow County a temporary housing plan for the construction workforce. The plan shall include coordination with contractors and local officials on housing options that minimize impacts to local housing supply.
[PRE-PS-02; Final Order on ASC]

Recommended Public Services Condition 4 (GEN): Prior to and during construction, the certificate holder shall report to the Department the outcomes of the work completed under the temporary housing plan, including but not limited to the following tasks.

[330] Includes Morrow, Umatilla, Gilliam Counties in Oregon, and Benton and Franklin Counties in Washington. SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.5.
[331] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.3.2.5; Attachment U-1: Sunstone Solar Project Workforce and Housing Availability, Table 15.
[332] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.6.1.; SSPAPPDoc12 pASC SAG Comment 2023-09-27; SSPAPPDoc36-06 ASC Reviewing Agency Comment Morrow County 2024-06-18.
[333] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.6.1.

c. Outcome of coordination with construction contractors to identify housing options based on an ongoing evaluation of patterns of uses and potential shortages or housing demand.
d. Outcome of coordination with local officials such as the Morrow County Planning Department, nearby cities and towns such as Lexington and Ione, the Boardman Community Development Association, the Willow Creek Valley Economic Development Group, and other housing providers on the housing plan, ensuring that impacts to available housing resources are minimized.

[GEN-PS-01; Final Order on ASC]

The applicant estimates that up to 10 workers, and their families, will require permanent housing during operation of the proposed facility.[334] The Department recommends the Council find that this level of housing demand is not likely to have a significant impact on housing availability.

The Department recommends the Council find that the construction and operation of the proposed facility, taking into account recommended Public Services Conditions above, is not likely to result in significant adverse impact on the ability of any public or private housing providers within the analysis area to provide adequate housing.

IV.M.2.9 Schools and Healthcare

Impacts to health care could occur if proposed facility construction activities or increases in temporary residents (during construction) and permanent residents (during operations) resulted in an increase in the use of emergency and routine health care services that exceeded the current capacity of local providers. Potential impacts could include accidents on-site during construction or traffic-related incidents from the increased traffic.

There is one hospital within the analysis area, the Pioneer Memorial Hospital located 15 miles south in Heppner. The next nearest hospital to the proposed facility is the Good Shepherd Medical Center, located approximately 18 miles northeast in Hermiston, which is considered a Level III trauma center. Ambulance service in the area is provided by the Morrow County Health District's Emergency Medical Services. Some of the nearby fire districts also have First Response Vehicles, with equipment and crew trained to stabilize a patient until the arrival of an ambulance for transport. In the event of a serious injury during construction or operation of the proposed facility, the patient may be flown by helicopter (operated by Life Flight) to one of the two Level 1 hospitals located in Portland: Oregon Health & Science University Hospital or Legacy Emmanuel Medical Center.

As discussed in Section IV.N., *Wildfire Prevention and Risk Mitigation,* and as recommended Wildfire Prevention and Risk Mitigation Conditions 1-4, the applicant would submit and implement Wildfire Mitigation Plans, during construction and operation. The WMPs include

[334] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.6.2.

training, emergency preparation and response procedures which would reduce emergency incidents related to construction and operation of the proposed facility. These measures would help avoid impacts to health care providers and responders. Due to the relatively small number of new temporary residents and new permanent residents, the Department recommends that the Council find that the proposed facility is not likely to cause significant adverse impact on the ability of communities to provide health care.

There are little to no anticipated construction-related impacts on schools because the proposed facility construction will be short-term and peak construction will take place over the summer, when typical schools are not in session. The applicant estimates that during operations, up to 10 new permanent households, with an estimated maximum of 15 new schoolchildren could move to the analysis area. Approximately 210 students and 341 students are currently enrolled at the Ione High School and Sam Boardman Elementary School, respectively, both within the analysis area. The schools can accommodate the addition of 15 students, or slightly greater than a 2 percent increase over the current combined population of 651 students.[335] Due to the relatively small number of new temporary residents and new permanent residents, as well as the dispersed area in which new residents are likely to settle, significant new demands are not expected from schools that serve the area. Therefore, the Department recommends that Council find that the construction and operation of the proposed facility are not likely to impact the ability of communities to provide school services.

IV.M.3. Conclusions of Law

Based on the foregoing analysis, finding of facts, and recommended site certificate conditions, the Department recommends that the Council find that the construction and operation of the proposed facility, taking into account mitigation, are not likely to result in significant adverse impact to the ability of public and private providers within the analysis area to provide their services.

IV.N. Wildfire Prevention and Risk Mitigation: OAR 345-022-0115

(1) To issue a site certificate, the Council must find that:

(a) The applicant has adequately characterized wildfire risk within the analysis area using current data from reputable sources, by identifying:

(A) Baseline wildfire risk, based on factors that are expected to remain fixed for multiple years, including but not limited to topography, vegetation, existing infrastructure, and climate;

(B) Seasonal wildfire risk, based on factors that are expected to remain fixed for multiple months but may be dynamic throughout the year,

[335] SSPAPPDoc25-21 ASC Exhibit U Public Services 2024-05-15, Section 2.4.11.

including but not limited to, cumulative precipitation and fuel moisture content;

(C) Areas subject to a heightened risk of wildfire, based on the information provided under paragraphs (A) and (B) of this subsection;

(D) High-fire consequence areas, including but not limited to areas containing residences, critical infrastructure, recreation opportunities, timber and agricultural resources, and fire-sensitive wildlife habitat; and

(E) All data sources and methods used to model and identify risks and areas under paragraphs (A) through (D) of this subsection.

(b) That the proposed facility will be designed, constructed, and operated in compliance with a Wildfire Mitigation Plan approved by the Council. The Wildfire Mitigation Plan must, at a minimum:

(A) Identify areas within the site boundary that are subject to a heightened risk of wildfire, using current data from reputable sources, and discuss data and methods used in the analysis;

(B) Describe the procedures, standards, and time frames that the applicant will use to inspect facility components and manage vegetation in the areas identified under subsection (a) of this section;

(C) Identify preventative actions and programs that the applicant will carry out to minimize the risk of facility components causing wildfire, including procedures that will be used to adjust operations during periods of heightened wildfire risk;

(D) Identify procedures to minimize risks to public health and safety, the health and safety of responders, and damages to resources protected by Council standards in the event that a wildfire occurs at the facility site, regardless of ignition source; and

(E) Describe methods the applicant will use to ensure that updates of the plan incorporate best practices and emerging technologies to minimize and mitigate wildfire risk.

** * * * **[336]

[336] Administrative Order EFSC 2-2022, effective July 29, 2022.

(2) The Council may issue a site certificate without making the findings under section (1) if it finds that the facility is subject to a Wildfire Protection Plan that has been approved in compliance with OAR chapter 860, division 300.

(3) This Standard does not apply to the review of any Application for Site Certificate or Request for Amendment that was determined to be complete under OAR 345-015-0190 or 345-027-0363 on or before the effective date of this rule.

IV.N.1. Findings of Fact

The Wildfire Prevention and Risk Mitigation standard requires the Council to find the applicant has adequately characterized wildfire risk associated with a proposed facility using reputable data sources; and under OAR 345-022-0115(1)(b), that the proposed facility would be operated in compliance with a Council-approved wildfire mitigation plan.[337] The analysis area to evaluate potential wildfire risks is the site boundary and one-half mile from the site boundary.[338] The proposed facility site boundary is approximately 10,960 acres, and the analysis area is approximately 19,795 acres.

Characterization of Wildfire Risk within Analysis Area

Under OAR 345-022-0115(1)(a), an applicant must adequately characterize the wildfire risk within the analysis area using reputable sources to describe Baseline Wildfire Risk, Seasonal Wildfire Risk, Areas Subject to Heightened Risk of Wildfire, and High-fire Consequence Areas. Each of these are discussed in detail in this section with a description of the data source, as necessary to support the findings and recommended conclusions. The data sources the applicant used to evaluate wildfire risk include:

- Landowner, site specific information based on landowners surveys;
- National Oceanic & Atmospheric Administration precipitation data; Summary of Monthly Normals 1991 – 2020, Heppner weather station;
- Morrow County Comprehensive Plan, 1986;
- Morrow County Community Wildfire Protection Plan (MCCWMPP), 2019;
- U.S. National Park Service (NPS), 2019 Arid and Semi-Arid Region Landforms – Geology;

[337] OAR 345-022-0115(2) allows the Council to issue a site certificate without making the findings under section (1) if it finds that the facility is subject to a Wildfire Protection Plan that has been approved in compliance with OAR chapter 860, division 300. OAR 860-300-0001 designates that the rules in that rule division prescribe the filing requirements for risk-based Wildfire Mitigation Plans *filed by a Public Utility* that provides electric service in Oregon pursuant to ORS 757.005. [emphasis added] ASC Exhibit V discusses the Morrow County Community Wildfire Protection Plan (CWPP) and states that the Morrow County CWPP is an approved plan, but the County is not aware if the CWPP has been approved in compliance with OAR Chapter 860, Division 300. Because the County is not a Public Utility that provides electric service in Oregon pursuant to ORS 757.005 (and regulated by OPUC), the CWPP and OAR 345-022-0115(2) do not apply to this facility. Measures from the Morrow County CWPP is discussed later in this Section.

[338] OAR 345-001-0010(35)(c).

- National Landcover Dataset data for vegetation;
- U.S. Forest Service 1970 A Guide for Application of Meteorological Information to Forest Fire Control Operations, and 2012 Information from LANDFIRE on fire regimes of Columbia Plateau grasslands and steppe communities;
- National Wildfire Coordinating Group (NWCG) 2021 Fire Behavior Field Reference Guide;
- Oregon Community Wildfire Protection Plans (Oregon CWPP) 2018 Planning Tool;
- Oregon Explorer 2018 Quantitative Wildfire Risk Assessment;
- Pyrologix 2018 Pacific Northwest Quantitative Wildfire Risk Assessment: Methods and Results. Prepared for the U.S. Forest Service by Pyrologix LLC;
- National Interagency Fire Center (NIFC) 2019-2022 Wildfire Perimeter and Boundary Data;
- Conservation Biology Institute (CBI), 2020 Wildfire Risk Assessment Data Layer Descriptions Spreadsheet.

Based upon the analysis provided below of the applicant and Department evaluation of baseline and seasonal fire risk, areas subject to heightened fire risk, and high-fire consequence areas using current and reputable data sources and methods, the Department recommends Council find that the wildfire risk within the analysis area is low, except in areas where there are agricultural fields, residential structures, and transmission and transportation corridors. For these areas, the Department recommends Council find that the wildfire risk in these areas is moderate.

IV.N.1.1 Baseline Wildfire Risk

Baseline wildfire risk within the analysis area is evaluated based on factors expected to remain fixed for multiple years, including topography of the site, vegetation, existing infrastructure, regional climate, and burn probability.

Topography

The analysis area is in Morrow County where the topography varies from gently rolling plains adjoining the Columbia River to broad plateaus and rounded ridges in the central part of the county, which merges with the more rugged terrain of a forested spur of the Blue Mountains in the southern part of the county. Potential wildfires could travel quicker on steeper slopes and slower on the flatter portions of land within the analysis area. The entire site boundary and wildfire analysis area have less than a 25-degree slope, where the steeper areas are in the southeast portions of both the site boundary and wildfire analysis area near Sand Hollow Road and south of Melville Lane towards Carpenter Butte.[339] As illustrated in ASC Exhibit V, Figure V-1, there are no areas within the analysis area that have slopes steeper than 25 percent.

[339] SSPAPPDoc25-22 ASC Exhibit V Wildfire 2024-05-15, Section 2.1.1.

Vegetation

ASC Exhibit P indicates that 92 percent of the analysis area is mapped Category 6 Habitat.[340,341] Under the Oregon Department of Fish and Wildlife rules, Category 6 Habitat has low potential to become essential or important habitat for fish and wildlife and includes developed areas, revegetated or other planted grasslands, dryland wheat, and irrigated agriculture.

The Oregon CWPP Planning Tool offers a data layer that provides Fuel Models which describe the composition and characteristics of fire fuels. The models are specific categories of burnable fuels based on descriptions of live and dead vegetation. The two fuel models that the Oregon CWPP Planning Tool describes as making up the area within the site boundary and analysis area are Fuel Model 93 and Fuel Model 102. Fuel Model 93 constitutes agricultural land maintained in a non-burnable condition such as irrigated annual crops and make up 46 percent of the site boundary and 48 percent of the analysis area. Fuel Model 102 is primarily grassy areas with some small amounts of fine, dead fuel, where any shrubs present do not affect fire behavior and makes up 51 percent of the site boundary and 47 percent of the analysis area.[342]

The applicant provides a reassessment of the fuel models that more accurately categorize or represent wildfire risk at the site. The applicant explains that Fuel Model 93 (agricultural field), is considered nonburnable (NB), and this does not accurately represent the wildfire risk within the site boundary. In its preparation of the ASC, the applicant conducted landowner surveys regarding agricultural practices on their lands. Based on the landowner surveys, landowners do not irrigate and have cycles of growing dryland wheat on 50 percent of their land.[343] Fuel Model 93 "NB" areas are mostly burnable areas, and the wildfire risk is higher than the model suggests. In cases where agricultural fields are not kept in NB condition such as when wheat or similar crops are allowed to cure before harvest; like in the instance of these landowners, use a fuel model other than 93. The applicant proposes that most of the area within the site boundary that is categorized as Fuel Model 93 above can be more accurately categorized to represent wildfire risk as either Fuel Model 1 (short grass) or Fuel Model 104 (moderate load dry climate grass), with only a small portion remaining as Fuel Model 93 (agriculture), as provided in Table 15 below.

Table 15: Applicant Assessment of Fuel Models within Site Boundary

Fuel Model Number	Site Boundary
1	19%

[340] SSPAPPDoc25-16 ASC Exhibit P Fish and Wildlife 2024-05-15, Table P-4.

[341] The analysis area for fish and wildlife habitat is the same as the analysis area for the wildfire risk assessment. OAR 345-001-0010(1) and 345-001-0010(35)(c).

[342] https://tools.oregonexplorer.info/OE_HtmlViewer/Index.html?viewer=wildfireplanning. Accessed by Department 11-03-2023.

[343] SSPAPPDoc25-22 ASC Exhibit V Wildfire 2024-05-15, Section 2.1.2 and ASC Exhibit K, Attachment K-1.

Table 15: Applicant Assessment of Fuel Models within Site Boundary

Fuel Model Number	Site Boundary
91	2%
93	5%
101	1%
102	53%
104	19%
122	1%
Total	**100%**

Fuel Model 104 more accurately represents wildfire risk of the agricultural areas within the site boundary that include dryland wheat, because it is a fuel model where grass is the primary carrier of fire and uses a dynamic transfer of herb fuel load from live to dead.[344] The areas that are fallowed and only contain stubble are more accurately representing wildfire risk within the site boundary as Fuel Model 1, which includes annual grasses, cured or nearly cured fine herbaceous fuels, and stubble with very little shrub or timber present. A small portion of areas that are tilled (and not simply fallowed) remain as Fuel Model 93, where tilled areas are considered NB.

For the reasons described by the applicant to characterize vegetation at the using different Fuel Models that the Oregon CWPP Planning Tool identifies for the site, the Department recommends Council find that the Fuel Model descriptions provided in Table 15, more adequately describe, and slightly increase, wildfire risk in agricultural areas at the site. Fuel Models are also used to describe the composition and characteristics of fire fuels is provided below in Section under Seasonal Wildfire Risk.

Existing Infrastructure

Understanding the type and location of existing infrastructure for baseline fire risk is important because overall wildfire risk for an area is based, in part, on wildfire risk to assets, people and property which includes where people live, critical infrastructure, developed recreation, housing unit density, and other factors. Although the proposed facility site is within a rural agricultural area, this area of Morrow County includes operational and approved yet not yet constructed energy generation and transmission line facilities. A summary of existing infrastructure within the analysis area is provided below from the northern portion of the facility to the southern portion. Figure 8, below, shows the facility site boundary and potential fire hazard to structures, so illustrates the locations where infrastructure is located and more concentrated. The Department emphasizes that these areas are also the areas that have higher wildfire risk, which is discussed later in this Section.

[344] SSPAPPDoc25-22 ASC Exhibit V Wildfire 2024-05-15, Section 2.1.2.

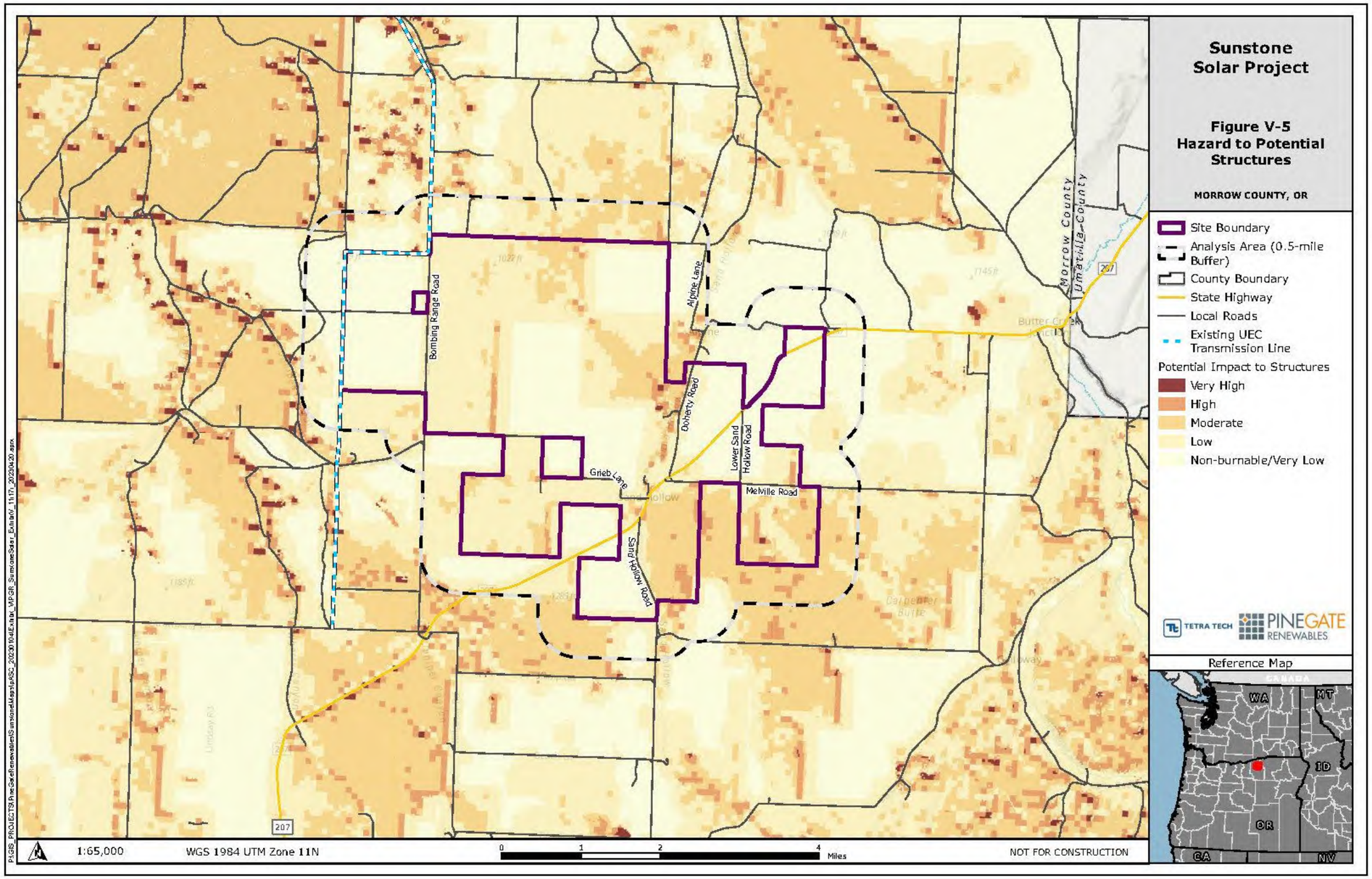
North/northwest: Roads include Alpine Lane, Bombing Range Road, and Lexington-Echo Highway. An existing pipeline and distribution line and a residence along Lexington-Echo Highway, and a distribution line along Bombing Range Road borders the northwest edge of the site boundary and continues within the wildfire analysis area into the southwest.

East/southeast: Roads include Doherty Road, Lexington-Echo Highway, and Melville Lane. Residences located along Doherty Road to the east and along Lexington-Echo Highway. Existing transmission line within the site boundary in this area. South of Melville Lane, agricultural operations with heighted wildfire potential.

Central: Roads include Doherty Road, Lexington-Echo Highway, and Grieb Lane. An exiting substation near the intersection of Grieb Lane and Lexington-Echo Highway, which is the largest concentration of infrastructure/wildfire risk within the site boundary, this is also a development avoidance area, discussed further in Section IV.A., *General Standard of Review* and III.B., *Proposed Facility Location and Site Boundary*, of this order.

West: Roads include Bombing Range Road and Grieb Lane. The area includes existing distribution lines, an existing UEC transmission line, residences, and agricultural structures along Bombing Range Road.

Figure 8: Hazard Potential to Structures



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Climate

Areas that receive less than 10 inches of rain per year are considered arid climates, and semi-arid regions receive 10 to 20 inches of rain per year.[345] The total average annual precipitation for the area is 13 inches per year which is indicative of a semi-arid climate. The driest months on average are July, August, and September which have averages of 0.31, 0.28, and 0.43 inches per month, respectively; these summer months are also the hottest months, which increase fire risk. Table 16 below summarizes average normal precipitation and temperatures in the area.

Table 16: Summary of Monthly Normal Temperature and Precipitation at Heppner Station (1991 – 2020)

Month	Max Temperature (°F)	Avg Temperature (°F)	Avg Precipitation (inch)
January	43.6	35.6	1.32
February	47.4	38.3	1.07
March	54.7	44.2	1.36
April	60.8	49.3	1.46
May	69.4	56.9	1.71
June	76.6	63.1	1.35
July	86.8	71	0.31
August	86.1	70.4	0.28
September	77.3	62.8	0.43
October	63.8	51.7	1.17
November	51.0	41.6	1.37
December	42.5	34.9	1.26
Summary/Total	**63.3**	**51.7**	**13.09**

Source: ASC Exhibit V, Table 2. Heppner Station, OR US USC00353827 (NOAA 2023)

Burn Probability

Burn Probability shows the likelihood of a wildfire greater than 250 acres burning in each location, based on wildfire simulation modeling. This is an annual burn probability, adjusted to be consistent with the historical annual area burned. The burn probability classes within the site boundary range from zero (most non-burnable fuel types such as water, agriculture, or urban areas) to moderate burn probability in most areas. There is a high burn probability (1-in-500 to 1-in-100) area in the southern portion of the site boundary east of Sand Hollow Road

[345] https://www.nps.gov/subjects/geology/arid-landforms.htm.

and south of Melville Lane where there is more shrub-steppe vegetation, as well as portions along Juniper Road in the southwest and Bombing Range Road in the southwest and northwest of the wildfire analysis area. Same as discussed above, the applicant conducted landowner surveys in preparation of the ASC and offers a reassessment burn probability for the site boundary (provided below in Table 17). The applicant maintains, and the Department concurs, that because of seasonal vegetation and harvesting, the burn probability within the site boundary would be moderate; higher than the online Oregon CWPP data provides. Moderate burn probability (1-in-5,000 to 1-in-1,000) more accurately represents the areas that are fallow and contain stubble within the site boundary.[346] This is a lower burn probability than the dryland wheat areas as these areas are fallowed or contain stubble.

Table 17: Applicant Reassessment of Burn Probability within Site Boundary

Burn Probability	Site Boundary
0	5%
Low (<= 1-in-10,000)	0%
Low (1-in-10,000 to 1-in-5,000)	0%
Moderate (1-in-5,000 to 1-in-1,000)	34%
Moderate (1-in-1,000 to 1-in-500)	58%
High (1-in-500 to 1-in-100)	2%
High (1-in-100 to 1-in-50)	0%
Very High (1-in-50 to 1-in-25)	0%
Total	**100%**

IV.N.1.2 Seasonal Wildfire Risk

Seasonal wildfire risk within the analysis area is expected to remain fixed for multiple months but may be dynamic throughout the year, including cumulative annual and monthly precipitation, weather advisories which include fuel moisture content data, and Average Flame Length which is the average length of flames expected during a fire, given local fuel and weather conditions discussed below.

Precipitation

As discussed above, under baseline climatic conditions and provided in Table 16: *Summary of Monthly Normal Temperature and Precipitation at Heppner Station (1991 – 2020)*, the total average annual precipitation for the area is 13 inches per year which is indicative of a semi-arid climate.

[346] SSPAPPDoc25-22 ASC Exhibit V Wildfire 2024-05-15, Section 2.1.5.

Fuel Moisture Content

Fuel moisture content varies depending on changes in weather (both seasonally and during short periods) and determination of exact fuel-moisture values at any time is complicated by both the nature of the fuels and their responses to the environment. Therefore, fuel moisture content is dynamic throughout the year, and throughout the day. The higher the fuel moisture content, the more difficult it is for fires to ignite and propagate. Living plants and dead fuels respond differently to weather changes and the nature of the drying and wetting processes of dead fuels is such that the moisture content of these fuels is strongly affected by weather changes. Current conditions such as precipitation to-date, current fuel moisture data, and local weather may increase or decrease seasonal fire risk. The Northwest Interagency Coordination Center (NWCC) Predictive Services group provides fire weather advisories (such as Red Flag Warnings) and fuel and fire behavior advisories (including fuel status reports and fuel moisture content predictions) for each predictive service area (PSA) in the northwest. The site boundary is located within PSA E3. The applicant indicates that during construction and operation, fire danger forecasts, such as Red Flag Warnings, would be monitored and facility activities and mitigation measures would be adjusted based on their annual variations under the methods and measures identified in both the Construction and Operational Wildfire Mitigation Plans (Attachments L, and M respectively), as discussed further below.

Fires in the Columbia River Plateau burn in fuel types that are best described as moderate load, dry climate grass-shrub (Fuel Model 122 – fire is carried by grasses and shrubs), and low load, dry climate grass (Fuel Model 102 – fuel is grass, with shrub cover not contributing to the flaming front). As described above in baseline fire risk, the wildfire analysis area is primarily agriculture (Fuel Model 93) and grassland (Fuel Model 102), however, the Department recommends that these areas would behave similar to Fuel Models 122, as they have more herbaceous shrubs vegetation.

Flame Length

According to the 2018 Oregon Wildfire Risk Explorer, Average Flame Length shows the average length of flames expected, given local fuel and weather conditions. Flame lengths have potential to exceed the mapped values shown, even under normal weather conditions. Flame length is commonly used as a direct visual indication of fire intensity and is a primary factor to consider for firefighter safety and for gauging potential impacts to resources and assets. Fires with a flame length of 4 to 8 feet can be expected to have moderate intensity under normal weather conditions and fires with a flame length of below four feet are expected to be low intensity under normal weather conditions.

The site boundary and analysis areas both have high portions of 4 to 8 feet of average flame length (38 percent and 37 percent, respectively); consequently, the rate of fire spread can be high. The small discrete areas that have higher average flame lengths of 8 to 11 feet and greater than 11 feet are in the eastern portion of the site boundary along Doherty Road and

Melville Lane.[347] However, based on the landowner surveys conducted in preparation of the ASC (ASC Exhibit K, Attachment K-1), applicant indicates that the areas categorized as non-burnable (NB), are actually mostly burnable areas with a more accurate Average Flame Length of either 4 to 8 feet or 0 to 4 feet, with only a small portion remaining with an average flame length of 0 feet, because landowners do not irrigate and they have cycles of growing dryland wheat on 50 percent of their land.[348] ASC Exhibit V, Table V-8 describes the applicant's reassessed Average Flame Length that takes into consideration the underlying agricultural land use, and applicant indicates and Department recommends Council find that the reassessed Average Flame Length in the site boundary would be approximately 61 percent of the site boundary would have an average flame length of 4-8 feet.

IV.N.1.3 Areas Subject to Heightened Risk of Wildfire and High-Fire Consequence Areas

Under OAR 345-022-0115(1)(a)(C), the Council must find that the applicant has adequately characterized wildfire risk within the site boundary and analysis area by identifying areas subject to a heightened risk of wildfire, using the information provided in support of the baseline and seasonal wildfire risk evaluation under OAR 345-022-0115(1)(a)(A) and (B) as well as additional information to model wildfire risk, discussed below. Under OAR 345-022-0115(1)(a)(D), the Council must find that the applicant has adequately characterized wildfire risk within the analysis area by identifying high-fire consequence areas, which include but are not limited to areas containing residences, critical infrastructure, recreation opportunities, timber and agricultural resources, and fire-sensitive wildlife habitat. The data inputs used for modeling Areas Subject to Heightened Risk of Wildfire and High-Fire Consequence Areas are similar because they include the areas where there is infrastructure, resources, and development. Therefore, the Department combines the assessment of both in this section.

The applicant evaluates areas of heightened wildfire risk and high-fire consequence areas using a review of the 2019 Morrow County Community Wildfire Protection Plan (Morrow County CWPP), the Oregon CWPP Planning Tool Hazard to Potential Structures analysis layer, and Overall Wildfire Risk data layer.

- Morrow County CWPP - Identify and evaluate wildfire hazards utilizing risk data with an emphasis on Stakeholder Group members on Communities at Risk. Improve wildfire response capability of fire districts and better prepare County residents to survive and save their property during a wildfire situation. Ensure that the county and their respective fire districts and communities are eligible for funding assistance to reduce wildfire hazards and to prepare residents for wildfire situations, and develop

[347] SSPAPPDoc25-22 ASC Exhibit V Wildfire 2024-05-15, Section 2.2.3.
[348] *Id*.

recommended strategies for private, state, and federal lands to reduce hazardous fuel situations and reduce the risk for damage to lives and property from wildfires.[349]

- Potential Impact to Infrastructure - Represents the consequence of wildfire, if it occurs, on mapped highly valued assets: critical infrastructure, developed recreation, housing unit density, seed orchards (agriculture), sawmills, and historic structures.
- Overall Wildfire Risk - The product of the likelihood and consequence of wildfire on all mapped highly valued resources and assets combined: critical infrastructure, developed recreation, housing unit density, seed orchards, sawmills, historic structures, timber, municipal watersheds, vegetation condition, and terrestrial and aquatic wildlife habitat.

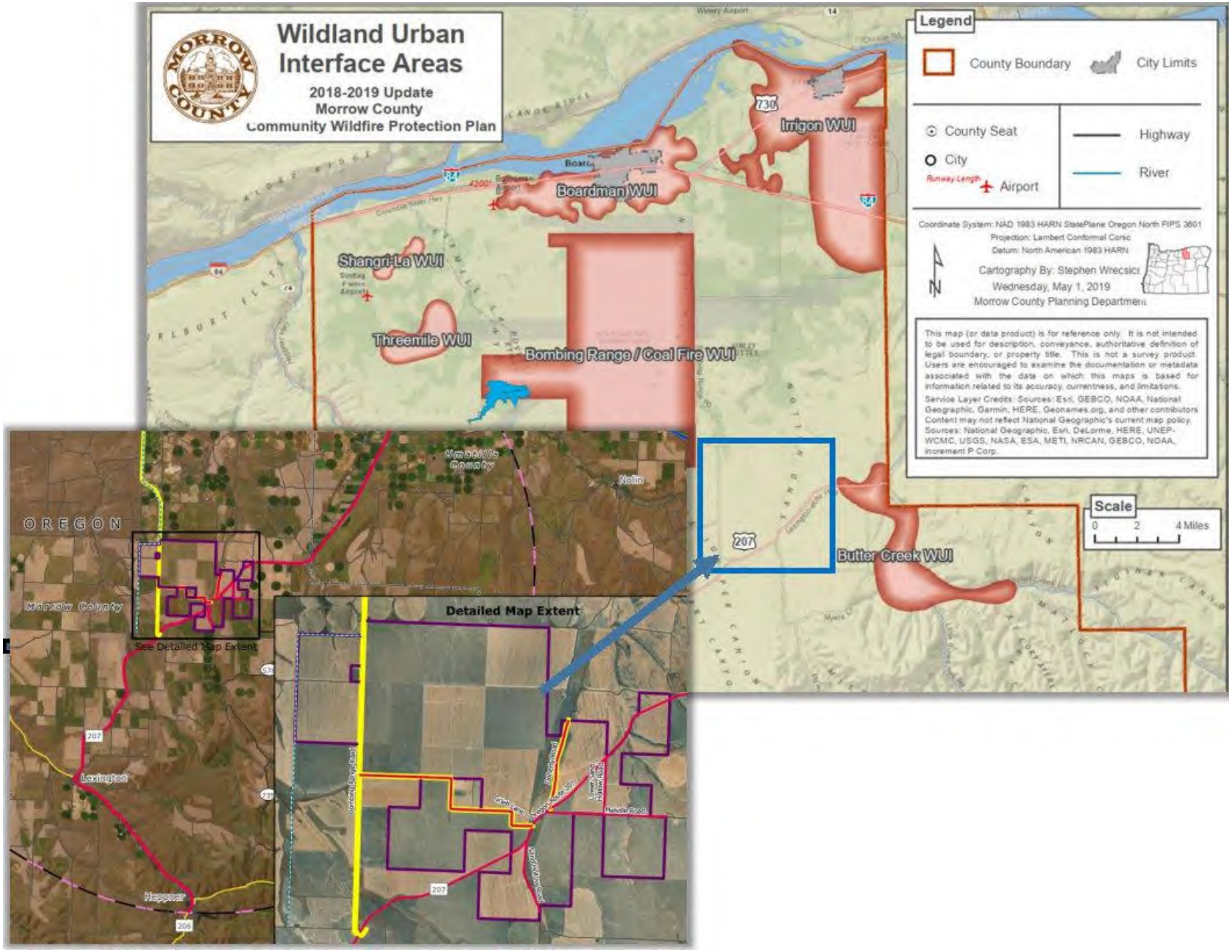
The areas within the site boundary and analysis area for the proposed facility that have higher wildfire risk are the areas described above under *Baseline Wildfire Risk for Existing Infrastructure* Section, which are the areas where there is existing infrastructure such as transmission lines, roads, and residences.

The 2019 Morrow County CWPP describes that the wildland-urban interface (WUI), includes boundaries of populated areas at risk, forested areas that contain critical human infrastructure, and forest areas that are at risk for large-scale fires. The WUI's are identified by the high risk due to, but not limited to, fuel loading, initial response time to structures and wildland fires, location of structures, and lack of water supply. The management objective in the WUI zone is to enhance fire suppression capabilities by modifying fire behavior inside the zone and providing a safe and effective area for fire suppression activities. Fuel reduction treatments are designed to protect human communities from wildland fires as well as minimize the spread of fires that might originate in urban areas. The applicant highlights that the northwestern edge of the wildfire analysis area overlaps the Bombing Range WUI and northeastern edge of the site boundary overlaps the Butter Creek WUI along Lexington-Echo Highway. The Department provides Figure 9, *Facility Proximity to Morrow County CWPP WUIs*, below to illustrate the location of the facility relative to WUIs within the analysis area.[350]

[349] https://www.co.morrow.or.us/sites/default/files/fileattachments/planning/page/15251/2019_cwpp_final.pdf Executive Summary. Accessed by Department 06-19-2024.

[350] Source of Figure: ASC Exhibit U, Figure U-2 and the Morrow County CWPP, Appendix A. Please see original figures for accurate scaling.

Figure 9: Facility Proximity to Morrow County CWPP WUIs



As discussed in the next section, the applicant provides and the Department recommends Council adopt, with revisions, the applicant's s wildfire mitigation plans for construction and operation of the facility. Because the Council's WMPs require coordination with landowners and agencies involved with emergency management and wildfire protection and the WMPs have measures to address and minimize burnable fuels onsite and fire ignitions, the Council's WMPs do not conflict with the Morrow County CWPP and are consistent with its Mission, Goals and Objectives.[351]

The Overall Fire Risk Rating measures vulnerability of assets by the presence of the assets within the fire's path, and the likelihood of that asset being harmed. This data layer maps highly valued resources and assets combined: critical infrastructure, developed recreation, housing unit density, seed orchards, sawmills, historic structures, timber, municipal watersheds, vegetation condition, and terrestrial and aquatic wildlife habitat.[352] Overall Risk ratings range from very high wherein many resources are vulnerable, to beneficial, where fires may improve resources such as timber stands or wildlife habitat. ASC Exhibit V, Table V-10 provides the percent of the site boundary and analysis area that fall into each Overall Fire Risk Rating category.

Most of the site boundary is documented as unmapped or no data is available, which is common in agricultural areas. The applicant explains that agriculture and pasture areas are categorized as low wildfire risk and are primarily in the west, however, based on its landowner consultation, many of the agricultural areas would have a higher wildfire risk than available data, therefore the Department recommends these areas be considered to have low to moderate wildfire risk. Areas of high and moderate wildfire risk are centered around the gentle sloping features, shrub or grassland vegetation, and infrastructure along Grieb Lane, Doherty Road, Melville Lane, and Lexington-Echo Highway near the middle of the site boundary as well as along Bombing Range Road in the northwestern portion of the wildfire analysis area.[353] The areas of moderate to high wildfire risk outside of the site boundary but within the analysis area include the same roads such as Bombing Range Road and Lexington-Echo Highway, as well as the southeast corner of the Boardman Bombing Range in the northwestern corner of the wildfire analysis area. Figure 10: *Overall Wildfire Risk*, below, illustrates the areas with higher wildfire risk, which generally follow highways, transmission lines, residential areas, as described further below. Many of the unmapped areas have a low to moderate wildfire risk, as described above.

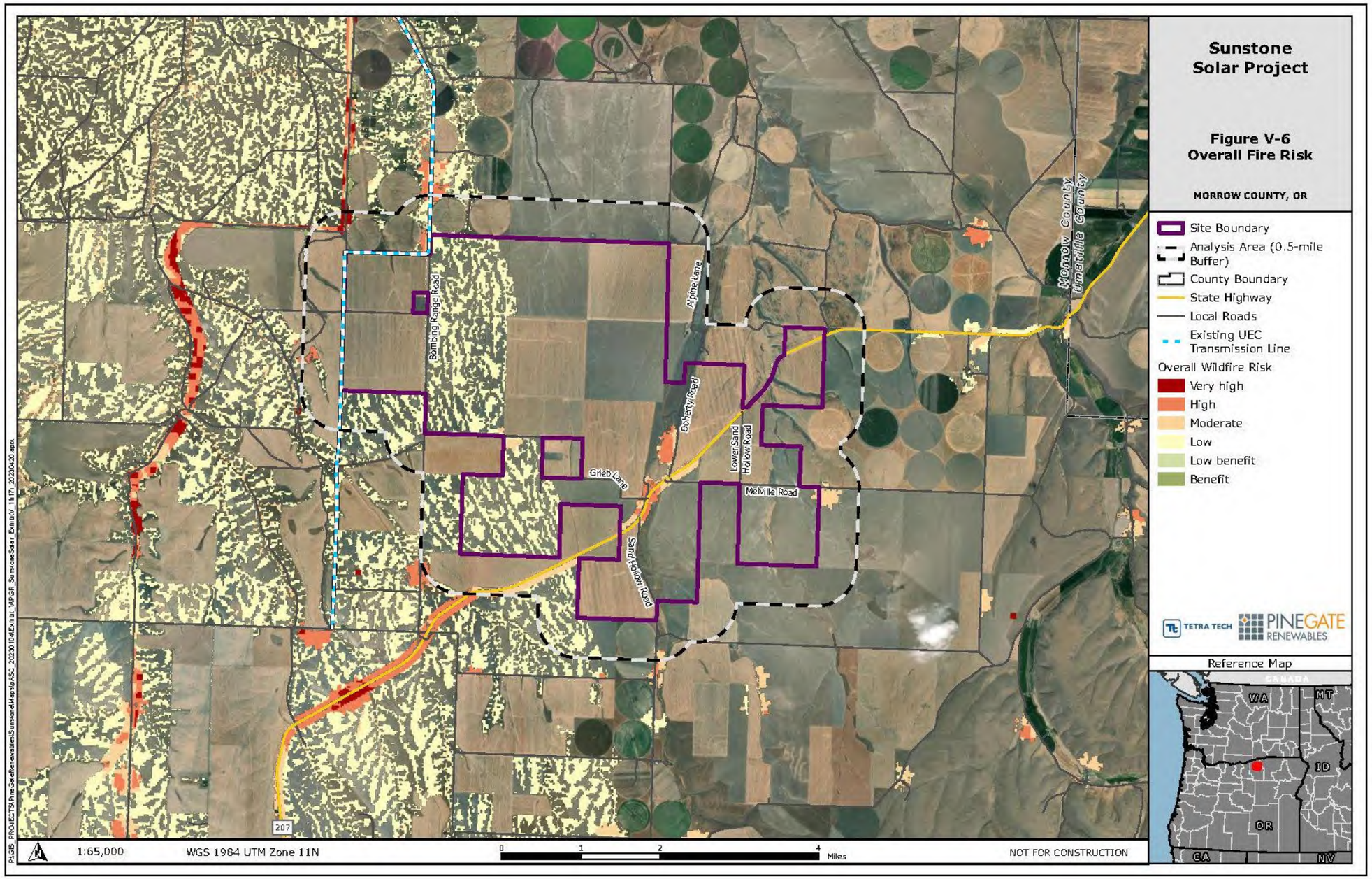
[351] "..mission is to reduce the risk from wildland fire to life, property and natural resources in the County…. the following Goals have been identified: County-wide fuels reduction initiative. Education and community outreach focused on wildfire reduction. Improved development standards targeted at reducing community wildfire risk. Increase federal and state agency involvement in local wildfire mitigation efforts.

[352] This data layer contains all the resources required under OAR 345-022-0115(1)(D); High-fire consequence areas, including but not limited to areas containing residences, critical infrastructure, recreation opportunities, timber and agricultural resources, and fire-sensitive wildlife habitat.

[353] SSPAPPDoc25-22 ASC Exhibit V Wildfire 2024-05-15, Section 2.4.

Based on the evaluation provided above, the Department recommends Council find that the wildfire risk within the site boundary and analysis area is low to moderate, except in areas that have a higher concentration of agricultural and residential areas, and transmission and transportation corridors, the Department recommends Council find that the wildfire risk in these areas is moderate. With the addition of infrastructure that will result from proposed facility construction and operation, it is expected that more of the area would fall into moderate category for wildfire risk to assets.

Figure 10: Overall Wildfire Risk



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IV.N.2. Wildfire Mitigation Plan

Under OAR 345-022-0115(1)(b), the Council must find that the facility will be designed, constructed, and operated in compliance with a WMP approved by the Council. The applicant's Draft WMP is included in ASC Exhibit V, as discussed in this subsection, the Department recommends Council amend the applicant's WMP to add additional fire-prevention and safety measures as well as separate the measures into a construction WMP and operational WMP. These two plans are attached to this order as Attachments L and M.

IV.N.2.1 Facility Design:

Proposed facility design standards and measures that would minimize wildfire risk to and from the facility includes, but is not limited to the following:

- A 5-foot noncombustible, defensible space clearance along the fenced perimeter of the site boundary will be maintained;
- Roads will primarily be 10 feet wide in the solar array area with roads up to 20 feet wide near the substation, with an internal turning radius of 28 feet and less than 10 percent grade;
- Facility infrastructure will be spaced sufficiently (fire breaks) to prevent the spread of fire and allow emergency vehicle access.
- The substation areas, transformer pads, and the permanent, fenced parking and storage area will have reduced risk for fire since these areas will have a gravel base with no vegetation within a 10-foot perimeter;
- Solar array will have shielded electrical cabling, as required by applicable code, to minimize electrical fires;
- Collector system and substation will have redundant surge arrestors to deactivate the facility during unusual operational events that could start fires.
- All Facility components will meet National Electrical Code and Institute of Electrical and Electronics Engineers standards; BESS components will meet applicable Underwriters Laboratories Standards (UL 1642, 1741, 1973, 9540A), National Electric Code, and National Fire Protection Association (specifically 855) standards.
- Batteries will be stored in completely contained, leak-proof modules storage; and containers will be constructed on concrete foundations;
- If Lithium-ion batteries are selected, the BESS will incorporate a fire response system as designed by the battery manufacturer. A zinc-based battery system is not expected to require on-site fire suppression systems.
- SCADA system will provide 24 hour, off-site monitoring of all electrical equipment and allows for control and shut down;
- Smoke/fire detectors will be placed around the site that will be tied to the Supervisory Control and Data Acquisition system and will contact local firefighting services.

IV.N.2.2 Facility Construction:

The Council's Wildfire Prevention standard and Wildfire Mitigation Plan requirements apply to construction and operation of the proposed facility. The applicant's WMP, ASC Exhibit V, Attachment V-1 predominantly addresses operational wildfire risk and prevention measures, however, multiple safety measures and best management practices (BMPs) apply to both construction and operation of the facility. The applicant's WMP also states they or their construction contractor will develop an Emergency Response Plan for construction and identifies fire-related safety measures that would apply. The Department has modified the applicant WMP to include their proposed fire prevention measures that apply to construction (Attachment L of this order) as well as added additional protocols, BMPs, and fire prevention measures that have been raised by Council in its review of other EFSC energy facilities, these changes are shown in redline track changes. In Attachment L, the Department also removed provisions that are specific to operation, which are included in the operational WMP (Attachment M of this order). Additional fire prevention measures added by the Department include details regarding measures to follow during Red Flag weather events including specifications for "hot work," such as a fire watch during and after hot work.

The Department recommends Council impose the following two conditions which would require the finalization of the construction WMP prior to construction, and then that WMP be implemented by the applicant and its contractors during facility:

Recommended Wildfire Prevention and Risk Mitigation Condition 1 (PRE): Prior to construction of the facility or phase, as applicable the certificate holder shall finalize the Construction Wildfire Mitigation Plan, as provided in Attachment L to the Final Order on ASC. The final Construction Wildfire Mitigation Plan shall be submitted to the Department for review and approval.
[PRE-WF-01]

Recommended Wildfire Prevention and Risk Mitigation Condition 2 (CON): During construction of the facility or phase, as applicable the certificate holder shall implement and require all onsite contractors and employees to adhere to, the Construction Wildfire Mitigation Plan required under PRE-WF-01. Updates to the Wildfire Mitigation Plan may be required if determined necessary by the certificate holder, certificate holder's contractor(s) or the Department to address wildfire hazard to public health and safety. Any Department required updates shall be implemented within 14 days, unless otherwise agreed to by the Department based on a good faith effort to address wildfire hazard.
[CON-WF-01]

IV.N.2.3 Facility Operation:

<u>Facility Component Inspections and Vegetation Management</u>

OAR 345-022-0115(1)(b)(A) requires the WMP to identify areas within the site boundary that are subject to a heightened risk of wildfire, using current data from reputable sources, and discuss data and methods used in the analysis. Section 2 of the WMP, and Section IV.N.1.c *Areas Subject to Heightened Risk of Wildfire and High-Fire Consequence Areas*, of this order identify these areas, which are the areas where there is existing infrastructure, people, and property, as discussed above.

The Applicant provides its WMP in ASC Exhibit V, and as noted above, the Department recommends dividing their WMP into a construction and operational WMP (Attachments L and M of this Order). The Department recommends editing the operational WMP to remove the summary of wildfire risk at the site and designate that to be updated prior to operation to capture changes from Council approval and operation of the facility.

OAR 345-022-0115(1)(b)(B) requires the description of procedures, standards, and time frames that the applicant will use to inspect proposed facility components. The Department has added a draft of the inspection table provided below in this order to the Draft Operational WMP (Attachment M), to be updated during finalization of the WMP.

Table 18: Operational Inspections for Electrical Components

Inspection	Procedure	Standard	Time frame
Solar Inverter	Visual inspection of inverter and surrounding area.	SPCC Plan[1] Manufacturer's maintenance recommendations	Monthly SPCC Bi-annual Preventative Maintenance
Substation	Visual inspection of MPT, APLIC measures, and surrounding area.	Manufacturer's maintenance recommendations APLIC[2,3]	Monthly Yearly (APLIC)
BESS	Visual inspection of BESS, PCS, and surrounding areas	SPCC Plan Manufacturer's maintenance recommendations	Monthly
Overhead electrical lines	Visual inspection of components, grounding, APLIC measures, vertical clearance distance between conductor and vegetation.	NERC[4] APLIC	Bi-annual

[1] The Operational Spill Prevention, Control, and Countermeasure Plan for the facility will require these components to be inspected monthly for spills. During these inspections, Operational Staff will also visually inspect the component and surrounding area.
[2] Applicant will develop an inspection checklist and program of electrical equipment based on manufacturer's recommendations for individual components.

Table 18: Operational Inspections for Electrical Components

Inspection	Procedure	Standard	Time frame
[3] APLIC. [4] National Energy reliability Corporation, vegetation maintenance standard FAC-003-0.			

OAR 345-022-0115(1)(b)(B) also requires the description of the procedures, standards, and time frames that the applicant will use to manage vegetation. Table 19: *Vegetation Management Procedures by Facility Component*, derived from the WMP outlines the procedure and schedule for vegetation management.

Physical vegetation survey assessments of the fenced area will be completed at least twice a year to monitor for vegetation clearances, maintenance of fire breaks, and monitor for wildfire hazards. One of the vegetation survey assessments will occur in May or June, prior to the start of the dry season, a time when wildfire risk is heightened. The survey will be conducted by the Site Operations Manager and will be used to assess the frequency of upcoming vegetation maintenance and identify areas that may need additional attention. Applicant proposes to take this information and create a Vegetation Maintenance Work Plan. However, the Department proposed revision to the operational WMP, requires the surveys notes and vegetative maintenance BMPs in the WMP to be the vegetative maintenance BMPs. Observations in the vegetation survey will include:

- Location
- Species
- Estimated growth rate
- Abundance
- Clearance / Setbacks
- Risk of fire hazard

The Department compiled from the WMP the below Table 19: *Vegetation Management Procedures by Facility Component*, which describes the vegetation management standards for each type of facility component.

Table 19: Vegetation Management Procedures by Facility Component

Facility Component	Vegetation Management Procedure	Standard	Time frame
Solar Inverters	Herbicide application on gravel pad around inverter to prevent vegetation growth.	Institute of Electrical and Electronics Engineers (IEEE) 80	Herbicide application on gravel pad around inverter to prevent vegetation growth.
Substation	Herbicide application on substation gravel pad. Highly compacted gravel foundations of substation	IEEE 80	Substation

Table 19: Vegetation Management Procedures by Facility Component

Facility Component	Vegetation Management Procedure	Standard	Time frame
	are not suitable for vegetation.		
Battery energy storage system	Herbicide application on gravel pad surrounding the battery energy storage system. Highly compacted gravel foundations of the battery energy storage system are not suitable for vegetation.	IEEE 80	Battery energy storage system
Overhead electrical lines	Mow vegetation to achieve clearance requirements between conductor and ground.	North American Electric Reliability Corporation (NERC)	Yearly, depending on vegetation condition.

Preventative Actions and Programs and Mitigation of Wildfire Risks

OAR 345-022-0115(1)(b)(C) requires the identification of preventative actions that the applicant will carry out to minimize the risk of proposed facility components causing wildfire. Table 20: *Design Considerations for Fire Safety by Facility Component*, from the WMP outlines these actions.

Table 20: Design Considerations for Fire Safety by Facility Component

Consideration	Solar Inverter	Substation	BESS	Overhead Lines
Electrical connections by qualified electricians	X	X	X	X
Inspections for mechanical integrity prior to energizations	X	X	X	X
Lighting protection	X	X	X	X
Corrosion protection	X	X	X	X
Strain relief of connecting cabling	X	X	X	X
Protection against moisture	X	X	X	X
Grounding systems	X	X	X	X
Limits on input voltage and power	X	X	X	X
Safety setback from structures	X[1]	X[1]	X[1]	X[2]

Table 20: Design Considerations for Fire Safety by Facility Component

Consideration	Solar Inverter	Substation	BESS	Overhead Lines
Technology specific design standards	X[3]	X[4]	X[5]	X[3]

[1.] 50-foot setback from structures.
[2.] Vertical and horizontal clearances from structures depend on voltage of conductor.
[3.] NFPA 70.
[4.] IEEE 979.
[5.] NFPA 1, Chapter 52.

OAR 345-022-0115(1)(b)(C) requires the identification of preventative programs that the applicant will carry out to minimize the risk of proposed facility components causing wildfire, including procedures that will be used to adjust operations during periods of heightened wildfire risk.

Both of the Draft Wildfire Mitigation Plans (Attachments L and M) lists the programs that the applicant will implement at the proposed facility, which include:

OSHA-Compliant Fire Prevention Plan[354]: All workers, contracting employees, and other personnel performing official duties at the proposed facility will conduct work under a Fire Prevention Plan (or WMP) that meets applicable portions of 29 CFR 1910.39, 29 CFR 1910.155, 29 CFR 1910, subpart L. The Fire Prevention Plan will ensure that:

- Workers are trained in fire prevention and use of a fire extinguisher;
- Necessary equipment is available to fight incipient stage fires. Fire beyond incipient stage shall be managed using local fire response organizations;
- Provide necessary safety equipment for handling and storing combustible and flammable material;
- Implement a Hot Work Procedure and permit program.

Electrical Safety Program: All operational workers will be trained in electrical safety and the specific hazards of the facility.
This training will address:

- Minimum experience requirements to work on different types of electrical components;
- Electrical equipment testing and troubleshooting;
- Switching system;
- Provisions for entering high voltage areas (e.g., substation);
- Minimum approach distances;
- Required personal protective equipment.

[354] The Department notes that these measures are presented as safety and fire prevention measures that will be implemented by the applicant and its contractor on site, however, are not within Council jurisdiction.

Lock Out/Tag Out Program: During maintenance activities on electrical equipment, personnel will be required to ensure that the equipment is de-energized and physically locked or tagged in the de-energized positions to prevent inadvertent events that could result in arc flash.

Fire Weather Monitoring: Personnel on site will monitor Fire Weather Watches and Red Flag Warnings. The Department recommends adding revisions that require personnel monitoring these conditions to halt work in high-risk locations and employ additional mitigation measures, especially related to hot work and a fire watch.

Safety Procedures: Personnel will be trained in the RACE procedure to implement in the event of a fire start. RACE procedure includes:

- **R**escue anyone in danger (if safe to do so);
- **A**larm – call the control room, who will then determine if 911 should be alerted;
- **C**ontain the fire (if safe to do so); and
- **E**xtinguish the incipient fire stage (if safe to do so).

OAR 345-022-0115(1)(b)(D) requires the identification of procedures to minimize risks to public health and safety, the health and safety of responders, and damages to resources protected by Council standards if a wildfire occurs at the proposed facility site, regardless of ignition source.

Plan Updates

The applicant's WMP states that it will be updated every five years. Updates to the WMP will account for changes in local fire protection agency personnel and changes in best practices for minimizing and mitigating fire risk. After each five-year review, a copy of the updated plan will be provided to the Department with the annual compliance report required under OAR 345-026-008(2), imposed under General Standard of Review Condition 10. As required under OAR 345-022-0115(1)(b), because the proposed facility site has a low to moderate wildfire risk, and to reflect the applicant representations to evaluate and reduce the risk of wildfire during the design, construction, and operation of the facility in compliance with the WMP, the Department recommends Council impose the following conditions:

> **Recommended Wildfire Prevention and Risk Mitigation Condition 3 (PRO)**: Prior to operation of the facility or phase, as applicable, the certificate holder shall finalize the operational Wildfire Mitigation Plan (WMP), included as Attachment M to the Final Order on ASC.
> [PRO-WF-01]
>
> **Recommended Wildfire Prevention and Risk Mitigation Condition 4 (OPR)**: During operation of the facility or phase, as applicable, the certificate holder shall:
> a. Implement the Operational Wildfire Mitigation Plan (Attachment V-1b), finalized under PRO-WF-01.

b. Every 5 years after the first operational year, review and update the evaluation of wildfire risk under OAR 345-022-0115(1)(b) and submit the results in the annual report required under Organizational Expertise Condition 9 for that year.
c. Submit an updated Operational Wildfire Mitigation Plan to the Department if substantive changes are made to the plan because of the review under sub (b) of this condition, or at any other time substantiative revisions are made to Attachment M.
[OPR-WF-01]

IV.N.3. Conclusions of Law

Based on the foregoing analysis, and subject to compliance with the recommended site certificate conditions and proposed revisions to the WMPs described above, the Department recommends the Council find that the applicant has adequately characterized wildfire risk within the analysis area using current data from reputable sources, and that, subject to Council approval, the facility will be designed, constructed, and operated in compliance with Wildfire Mitigation Plans.

IV.O. Waste Minimization: OAR 345-022-0120

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that, to the extent reasonably practicable:

(a) The applicant's solid waste and wastewater plans are likely to minimize generation of solid waste and wastewater in the construction and operation of the facility, and when solid waste or wastewater is generated, to result in recycling and reuse of such wastes;

(b) The applicant's plans to manage the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility are likely to result in minimal adverse impact on surrounding and adjacent areas.

*(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.****[355]*

IV.O.1. Findings of Fact

[355] Administrative Order EFSC 1-2007, effective May 15, 2007.

IV.O.1.1 *Construction*

Solid Waste

Proposed facility construction would generate up to 14,400 cubic yards of nonhazardous solid waste in total.[356] Nonhazardous solid waste includes wood forms from cast-in place concrete foundations; waste concrete; erosion control materials including spent straw wattles, and silt fencing; scrap steel from damaged pilings or racking equipment; unused wiring; and packaging materials including cardboard and plastic electronics packaging and wood pallets.[357] Nonhazardous solid waste will be recycled, when feasible; or will be disposed of at the Finley Butte Landfill in Morrow County.

As presented below, the Department recommends Council impose Waste Minimization Conditions 1, 2 and 3 to ensure that construction-related waste is properly managed and minimized to the extent practicable.

Wastewater

Proposed facility construction would generate wastewater during washdown of concrete trucks after concrete loads have been emptied. Concrete truck chutes will be washed down at each foundation site to prevent the concrete from hardening within the chutes. Washdown methods will be determined by the contractor and may occur at contractor-owned batch plants or a designated concrete washout.[358] Any on-site concrete or washout disposal must be conducted in accordance with OAR 340-093-0080 which requires DEQ approval of a permit exemption for materials substantially similar to clean fill; and infiltration and evaporation in accordance with a DEQ-issued NPDES 1200-C permit.

In addition, construction-related wastewater would be generated from portable toilets, which would be serviced by a local contractor for offsite disposal in accordance with applicable regulations, including the use of holding tanks for biological waste that conform to OAR 340-071 and transportation of waste in accordance with Oregon Revised Statutes 466.005.[359] The construction contractor will provide an adequate number of portable toilets to accommodate construction staff on site. These would be serviced a minimum of once per week, and wastewater generated during construction would be transported via trucks by a local licensed subcontractor to a treatment facility. Portable handwashing stations would also be used during construction and would be hauled off site as well.

The Department recommends Council find that construction waste and wastewater sources and management methods have been adequately addressed. The Department recommends

[356] SSPAPPDoc25-23 Exhibit W Waste, Section 2.1.1. 2024-05-15.
[357] *Id*.
[358] SSPAPPDoc25-23 Exhibit W, Section 2.2.1. 2024-05-15
[359] SSPAPPDoc25-07 Exhibit G, Section 5.1; SSPAPPDoc25-23 Exhibit W, Section 2.2.1. 2024-05-15

Council impose the following conditions to ensure the construction-related waste and wastewater impacts are minimized, via recycling and proper disposal:

Recommended Waste Minimization Condition 1 (PRE): Prior to construction of the facility, or phase, as applicable, the certificate holder shall require contractors to develop and submit to the Department for review and approval, Construction Waste Management Plan(s) that, at a minimum, include the following:

a. All sources and quantities of construction waste and wastewater, including damaged or dysfunctional energy facility components, and where feasible, estimated quantities that can be recycled.
b. Process for disposal and recycling, including use of licensed haulers and disposal/recycling facilities; names and locations of licensed recycling and disposal facilities; collection, hauling and tracking requirements.
c. Process for requesting a permit exemption from DEQ pursuant to OAR 340-093-0080 to ensure that concrete washout materials reused in foundation backfill are substantially the same as clean fill.
d. Process for training workers and tracking compliance with the requirements of the plan.

[PRE-WM-01; Final Order on ASC]

Recommended Waste Minimization Condition 2 (CON): During construction, the certificate holder shall require that contractors adhere to the requirements of the Construction Waste Management Plan(s) and maintain records of employee training and tracking compliance onsite and available upon Department request.
[CON-WM-01; Final Order on ASC]

Recommended Waste Minimization Condition 3 (CON): During construction, on-site concrete washwater disposal is prohibited unless DEQ approval of a permit exemption for materials substantially similar to clean fill is obtained. If DEQ approval of a permit exemption is obtained, concrete washwater must be disposed of onsite via infiltration and evaporation in accordance with the DEQ-issued NPDES 1200-C permit required under Condition CON-SP-02.
[CON-WM-02; Final Order on ASC]

IV.O.1.2 *Operations*

Solid Waste

Proposed facility operations and maintenance would generate nonhazardous solid wastes including solar modules and other general wastes, and potentially hazardous wastes such as spent lithium-ion batteries. An average of approximately 5,118 solar modules may be replaced each year, for a total of approximately 204,720 modules that may need to be stored on-site over

the life of the facility.[360] The Department assumes that the routine replacement of solar modules will generate solid waste during operations which is estimated to produce 550 cubic yards of module waste per month over the estimated 30-year life of the facility.

On average, proposed facility operations will generate approximately 12 cubic yards of general waste, such as damaged equipment, food scraps, packaging materials, per month. [361] Solid wastes generated during operations would be collected and recycled as practicable and that non-recyclable wastes would be disposed of at the Finley Butte Landfill.[362]

Batteries included in the BESS would also need to be replaced. Each battery included in the facility would need to be replaced twice during the 40-year expected operational lifetime, resulting in 24,000 batteries being replaced if a Lithium-Ion (Li-ion) system is selected, or 29,892 batteries being replaced if a zinc system is selected.[363]

To ensure the applicant establishes a plan or protocol that will minimize waste associated with replaced solar panels and BESS batteries and to support to the maximum extent practicable, recycling or reuse of solar panels based on available licensed facilitates or programs at the time of replacement, the Department recommends Council impose the following conditions:

> **Recommended Waste Minimization Condition 4 (PRO):** Prior to operation, the certificate holder shall develop an Operational Recycling Plan or protocol requiring that damaged or nonfunctional panels and lithium-ion batteries be recycled to the extent practicable. The certificate holder shall report in its annual report to the Department the quantities of panels and lithium-ion batteries recycled, reused or disposed of in a landfill. Requirements for lithium-ion battery recycling do not apply if the BESS is not constructed.
> [PRO-WM-01; Final Order on ASC]
>
> **Recommended Waste Minimization Condition 5 (OPR):** During operations, the certificate holder shall adhere to the requirements of the Operational Recycling Plan or protocol developed under Condition PRO-WM-01.
> [OPR-WM-01; Final Order on ASC]

Wastewater

Facility operations will produce washwater from solar panel washing. No acids, bases or metal brighteners will be used; biodegradable, phosphate cleaners may be used sparingly. To ensure that solar panel washwater does not result in soil contamination, the Department recommends Council impose the following condition:

[360] SSPAPPDoc25-02 Exhibit B 2024-05-15, Section 3.4
[361] SSPAPPDoc25-23 Exhibit W 2024-05-15, Section 2.2.1
[362] SSPAPPDoc25-07 Exhibit G, Section 5.1; SSPAPPDoc25-23 Exhibit W 2024-05-15, Section 2.2.1.
[363] SSPAPPDoc25-07 Exhibit G, Section 5.1; SSPAPPDoc25-23 Exhibit W 2024-05-15, Section 2.2.1.

Recommended Waste Minimization Condition 6 (OPR): During operation, the certificate holder shall:

a. Prohibit use of chemicals, soaps, detergents and heated water unless Chemical Safety Data Sheets for low volatile organic compound/biodegradable cleaning chemicals and solvents are submitted to the Department for review and approval prior to use.
b. Ensure that washing is conducted in a manner that does not remove paint or other finishes.
c. Discharge wash water through evaporation and infiltration only.

[OPR-WM-02; Final Order on ASC]

IV.O.2. Conclusions of Law

Based on the foregoing analysis, and in compliance with OAR 345-022-0120(2), the Department recommends that the Council find that, based upon negligible sources of facility-related wastewater and compliance with the recommended solid waste management plan condition, waste would be minimized during proposed facility construction and operation and therefore the applicant has sufficiently addressed the Council's Waste Minimization Standard.

IV.P. Siting Standards for Transmission Lines: OAR 345-024-0090

To issue a site certificate for a facility that includes any transmission line under Council jurisdiction, the Council must find that the applicant:

(1) Can design, construct and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;

(2) Can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.[364]

IV.P.1. Findings of Fact

Transmission lines must comply with the electric field standard found in OAR 345-024-0090, which requires that the applicant design, construct, and operate a proposed transmission line so that AC electric fields do not exceed 9 kV/m at 1 meter above the ground surface in areas accessible to the public. There is no similar Oregon design standard for magnetic fields.

[364] Administrative Order EFSC 1-2007, effective May 15, 2007

As described in Section III.A.2, the proposed facility includes 4.3 miles of above-ground 34.5 kV collector lines, and approximately 9.5 miles of above-ground, 230-kV transmission lines.

The 230 kV transmission line will connect the collector substations to the switchyard and then the UEC 230-kV Blue Ridge Line. It will consist of 2 segments: southern and northern, at 6.3 miles and 3.2 miles in length, respectively, with a one-mile stretch where both lines run parallel to each other.[365] Both overhead transmission lines connect the electrical collection substations to the two facility switchyards. The northern transmission line connects two substations, and the southern transmission line connects four substations.[366] The applicant identifies that the transmission line corridor would be approximately 1,000 feet in width to allow flexibility for final design. No new right-of-way will be needed, and no widening of the existing UEC right-of-way is required. The 230-kV line will generally have 1,000-foot-long spans between structures; however, spans may be shorter or longer depending on the terrain. The 230 kV transmission line will be located within the solar array fence line area as well as outside where the lines span between the 20 solar array fenced areas/substations and ultimately interconnects to the UEC 230-kV Blue Ridge Line, located in unincorporated parts of Morrow County and entirely within the facility's leased boundary.

IV.P.1.1 Electric and Magnetic Fields

The presence of an electric charge on an energized conductor produces an electric field. The strength of the electric field is measured in kilovolts per meter (kV/m). Electric field strength is directly proportional to the line's voltage; increased voltage produces a stronger electric field. The strength of the electric field is inversely proportional to the distance from the conductors; the electric field declines as the distance from the conductor increases.

Bonneville Power Administration Corona and Fields Effect Program, Version 3 (CAFE) model was used to estimate the electric fields that would be generated within a 200-ft right of way by the transmission lines at 1 meter above ground level. There are no known occupied buildings, residences, or other sensitive receptors within 200 feet of either overhead transmission lines or within the parallel transmission line segment. The nearest structure is located approximately 430 feet away from the proposed centerline of the northern transmission line. The results of the modeling for electrical fields are summarized in the table below.

Table 21: Electrical Field Modeling Results for 230 kV Transmission Line

Line Description	Electric Field (kV/m)		
	200 feet Left	Peak Value	200 feet Right
Northern Transmission Line	0.021	2.873 (either 16 feet left or right of centerline)	0.022

[365] SSPAPPDoc25-02 ASC Exhibit B 2024-05-16, Section 3.2.2 and 3.2.3.

[366] SSPAPPDoc25-27 ASC Exhibit AA 2024-05-16, Section 2.0.

Table 21: Electrical Field Modeling Results for 230 kV Transmission Line

Line Description	Electric Field (kV/m)		
	200 feet Left	Peak Value	200 feet Right
Southern Transmission Line	0.147	5.287 (at centerline)	0.152
Parallel Transmission Lines	0.185	6.144 (12 feet left of centerline)	0.167

The modeling results for magnetic fields generated by the 230 kV transmission line for each of the three-line configurations are showing in the following table:

Table 22: Magnetic Field Modeling Results for 230 kV Transmission Line

Line Description	Exh AA Figure	Magnetic Field (mG)		
		200 feet Left	Peak Value	200 feet Right
Northern Transmission Line	AA-1 AA-6	1.8	116.9 (at centerline)	1.9
Southern Transmission Line	AA-2 AA-7	6.0	126.3 (either 12 feet left or right of centerline)	6.2
Parallel Transmission Lines	AA-8	8.2	189.0 (18 feet right of centerline)	5.2

Modeling results showed that peak (maximum) electric field strength on a 230 kV line, in the rights-of-way would be approximately 2.87 kV/m for the northern transmission line, 5.29 kV/m for the southern transmission line, and 6.14 kV/m for segment where the two lines run parallel.[367] All of these measurements fall below the 9 kV/m threshold. Therefore, the Department recommends that Council find that the applicant can design, construct and operate the proposed transmission line in accordance with OAR 345-024-0090(1).

IV.P.1.2 Induced Voltage and Current

Electric currents can be induced by electric and magnetic fields in conductive objects near transmission lines. In particular, the concern is for very long objects parallel and close to the line. The primary concern is the potential for small electric currents to be induced by electric fields in metallic objects close to transmission lines. Metallic roofs, farming equipment and large vehicles, vineyard trellises, and fences are examples of objects that can develop a small electric charge in proximity to high-voltage transmission lines. Object characteristics, degree of

[367] SSPAPPDoc25-27 ASC Exhibit AA EMF 2024-05-15, Table AA-3.

grounding, and electric field strength affects the amount of induced charge. An electric current can flow when an object has an induced charge and a path to ground is presented.

A current-carrying conductor will induce a current to flow in another conductor that is parallel to it. Induced currents result from the net alternating current magnetic field. In the common case of grounded fences, electrical loops can be created in which induced currents can flow. The value of the induced current will depend on the magnetic field strength; the size, shape, and location of the conducting object; and the object-to-ground resistance.

Based on the modelling results, the calculated maximum electric fields (2.873 kV/m to 5.287 kV/m for the 230-kV transmission line) at the right-of-way edges and beyond will be sufficiently low enough that nuisance shocks should not occur. The peak is 6.144 kV/m for the 1-mile segment where the two lines run parallel within the site boundary.

Based on the modeling results, the calculated maximum magnetic fields (116.9 to 126.3 milligauss (mG) within the right-of-way of the 230-kV transmission lines) are sufficiently low that induced current in a metallic object should not occur. The peak is 189.0 mG for the 1 mile segment where the two lines run parallel.

Based upon the results of the modeling, the Department recommends that Council find that the predicted maximum electrical and magnetic fields from the 230 kV transmission line will not exceed the 9 kV/m above ground surface for any of the 3 230 kV transmission lines.

The Siting Standards for Transmission Lines requires the Council to find that the applicant "can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable." General Standard Condition 8 [based on the mandatory condition contained in OAR 345-025-0010(4)], presented in Section IV.A. *General Standard of Review* requires, in part, the applicant to develop and implement a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, or other objects or structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line. This includes both existing infrastructure as well as other facility components such as perimeter fencing. To ensure that induced currents are minimized based on applicant's representations, consistent with Council's Site-Specific Condition under OAR 345-025-0010(4), the Council imposes the following condition:

> **Recommended Siting Standards for Transmission Lines Condition 1 [GEN]:** The certificate holder shall:
> a. Design, construct and operate the transmission lines in accordance with the requirements of the National Electrical Safety Code as approved by the American National Standards Institute; and
> b. Develop and implement a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, or other objects or structures of a permanent

nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line.
[GEN-TL-01]

IV.P.2. Conclusions of Law

Based on the foregoing analysis, and subject to compliance with the proposed site certificate conditions described above, the Department recommends the Council find that the applicant can design, construct, and operate the facility, with proposed changes, so that alternating current electric fields do not exceed 9-kV per meter at one meter above the ground surface in areas accessible to the public and that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.

V. Evaluation of Other Applicable Regulatory Requirements

Under ORS 469.503(3) and under the Council's General Standard of Review (OAR 345-022-0000), the Council must determine whether the proposed facility complies with "all other Oregon statutes and administrative rules…as applicable to the issuance of a site certificate for the proposed facility." This section addresses the applicable Oregon statutes and administrative rules that are not otherwise addressed in Council standards, including noise control regulations, regulations for removal or fill of material affecting waters of the state, and regulations for water rights.

V.A. Noise Control Regulations for Industry and Commerce: OAR 340-035-0035

(1) Standards and Regulations:

** * * * **

(B) New Sources Located on Previously Unused Site:

(i) No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L10 or L50, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, except as specified in subparagraph (1)(b)(B)(iii).

(ii) The ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities. Sources exempted from the requirements

of section (1) of this rule, which are identified in subsections (5)(b) - (f), (j), and (k) of this rule, shall not be excluded from this ambient measurement.
*****
(1) Measurement:

(a) Sound measurements procedures shall conform to those procedures which are adopted by the Commission and set forth in Sound Measurement Procedures Manual (NPCS-1), or to such other procedures as are approved in writing by the Department;

(b) Unless otherwise specified, the appropriate measurement point shall be that point on the noise sensitive property, described below, which is further from the noise source:

A. 25 feet (7.6 meters) toward the noise source from that point on the noise sensitive building nearest the noise source;

B. That point on the noise sensitive property line nearest the noise source.
(2) Monitoring and Reporting:

(a) Upon written notification from the Department, persons owning or controlling an industrial or commercial noise source shall monitor and record the statistical noise levels and operating times of equipment, facilities, operations, and activities, and shall submit such data to the Department in the form and on the schedule requested by the Department. Procedures for such measurements shall conform to those procedures which are adopted by the Commission and set forth in Sound Measurement Procedures Manual (NPCS-1);

** * * * **

(5) Exemptions: Except as otherwise provided in subparagraph (1)(b)(B)(ii) of this rule, the rules in section (1) of this rule shall not apply to:

** * **

(c) Sounds created by the tires or motor used to propel any road vehicle complying with the noise standards for road vehicles;

** * **
(g) Sounds that originate on construction sites.

*****

(k) Sounds created by the operation of road vehicle auxiliary equipment complying with the noise rules for such equipment as specified in OAR 340-035-0030(1)(e);

** * **

Council has the authority to interpret and implement other state agency and Commission rules and statutes that are relevant to the siting of an energy facility,[368] including noise rules adopted by the Environmental Quality Commission and previously administered by the Department of Environmental Quality (DEQ).[369, 370]

V.A.1. Findings of Fact

The analysis area for the Noise Control Regulation includes the area within and extending 1-mile from the proposed site boundary.

V.A.1.1 Exempt Construction Noise

Under OAR 340-035-0035(5), noise generated during construction is exempt from the requirement to meet DEQ's noise standards. Nonetheless, construction-related noise impacts are evaluated under the Council's Protected Area, Scenic Resources, and Recreation standards, as provided in Sections IV.F., IV.J., and IV.L of this order. To support the evaluation required under those standards, the approach and results of predicted construction-noise impacts is evaluated in this section.

Construction noise levels are predicted using a semi-qualitative approach based on equipment sound levels for common construction equipment used in the Federal Highway Administration Roadway Construction Noise Model (2006).[371] Sounds levels for common construction equipment were then evaluated based on concurrent operation of equipment during typical construction phases including: demolition; site preparation and grading; trenching and road construction; equipment installation; and, commissioning, as presented in Table 23 below.

[368] See ORS 469.310 (stating that the legislative policy behind EFSC was to establish "a comprehensive system for the siting, monitoring and regulating of the location, construction and operation of all energy facilities in this state") and ORS 469.401(3) (giving EFSC the authority to bind other state agencies as to the approval of a facility).
[369] The Environmental Quality Commission and the DEQ suspended their own administration of the noise program because in 1991 the state legislature withdrew all funding for implementing and administering the program. A July 2003 DEQ Management Directive provides information on DEQ's former Noise Control Program and how DEQ staff should respond to noise inquiries and complaints. The Directive states (among other items) that the Energy Facility Siting Council (EFSC), under the Department of Energy, is authorized to approve the siting of large energy facilities in the State and that EFSC staff review applications to ensure that proposed facilities meet the State noise regulations.
[370] "We (the Oregon Supreme Court) conclude that EFSC had the authority to grant (1) an exception to the noise standards under OAR 340-035-0035(6)(a), and (2) a variance under OAR 340-035-0100 and ORS 467.060." B2HAPPDoc7 Supreme Court Decision Stop B2H Coalition v. Dept, of Energy 2023-03-09, pp 805-807.
[371] SSPAPPDoc25-25 Exhibit Y Noise 2024-05-15, Section 5.1.

Table 23: Predicted Construction Noise Levels

Construction Phase	Construction Equipment	Usage Factor (%)	Maximum Lmax Equipment Noise Level at 50 feet (dBA)	Composite Maximum Lmax Equipment Noise Level at 1,200 feet (dBA)
1 - Demolition	Excavators (168 hp)	40	85	59
	Tractors/Loaders/Backhoes (108 hp)	40	80	
	Rough Terrain Forklifts (93 hp)	40	85	
	Dump Truck	40	85	
2 - Site Preparation and Grading	Graders (174 hp)	40	85	61
	Rubber Tired Loaders (164 hp)	40	85	
	Scrapers (313 hp)	40	85	
	Water Trucks (189 hp)	40	88	
	Generator Sets	50	82	
3 - Trenching and Road Construction	Excavators (168 hp)	40	85	61
	Graders (174 hp)	40	85	
	Water Trucks (189 hp)	40	88	
	Trencher (63 hp)	40	85	
	Rubber Tired Loaders (164 hp)	40	80	
	Generator Sets	50	82	
4 - Equipment Installation	Crane (399 hp)	16	85	63
	Forklifts (145 hp)	40	85	
	Pile drivers	20	95	
	Pickup Trucks/ATVs	40	55	
	Water Trucks (189 hp)	40	88	
	Generator Sets	50	82	
5 - Commissioning	Pickup Trucks/ATVs	40	55	23
Source: SSPAPPDoc25-25 ASC Exhibit Y Noise 2024-05-15, Table 4.				

There are 14 Noise Sensitive Receptors (NSRs) within the 1-mile analysis area. The closest NSR is approximately 1,200 feet from the proposed site boundary. At the NSR nearest to the proposed site boundary, peak construction noise levels would be 63 dBA, or about the sound of a passenger vehicle passing approximately 25 feet away at 65 mph. Further, existing noise impacts from the nearby Boardman Bombing Range found that lands to the west (conservation lands and agricultural lands) and east (agricultural lands) have community day and night levels between 60 and 70 dBA as a result of military training activities.[372] Jet flyovers associated with

[372] FAA 2016; SSPAPPDoc25-12 ASC Exhibit L Protected Areas 2024-05-15, Section 4.1.

the Boardman Bombing Range are reported to reach 90 to 115 dBA, and frequently occur in the vicinity of the facility.

V.A.1.2 Operational Noise

The proposed facility would be a new industrial or commercial noise source located on a previously unused industrial or commercial site subject to the noise standards established under OAR 340-035-0035(1)(b)(B). The standards prohibit noise generated from a new industrial or commercial source from exceeding the limits in Table 24 below, or from increasing the L_{10} or L_{50} ambient statistical noise levels by more than 10 dBA in any one hour.

Table 24: Statistical Noise Limits for Industrial and Commercial Noise Sources

Statistical Descriptor[1]	Maximum Permissible Hourly Statistical Noise Levels (dBA)	
	Daytime (7:00 AM - 10:00 PM)	Nighttime (10:00 PM - 7:00 AM)
L50	55	50
L10	60	55
L1	75	60

Notes:
1. The hourly L50, L10 and L1 noise levels are defined as the noise levels equaled or exceeded 50 percent, 10 percent, and 1 percent of the hour, respectively.

Source: OAR 340-035-0035, Table 8

The noise limits apply at an appropriate measurement point on noise sensitive properties, such as dwellings, schools, churches, hospitals, or public libraries.[373] The appropriate measurement point is defined as the farther from the noise source of 25 feet toward the noise source from that NSR, or the point on the noise sensitive property line nearest the noise source using the DEQ Commission approved Sound Measurement Procedures Manual, NPCS-1 (Manual), unless other measurement points are specified or other measurement procedures are approved in writing by the Department, respectively.[374]

For this analysis, the applicant seeks approval for "other measurement procedures" as allowed under the rule. The "other measurement procedures" included identifying 5 representative monitoring locations (MLs) in proximity to the 14 NSRs identified within the 1-mile analysis

[373] See OAR 340-035-0015(38).

[374] As previously described, because DEQ does not fund, administer, or enforce the noise control requirements established in OAR 345-035-0035, yet they are applicable OARs to the facility, the Council assumes authority to review, interpret, and apply the rules. Therefore, the Council has authority to review and approve sound measurement procedures that differ from the Sound Measurement Procedures Manual (NPCS-1).

area. The MLs were selected and utilized to represent ambient noise levels at the 14 NSR locations, based on topography, land cover and proximate noise sources.

Ambient noise conditions were measured using a Larson Davis 831 real-time sound level analyzer. The real-time sound level analyzer recorded short-term (30-minute) ambient measurements, in 10- and 1-minute time intervals, during both the daytime and nighttime periods. The location of the short-term measurement locations is presented in ASC Exhibit Y Figure Y-1. The NPCS-1 Manual establishes a short-term spot sample approach stating that "a typical noise survey will require approximately 20 minutes of measurement to record the required number of samples at 5-second intervals."[375] While the measurement procedure differs from the NPCS-1 Manual, the Department recommends Council approve the procedure because it is more robust and consistent with the duration and approach for evaluating ambient conditions.

In Table 25 below, the Department presents its evaluation of whether, based on review of ASC Exhibit Y Figures Y-1 and Y-2, the 5 MLs reasonably represent the same acoustic environment as the 14 NSR locations that have been grouped with an ML to evaluate ambient noise conditions.

Table 25: Department Evaluation of Acoustic Noise Environment of Monitoring Locations Compared to NSR Locations

Monitoring Position:NSR	Ambient dBA (L_{50})	Noise Sources		Topography	Land Cover Type
		Source Description	Distance		
ML-1	38	Road/Intersection (Alpine Ln/Boardman Bombing Range Rd.)	0 ft.	Flat	Low vegetation; agriculture
NSR-1		Road (Alpine Ln)	250 ft.		Trees; agriculture
NSR-11		Road/Intersection (Alpine Ln/Boardman Bombing Range Rd.)	140 ft.		
ML-2	29	Road (Alpine Ln)	100 ft.	Flat	Trees; agriculture
NSR-2		Highway/Road (I-207; Wagon Trail Road)	350 ft.		
NSR-3		Road (Alpine Ln)	80 ft.		
NSR-4		Road (Alpine Ln)	90 ft.		
NSR-5		Road (Doherty Rd)	800 ft.		
NSR-6		Road (Doherty Rd)	50 ft.		
ML-3	25	Road (Melville Rd)	0 ft	Flat	Low vegetation; agriculture
NSR-7		Road (Melville Rd)	200 ft		
NSR-10		Highway (I-207)	157 ft		

[375] ODEQ Sound Measurement Procedure Manual, p. 27 of 38.

Table 25: Department Evaluation of Acoustic Noise Environment of Monitoring Locations Compared to NSR Locations

Monitoring Position:NSR	Ambient dBA (L_{50})	Noise Sources		Topography	Land Cover Type
		Source Description	Distance		
ML-4	27	Road (Barclay Ln)	120 ft	Flat	Low vegetation; agriculture
NSR-8					Trees; agriculture
ML-5	28	Road/Intersection (Grieb Ln/Bombing Range Rd)	125 ft.	Flat	Low vegetation; agriculture
NSR-9		Highway (I-207)	207 ft		Low vegetation; agriculture
NSR-12		Road (Little Juniper Ln)	750 ft		Low vegetation; agriculture
NSR-13		Road (Grieb Ln)	75 ft.		Trees; agriculture
NSR-14		Road/Intersection (Grieb Ln/Bombing Range Rd)	125 ft.		Trees; agriculture

As shown in Table 25 above, ambient background noise levels at the five MLs range from 27 to 38 dBA. Based on the Department's review of acoustic environments of MLs compared to the respective NSR, in all instances the acoustic environment of the ML reasonably represents locations with similar noise sources but located at greater distances than NSRs to noise sources. Therefore, the MLs represent a more conservative (lower) and acceptable ambient noise level for use in the evaluation of compliance with the DEQ noise rules.

Noise-generating equipment associated with proposed facility operation would include substation transformers, inverters and transformers for the solar arrays, cooling systems necessary for the battery storage systems, and transmission lines. Sound power level data was used as inputs to the acoustic modeling analysis, where the applicant assumed the maximum number of noise-generating equipment as:

- 318 inverter/transformer stations, 89 dBA per inverter
- 6 generator step-up transformers, 100 dBA per transformer
- 14,946 battery storage HVAC units, 66 dBA per unit
- 230 kV transmission line, 38 to 43 dBA at 50 feet[376]

[376] SSPAPPDoc25-25 Exhibit Y Noise 2024-05-15, Section 5.3.1.1.

The 2022 DataKustik GmbH's Computer-aided Noise Abatement (CadnaA) program and the Bonneville Power Administration's Corona and Field Effects Program v3 (Corona 3) were used to estimate expected noise levels during proposed facility operation.[377] Acoustic modeling results are presented in Table 26. As shown in the table, the expected noise levels from the proposed facility would increase night-time ambient noise levels by 10 dBA at one NSR location (NSR 7), and by 8 dBA at NSRs 13 and 14. Increases in nighttime ambient noise levels at other NSRs would be between 0 and 5 dBA.

Table 26: Acoustic Modeling Results of Proposed Facility Operational Noise

NSR ID	Lowest Measured Ambient Sound Level (dBA, L50)	Predicted Noise Level (Ambient + Proposed Facility, dBA)	Change in Noise (dBA)
1	38	42	4
2	29	29	0
3	29	31	2
4	29	33	4
5	29	33	4
6	29	33	4
7	25	35	10
8	27	28	1
9	28	29	1
10	25	30	5
11	38	39	1
12	28	30	2
13	28	36	8
14	28	36	8

The results of acoustic modeling demonstrate that the proposed facility would comply with the requirements of OAR 340-035-0035. To ensure that the final facility design continues to comply with OAR 340-035-0035, the Department recommends the Council impose Noise Control Condition 1 requiring that, prior to construction, the applicant provide an updated acoustic modeling analysis and associated maps based on final equipment specifications, noise warranty data which must demonstrate compliance with the antiambient degradation standard.

> **Recommended Noise Control Condition 1 (PRE):** Prior to construction of the facility or phase, as applicable, the certificate holder shall demonstrate that the operational noise levels comply with OAR 345-035-0035(1)(b), based on an updated acoustic modeling analysis using final design/layout and equipment specifications.
> [PRE-NC-01]

[377] SSPAPPDoc25-25 Exhibit Y Noise 2024-05-15, Section 5.2.1.

The maximum allowable L50 sound level standard is 50 dBA. Results of the acoustic modeling analysis, as presented in Table 26 above, indicate that operational noise will not exceed 42 dBA. Therefore, the Department recommends Council find that because the maximum L50 sound levels would be less than the "Table 8" maximum allowable sound level, the proposed facility would be in compliance with the maximum allowable sound level standard identified in OAR 340-035-0035(1)(b)(B)(i).

V.A.2. Conclusions of Law

Based on the recommended findings of fact and compliance with the recommended conditions of approval, the Department recommends the Council find that the design, construction, and operation of the proposed facility would comply with the requirements of OAR 340-035-0035.

V.B. Removal-Fill Law: ORS chapter 196 and OAR chapter 141

Under ORS 196.795 through 196.990 and OAR chapter 141, division 085, no person may remove, fill, or alter 50 cubic yards or more of material within any state jurisdictional waters, or any amount of material within state-designated Essential Salmonid Habitat, State Scenic Waterways or compensatory mitigation sites, without a permit from the Department of State Lands (DSL).[378] State jurisdictional waters include among other types of waterways, wetlands, rivers, and intermittent and perennial streams, lakes, and ponds.[379]

V.B.1. Findings of Fact

ASC Exhibit J Attachment J-1 is a wetland delineation report for a 10,992 acre study area. The delineation of potential wetlands and WOS within the study area was based on review of site-specific literature and geospatial data; and field investigations conducted on March 21-22, 2022. Delineations were conducted utilizing techniques published in the 1987 United States Army Corps of Engineers Wetlands Delineation Manual, the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, and OAR 141-090-0005 through 141-090-0055. The results of the wetland delineation identified 19 exempt waterways within the study area, as concurred by DSL on August 30, 2023.[380] DSL concurrence is valid for five years from the date of their 2023 letter, or August 2028 unless new information necessitates a revision.

Based on the DSL's concurrence, the Department recommends the Council find that no removal-fill permit is needed for the proposed facility. To ensure that a valid jurisdictional

[378] ORS 196.800(15) defines "Waters of this state." The term includes wetlands and certain other waterbodies.
[379] See definitions for "waters of this state" and the jurisdictional limits of the term under ORS 196.800 and OAR 141-085-0510, and 141-085-0515.
[380] An ephemeral stream only flows in direct response to precipitation events and does not meet the jurisdictional limits under OAR 141-085-0515. SSPAPPDoc10 pASC DSL Wetland Delineation Concurrence Letter 2023-08-31.

determination[381] is in place during construction of the proposed facility, the Department recommends the Council impose Removal-Fill Conditions 1, as presented below.

> **Recommended Removal-Fill Condition 1 (PRE):** Prior to construction of the facility, facility component or phase, as applicable, the certificate holder must provide documentation of a valid jurisdictional determination from the Oregon Department of State Lands demonstrating that no waterways subject to the State Removal-Fill law under ORS 196.795 through 196.990 are present within areas to be disturbed during construction or operation.
> [PRE-RF-01]

V.B.2. Conclusions of Law

Based on the recommended findings of fact and compliance with the recommended condition of approval, the Department recommends the Council conclude that the design, construction, and operation of the proposed facility would not require a removal fill permit because of the lack of presence of wetlands, therefore the facility complies with the applicable portions of the requirements of ORS 196.795 through 196.990 and OAR chapter 141, division 085.

V.C. Water Rights

Under ORS Chapters 537 and 540 and OAR Chapter 690, the Oregon Water Resources Department (OWRD) administers water rights for appropriation and use of the water resources of the state. Under OAR 345-022-0000(1)(b), the Council must determine whether the proposed facility would comply with statutes and administrative rules identified in the Project Order. As presented in the Project Order, Section III (E), OAR 345-021-0010(1)(o)(F) requires that if a proposed facility needs a groundwater permit, surface water permit, or water right transfer, that a decision on authorizing such a permit rests with the Council.

V.C.1. Findings of Fact

Proposed facility construction and operations will not rely upon a groundwater permit, surface water permit, or water right transfer. Construction related water use will be obtained either from Hermiston Water Department, Stanfield Public Works, the Port of Morrow, or another municipal source under an existing municipal water right. Under OWRD rules, examples of

[381] Jurisdictional determination may include letter of concurrence issued by DSL, see OAR 141-090-0020 (20) "Jurisdictional Determination" (JD) means a written decision by the Department that waters of this state subject to regulation and authorization requirements of OAR 141-085, 141-089, 141-0100 and 141-0102 are present or not present within a study area. The JD may include a delineation of the geographic boundaries of the area subject to state jurisdiction. For example, a JD may include the location of a wetland boundary or the location of the ordinary high water line (ordinary high water mark) of a waterway. A JD may, but does not necessarily, include a determination that a particular activity in a water of this state is subject to authorization requirements. The decision record includes the basis of the jurisdictional determination and is a final order subject to reconsideration according to the provisions in 141-090-0050.

municipal water use include but are not limited to domestic water use, irrigation of lawns and gardens, commercial water use, industrial water use, fire protection, irrigation, and other water uses.[382] Council has previously found, and affirmed by OWRD that water use for the construction and operation for the proposed facility qualifies under OAR 690-300-0010(25) as "industrial water use", which includes the use of water associated with the processing or manufacture of a product, such as the construction, operation, and maintenance of an industrial site like a solar facility. The Department recommends Council continue to find that the proposed solar facility, as an industrial or commercial use, qualifies as a municipal use under OWRD rules.

Operational water use would include solar module washing and sanitary uses at up to 4 O&M buildings, as presented below. Water necessary for proposed facility operations would be obtained from onsite, permit exempt wells to be located at the O&M buildings. Estimated construction and operational water uses are presented in Table 27 below.

Table 27: Estimated Water Use from Construction and Operation

Water Use	**Quantity**
Construction	Gallons, Total
Dust control	150.6 Mgal
Vehicle Wash Stations	1.2 Mgal
Road Compaction	7.3 Mgal
Concrete Mixing	-
Battery pad foundations	110,040 gal
Tracker post foundations	4.8 Mgal
Transmission line post foundations	9,900 gal
Inverter/transformer pad foundations	19.0 Mgal
Collector substations/switchyard foundations	197,040 gal
O&M building foundation	6,000 gal
Drinking water/sanitation	2.5 Mgal
Total Estimated Construction Use	186.5 Mgal
Operation	Gallons/Year
O&M Building	109,200
Solar Panel Washing (one per year)	790,000
Average Annual Estimated Operational Use	899,200

The proposed facility would include up to 4 O&M buildings, each proposed to include an onsite well. Under OAR 690-340-0010(1)(d), a commercial or industrial operation (in this case the construction and operation of a solar facility) shall be allowed only one well system and exemption under the exemptions defined in ORS 537.545(1)(f) on each ownership or tax lot, whichever is larger. The proposed facility would be located on separate tax lots, with lands

[382] OAR 690-300-0010(29).

under ownership of six different landowners. Three of the four O&M buildings are proposed to be located on lands under the same ownership.

Under ORS 537.545(1)(f), an exempt use of ground water includes any single industrial or commercial purpose in an amount not exceeding 5,000 gallons a day. The "purpose" is the construction and operation of the proposed solar facility; therefore, the proposed facility may not exceed 5,000 gallons per day use water from the well system. The applicant's proposal for use of groundwater from groundwater wells qualifies for an exemption under ORS 537.545(1)(f), therefore no registration, certificate of registration, application for a permit, permit, certificate of completion or ground water right certificate is required.

Under ORS 537.545(5) through (7), the landowner where an exempt well is constructed must file a record of the well, with appropriate fee, with the OWRD.[383] The provisions of ORS 537.765 outline water log requirements and apply to any person who constructs, alters, abandons or converts a well, which would apply to bonded contractors installing the wells, and not the applicant.

Under OWRD rules, wells that use less than 5,000 gallons of water per day for a single industrial or commercial purpose are exempt from registration, permits, or ground water right certificates.[384] The provisions of ORS 537.545 require the owner of the land on which an exempt well is drilled provide to the OWRD a map showing the exact location of the well, as well as pay a recording fee to OWRD. ORS 537.765 requires a well log containing specific information described in ORS 537.765 to be filed with the Water Resources Commission when a new exempt well is drilled, or an existing well is altered, converted, or abandoned. These OWRD requirements are not permits or other approvals included in or governed by the site certificate, therefore the applicant must independently comply with the provisions of ORS 537.454 and ORS 537.765 outside of the site certificate process.

To affirm the facility's water use during construction, the applicant's ability to obtain water for facility construction and operation from Hermiston Water Department, Stanfield Public Works, the Port of Morrow, or another municipal source, and to verify the applicant's ongoing qualification for exempt use of groundwater the Department recommends Council impose the following conditions:

Recommended Water Rights Condition 1 [PRE]: Prior to construction of the facility or phase, as applicable, the certificate holder shall:

a. Identify all water-related needs and estimate daily and annual water demand for each construction phase, as applicable.
b. Provide excerpts of agreements or other similar conveyance from the water providing entity to the Department demonstrating that construction activities will be adequately and legally served by service providers or third-party permits.

[383] See OAR 690-190-0005 for exempt groundwater use recording requirements in rule.
[384] ORS 537.545(1)(f).

[PRE-WR-01; Final Order on ASC]

Recommended Water Rights Condition 2 [CON]: During construction, if a water right, limited water use license or water rights transfer is needed and would not be obtained by a third-party, the certificate holder shall submit and obtain approval of the applicable water permit through the site certificate amendment process.
[CON-WR-01; Final Order on ASC]

Recommended Water Rights Condition 3 [PRO]: Prior to operation, the certificate holder shall provide the Department a copy of the map, well log and all other information it provided to OWRD pursuant to ORS 537.545 and ORS 537.765 to qualify for an exempt ground water use for any onsite exempt wells.
[OPR-WR-01; Final Order on ASC]

Recommended Water Rights Condition 4 [PRO]: During operation, the certificate holder shall verify that any onsite exempt wells do not use more than 5,000 gallons of ground water a day, collectively, and shall monitor the volume of groundwater used on a daily basis, maintain a record of such use and make the monitoring records available to the Department upon request.
[OPR-WR-01; Final Order on ASC]

The Department recommends Council find that because the applicant has estimated maximum water use during facility construction and operation, and demonstrated that with conditions, it has an ability to obtain an adequate supply of water, that neither the applicant nor a third-party contractor will require a groundwater permit, surface water permit, or water right transfer for construction or operation of the facility.

V.C.2. Conclusions of Law

Based on the foregoing findings of fact, the Department recommends that the Council conclude that the proposed facility does not need a groundwater permit, surface water permit, or water right transfer.

VI. PROPOSED CONCLUSIONS AND ORDER

The applicant, Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC, submitted an application for site certificate (ASC) to the Energy Facility Siting Council (Council) requesting authorization to construct and operate a solar photovoltaic energy generation facility including, related or supporting facilities, within Morrow County. Subject to compliance with the recommended site certificate conditions and based on the preponderance of evidence on the record, the Department recommends Council find that:

1. The proposed Sunstone Solar Project complies with the requirements of the Oregon Energy Facility Siting Statutes, ORS 469.300 to 469.520.

2. The proposed Sunstone Solar Project complies with the standards adopted by the Council pursuant to ORS 469.501.

3. The proposed Sunstone Solar Project complies with all other Oregon statutes and administrative rules identified in the Project Order as applicable to the issuance of a site certificate for the facility.

Based on the recommended findings of fact, reasoning, recommended conditions and conclusions of law in this draft proposed order, the Department recommends that Council conclude that the applicant has satisfied the requirements for issuance of a site certificate. The Department further recommends that, pursuant to ORS 469.401, the Chairperson execute the site certificate authorizing the applicant to construct, operate and retire the facility subject to the conditions set forth in the site certificate.

Issued July 12, 2024

The OREGON DEPARTMENT OF ENERGY

By: Todd Cornett
Todd Cornett (Jul 12, 2024 12:46 PDT)

Todd Cornett, Assistant Director of Siting
July 12, 2024

Attachments:
Attachment A: Draft Site Certificate
Attachment B: Reviewing Agency Comments on preliminary/complete ASC Relied upon in DPO
Attachment C: Draft Proposed Order Index/Comments (placeholder)
Attachment D: Draft Fugitive Dust Control Plan
Attachment E: Draft Noxious Weed Control Plan
Attachment F: Memorandum of Agreement for Agricultural Mitigation Fund/Agricultural Mitigation Plan
Attachment G: Draft Revegetation and Reclamation Plan
Attachment H: Draft Habitat Mitigation Plan
Attachment I: Construction Wildlife Monitoring Plan
Attachment J: Wildlife Monitoring Plan
Attachment K: Inadvertent Discovery Plan
Attachment L: Draft Construction Wildfire Mitigation Plan
Attachment M: Draft Operational Wildfire Mitigation Plan
Attachment N: Draft Road Use Agreement with Draft Construction Management Pla

Notice of the Right to Appeal

[Text to be added to Final Order]

Attachment A: Draft Site Certificate

ENERGY FACILITY SITING COUNCIL

OF THE STATE OF OREGON

Site Certificate for the Sunstone Solar Project

ISSUE DATE

<<ISSUE DATE>>

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Table of Contents

1.0 Introduction and Site Certification

This site certificate is a binding agreement between the State of Oregon (State), acting through the Energy Facility Siting Council (EFSC or Council), and Sunstone Solar, LLC (certificate holder), owned by Pine Gate Renewables, LLC (parent company). Both the State and certificate holder must abide by local ordinances, state law, and the rules of the Council in effect on the date this site certificate is executed. However, upon a clear showing of a significant threat to public health, safety, or the environment that requires application of later-adopted laws or rules, the Council may require compliance with such later-adopted laws or rules (ORS 469.401(2)).

This site certificate binds the State and all counties, cities and political subdivisions in Oregon as to the approval of the site and the construction, operation, and retirement of the facility as to matters that are addressed in and governed by this site certificate (ORS 469.401(3)). Each affected state agency, county, city, and political subdivision in Oregon with authority to issue a permit, license, or other approval addressed in or governed by this site certificate, shall upon submission of the proper application and payment of the proper fees, but without hearings or other proceedings, issue such permit, license or other approval subject only to conditions set forth in this site certificate. In addition, each state agency or local government agency that issues a permit, license or other approval for this facility shall continue to exercise enforcement authority over such permit, license or other approval (ORS 469.401(3)). For those permits, licenses, or other approvals addressed in and governed by this site certificate, the certificate holder shall comply with applicable state and federal laws adopted in the future to the extent that such compliance is required under the respective state agency statutes and rules (ORS 469.401(2)).

This site certificate does not address, and is not binding with respect to, matters that are not included in and governed by this site certificate, and such matters include, but are not limited to: employee health and safety; building code compliance; wage and hour or other labor regulations; local government fees and charges; other design or operational issues that do not relate to siting the facility (ORS 469.401(4)); and permits issued under statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council (ORS 469.503(3)).

The obligation of the certificate holder to report information to the Department or the Council under the conditions listed in this site certificate is subject to the provisions of ORS 192.502 *et seq.* and ORS 469.560. To the extent permitted by law, the Department and the Council will not publicly disclose information that may be exempt from public disclosure if the certificate holder has clearly labeled such information and stated the basis for the exemption at the time of submitting the information to the Department or the Council. If the Council or the Department receives a request for the disclosure of the information, the Council or the Department, as appropriate, will make a reasonable attempt to notify the

certificate holder and will refer the matter to the Attorney General for a determination of whether the exemption is applicable, pursuant to ORS 192.450.

Council shall have continuing authority over the site and may inspect, or direct the Oregon Department of Energy (Department) to inspect, or request another state agency or local government to inspect, the site at any time in order to ensure that the facility is being operated consistently with the terms and conditions of this site certificate (ORS 469.430).

The duration of this site certificate shall be the life of the facility, subject to termination pursuant to OAR 345-027-0110 or the rules in effect on the date that termination is sought, or revocation under ORS 469.440 and OAR 345-029-0100 or the statutes and rules in effect on the date that revocation is ordered. The Council shall not change the conditions of this site certificate except as provided for in OAR Chapter 345, Division 27.

In interpreting this site certificate, any ambiguity will be clarified by reference to the following, in order, incorporated herein by this reference: 1) *Final Order on the Application for Site Certificate for the Sunstone Solar Project* issued on XXX (hereafter, *Final Order on the ASC*); 2) the record of the proceedings that led to the Final Order on the ASC.

The definitions in ORS 469.300 and OAR 345-001-0010 apply to the terms used in this site certificate, except where otherwise stated, or where the context clearly indicates otherwise.

2.0 Facility Location and Site Boundary

The facility is located within an approximately 10,960-acre (17 sq. mile) site in Morrow County. The site is located on both sides of State Route 207 and is approximately 15 miles northeast of the Town of Lexington and approximately 4.5 miles west of Butter Creek Junction. The site is approximately 3 miles west of the Umatilla County line at its closest point. Table 1 below provides the Township, Range, and Sections occupied wholly, or in part, by the site. Up to 9,442 of land within the site boundary would be occupied by facility components. Approximately 1,518 acres within the site boundary are excluded from development as shown on ASC Exhibit C, Figures C-2, and C-2.1 to C-2.3, attached to this site certificate as Attachment 1.

Table 1: Township, Range, and Section for Areas Occupied by the Site Boundary

Township	Range	Sections
1N	26E	1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 14, 15
2N	26E	27, 28, 29, 30, 31, 32, 33, 34, 35, 36
Reference: SSPAPPDoc25-03 ASC Exhibit C Project Location, Table C-1. 2024-05-15.		

The regional location of the facility site boundary and transmission line corridor are presented in Attachment 1 Figure 1, *Regional Location of Facility and Site Boundary*.

3.0 Facility Description

The energy facility is approved to include the components presented in Table 2 below. Additional details regarding specific components, and discussion of alternative designs or technologies under consideration are provided in the sections that follow.

Table 2: Facility Component Summary

Component and Design Standard	No.	Unit
Site Boundary		
Site Boundary	10,960	acres
Maximum Footprint	9,442	acres
Permanent Impacts[1]	9,442	acres
Solar Components		
PV Solar Modules		
Approx. total number	3,937,536	modules
Max Height at full-tilt	15	feet
Posts		
Approx. total number (assumes concrete foundation)	535,056	posts
Cabling		
Combiner Boxes	61,524	each
Inverter Step Up (ISU) Transformer Units		
Approx. total number	319	each
Noise level	89	dBA
Transformer oil-containing capacity	800	gallons
Related or Supporting Facility Components		
34.5 kV Collection System		
Collector line length, belowground	82	miles
Collector line length, overhead (OH)	4.3	miles
Wood Monopoles (max estimate for OH)	151	each
Collector Substations		
Substations w SCADA; GSU transformers per each	6; 1	each

[1] The energy facility would occupy approximately 9,442 acres within up to 20 separately fenced areas. Most related or supporting facilities will be located within the energy facility's footprint; however, portions of the overhead 34.5 kV collector and 230-kV transmission lines running between solar array areas would result in additional temporary and permanent disturbance areas.

Table 2: Facility Component Summary

Component and Design Standard	**No.**	**Unit**
Site size	1.6	acres
Transformer oil-containing capacity	16,000	gallons/each
Transformer noise level	100	dBA
Max height of structures	45	feet
Switchyards		
Stations; Transformers per each	2; 0	each
Site size (northern and/or within solar fence line); with foundations and graveled areas	3	acres
230 kV Transmission Line		
Length (total; northern line; southern line)	9.5; 3.2; 6.3	miles
Structures: Type (Wood or Galvanized Steel); quantity	H-frame; 50	each
Height of structures	70- 180	feet
Battery Energy Storage System (Lithium-ion/Zinc)		
Zinc		
Approx. total batteries/containers on foundations with fans/heating systems; SCADA	14,946	each
Site size	0.2 to 0.4	acres
Approx. container dimensions	9.5 x 8 x 20	H x W x L; feet
Noise level (broadband)	66	dBA
Lithium-ion		
Approx. total batteries/containers on foundations with HVAC and fire suppression systems; SCADA	12,000	each
Site size	0.2 to 0.4	acres
Approx. container dimensions	11.25 x 8.1 x 5.2	H x W x L; feet
Noise level (broadband)	66	dBA
O&M Building		
Quantity	4	each
Site size	2.8	acres
Height	20	feet
Appurtenances	On-site well, septic system, SCADA System	
Storage for Replacement Solar Panels		
Containers	50	each
Approx. container dimensions	8.5 x 8 x 40	H x W x L; feet

Table 2: Facility Component Summary

Component and Design Standard	No.	Unit
Location	Dispersed within fence line if not next to O&M, gravel base	
Facility Roads		
Length	55	miles
Width	10- 20	feet
Perimeter Fence		
Length	58	miles
Height	7-8	feet
Access/gates	52	each
Temporary Construction Areas		
Quantity	54	each
Site size	5	acres
Description	Gravel base; diesel/gas storage; within fence line	

Energy Facility

The facility includes a solar photovoltaic power generation facility with up to 1,200 MW of electric generation capacity. The energy facility consists of up to 20 separately fenced solar arrays organized into six 200 MW blocks.

Photovoltaic Modules

Solar photovoltaic modules, or solar panels, convert sunlight into DC electric power. The typical module contains crystalline silicon photovoltaic cells arranged within glass panels equipped with an anti-reflective coating, a metal frame, and wire connectors.

Racking System

The photovoltaic modules are connected in series into strings and then mounted on a racking system. Each rack would contain 2 strings of 32 modules mounted on a single-axis tracking system. Multiple racks are organized into rows between 200 and 400 feet in length depending on topography. Rows would be spaced at least 10 feet apart and at least 15 feet from perimeter fencing to provide vehicle access.

Posts

Each row of tracker mounted modules is supported by multiple hollow, screw pile, or pile-type steel posts. Posts are typically installed to a depth of 6-8 feet below surface and extend 5 feet

above grade. Posts at the end of rows may be installed at greater depths to withstand wind uplift. Posts may be installed directly in the ground or concrete backfill may be required in some soil conditions.

DC Cabling System

Combiner boxes or a Big Lead Assembly (BLA) harness system is used to aggregate the DC output of the photovoltaic modules for transmission to an inverter by low-voltage DC cables. Using the combiner boxes, strings of modules are connected to a pad-mounted combiner box installed at each row, which in turn, are connected to the inverters by low voltage DC cables that are either mounted to the tracking system, installed in trays, or buried underground. Using the BLA system, strings are connected directly to a rack-mounted cabling system.

Inverters and Inverter Step Up (ISU) Transformers

Inverters convert the DC output of the photovoltaic modules to AC power that can be transmitted to the electric grid. A typical inverter in utility scale solar facilities converts the 900 to 1,500 volt DC module output to 660 volt AC output. After conversion, the output is sent to an inverter step-up (ISU) transformer to increase the voltage to 34.5 kV power for transmission to the collector substation via the electrical collector system. Inverters and ISU transformers are collocated on concrete slabs near each module block.

Related or Supporting Facilities

Related or supporting facilities include a battery energy storage system, an interconnection substation, up to six collector substations, up to four operations and maintenance building, and other structures.

Battery Energy Storage System

The battery energy storage system (BESS) is designed to provide up to 7.2 gigawatt-hours (GWh) of storage capacity. The BESS may be either Lithium-Ion (Li-ion) or Zinc-based battery technology. Under either technology, batteries are contained in pre-constructed modular containers, or “segments,” placed on concrete slab foundations.
The battery storage system includes, but is not limited to, the following elements:

- Batteries and containers, inverters, isolation transformers, and switchboards;
- Balance of plant equipment, which may include medium-voltage and low-voltage electrical systems, fire suppression and HVAC systems (for Li- ion technology, if selected), building auxiliary electrical systems, and network/SCADA systems;
- Cooling system, which may include a separate chiller plant located outside the battery racks with chillers, pumps, and heat exchangers (Li-ion only, if selected); zinc batteries will have fans and a heating unit for climate control; and

- High-voltage (HV) equipment, including a step-up transformer, circuit breaker, current transformers and voltage transformers, a packaged control building for the breaker and transformer equipment, towers, structures, and cabling.

The batteries and associated equipment maybe oversized or periodically augmented in accordance with the manufacturer's recommendations to ensure a minimum of 7,200 MWh of energy storage capability over the life of the BESS, taking into account natural degradation of the batteries over time.

Li-ion batteries are currently the most common battery type used in utility-scale battery energy storage systems. If a Li-ion battery technology is used at the facility, it would use Li-ion phosphate batteries, which are more thermally stable than Li-ion cathode batteries.
Each module contains approximately 10 hermetically sealed battery cells filled with a gel or liquid electrolyte. The module containers serve as secondary containment for the cells. Each container holds approximately 840 cells with a combined capacity of approximately 740 kilowatt-hour AC, and approximately 12,000 containers would be required to meet the capacity needs of the facility.

The electrolyte used in Li-ion batteries is flammable and susceptible to overheating and vaporization, so Li-ion Battery Systems typically require cooling, ventilation, and fire suppression systems included in each container. If Li-ion battery technology is used at the site, it would implement the following design features and fire prevention and control methods to minimize fire and safety risks:

- Batteries would be stored in completely contained, leak-proof modules.
- Ample working space would be provided around the BESS for maintenance and safety purposes.
- An off-site, 24-hour monitoring system with shutdown capabilities would be implemented.
- Batteries would be transported in accordance with Department of Transportation Pipeline and Hazardous Material Administration regulations under 49 CFR 173.185
- Battery systems would be designed in accordance with applicable Underwriters Laboratories, National Electric Code, and National Fire Protection Association Standards, including but not limited to, UL 1642, 1741, 1973, and 9540A, and NFPA 855.
- An advanced and proven battery management system would be employed;
- Battery Containers would be equipped with:
    - Heating, ventilation, and air conditioning (HVAC) systems to maintain optimal battery temperatures;
    - Fire control panels with 24-hour battery backup;
    - Fire sensors, smoke and hydrogen detectors, alarms, emergency ventilation systems, cooling systems, and aerosol fire suppression/extinguishing systems;
    - Doors equipped with a contact that will shut down the battery container if opened;

- Fire extinguishing and thermal insulation sheets between each individual battery cell;
- Locks and fencing to prevent entry of unauthorized personnel;
- Remote power disconnect switches with clear and visible signs identifying their location.[2]

Li-ion battery modules under consideration for this facility have an expected useful life of 20 years and it is expected that every module at the facility would need to be replaced at least once during the life of the facility. Used Li-ion batteries are generally considered to be hazardous waste by the EPA and must be transported and disposed of according to the most current guidelines at end of life.

A typical zinc-based BESS container includes 144 zinc-hybrid cathode powered batteries with a combined 700 kWh capacity. Zinc batteries are estimated to have a lifespan of at least 20 years. Zinc battery systems can operate across a higher range of temperatures and only require cooling fans rather than a full HVAC system. Zinc batteries have a lower fire-risk than lithium-ion batteries and do not require fire suppression systems to be included in the container design.

The BESS may be designed either as a DC-coupled system, with containers distributed throughout the energy facility site near inverter/transformer station sites, or as an AC-coupled system with containers concentrated in a single area near the switchyards. In either case, the containers and other BESS equipment are located within the fenced solar array areas and may have their own additional fencing.

34.5 kV Electrical Collection System

The facility includes up to 86 miles of 34.5 kV electrical collector lines that connects energy facility components to the collector substations described below. The majority of the collector lines are buried underground; however, overhead lines are installed at long “home run” stretches, stream or canyon crossings, and other areas where burial is infeasible. The collector lines are generally be located within the energy facility footprint except at road crossings and crossings between fenced solar array areas.

Communication and SCADA System

The facility includes a system of fiber optic and copper communication lines that connect the solar arrays, BESS, and substations to Supervisory Control and Data Acquisition (SCADA) system control rooms within each collector substation. The communication lines are collocated with the 34.5 kV electrical collection system described above. The SCADA system monitors meteorological conditions, critical operating parameters, and power output, for each solar

[2] SSPAPPDoc25-02 ASC Exhibit B Project Description 2024-05-15, Section 2.7.1.

string, battery energy storage system, and substation. The SCADA system is monitored by a remote operations center. Smoke and fire detectors placed around the site also connect to the SCADA system and will contact local emergency responders in the event of a fire at the site.

Collector Substations

The facility includes up to six collector substations at the site. Each substation includes a generator-step up (GSU) transformer and control building, and may also include circuit-breakers and fuses, transmission line termination structures, power transformers, bus bars and insulators, disconnect switches, relaying, battery and charger, surge arresters, AC and DC supplies, control systems, metering equipment, grounding, a lightning protection system and associated control wiring.

The GSU transformers increase the 34.5-kV ISU transformer output to 230-kV power. The GSU transformers are ground-mounted units constructed on concrete pads. Each of the six GSU transformers are filled with up to 16,000 gallons of non-toxic oil such as mineral or seed oil. Each GSU transformer is equipped with a secondary spill containment catchment system designed to minimize the possibility of accidental leakage. The concrete catchment system is sized to contain approximately 1.25 times the amount of oil inside the transformer.
All substation structures and components are surrounded by a graveled area and enclosed by an 8-foot-tall chain-link fence with three strands of barbed wire one foot above the top. Access to substation sites is limited with a locked gate.

230-kV Transmission Line

The facility includes up to two 230-kV overhead transmission lines that connect the collector substations to the two primary interconnection switchyards located at the point of interconnection. The transmission lines are supported by steel or wood monopole or H-Frame structures, spaced approximately 1,000 feet between structures, and have a combined length of approximately 9.5 miles. The northern line connects two collector substations along the south side of Alpine Lane to the switchyard and extends approximately 3.2 miles. The southern line connects four collector substations across the southern portion of the site and extend approximately 6.3 miles. The two lines run in parallel for approximately 1-mile between Bombing Range Road and the switchyards.

The transmission lines are located within the fenced solar array areas except where the lines span roads or corridors between areas and between the switchyards and the point of interconnection. All transmission line components are sited within the facility lease boundary.

No new or expanded right-of-way will be required, but some portions of the transmission lines are located within existing public rights-of-way. A portion of the transmission line that runs along the western boundary of energy facility footprint is within the public right-of-way on the

east side of Bombing Range Road. Additionally, portions of the transmission line that connect solar array areas in the southern portion of the site cross Doherty Road and the Lexington-Echo Highway.

Project Switchyards and Interconnection Facilities

The facility interconnects with the existing Umatilla Electric Cooperative 230kV Blue Ridge Line at the northwest corner of the facility. Two switchyards are approved to be located within a separately fenced site either within or adjacent to the energy facility footprint, each approximately 3 acres. The interconnection switchyards do not contain transformers and are constructed on foundations with surrounding gravel areas.

Operations and Maintenance Buildings

The facility includes up to four operations and maintenance (O&M) buildings, each including a utility room, storage for maintenance supplies and equipment, and a SCADA control room. The buildings each have an on-site well and septic system. Power is supplied by a local service provider using overhead and/or underground lines. Each O&M building site also has graveled parking and storage areas.

Small quantities of chemical materials, including cleaners, insecticides or herbicides, paint, lubricants, degreasers, and solvents, may be stored at the O&M buildings during construction and operation of the facility. No extremely hazardous materials would be stored on site; other chemicals will be handled in accordance with label instructions as well as state and federal standards.

The facility includes an aboveground fuel storage tank with capacity to store up to 500 gallons of diesel fuel or gasoline at each O&M building site.
The O&M buildings are equipped with basic firefighting equipment for use on-site during maintenance activities, such as shovels, beaters, portable water for hand sprayers, fire extinguishers, and other equipment.

Replacement Solar Panel Storage

To store spare solar panels and associated equipment, the facility is approved to store materials either at the O&M building sites or within approximately 50 locked Conex storage containers distributed throughout the site. The containers may be placed directly on the ground or on gravel pads. The containers would store up to the approximately 204,720 replacement panels needed over the life of the facility.

Access and Service Roads

The facility includes up to 55 miles of new roads (graded and graveled to meet load requirements for all equipment) to provide access to facility components. Corridors between module racking are at least 10 feet wide and racking are no closer than 15 feet from perimeter fencing. Some new road construction are required to access site features. Roads will be 10 to 20 feet in width, with some exceptions, including access to the substations and main travel corridors where two-way traffic is required. In these cases, roads will be 20 feet wide. A 5-foot maintained vegetative surface or noncombustible base, approved by the fire code official, will be maintained along the fenced perimeter of the site boundary. Use of the roads may continue after construction, or new roads may be removed and the land reclaimed to pre-construction conditions.

Security Fencing and Gates

The facility includes approximately 58 miles of security fence to enclose each solar array area, substation, and switchyard site. The perimeter fencing has lockable vehicle and pedestrian access gates to provide access to the site.

Temporary Construction Areas

The facility includes up to 54 temporary construction areas within the energy facility footprint to support construction, store supplies and equipment, and facilitate the delivery and assembly of materials and equipment. Each area consists of a 5-acre site that would be cleared and graveled prior to construction.

Up to five above-ground diesel tanks and one temporary above-ground gasoline tank may be stored in the temporary construction areas. The tanks each hold up to 1,000 gallons of fuel. Most fuel containers have self-contained secondary containment (e.g., double-walled containers) that provide capacity for the entire container plus precipitation, but in some cases may be placed in a constructed secondary containment area that is impervious and is diked or otherwise contained to provide the required fuel and precipitation capacity.

4.0 Facility Development

4.1 Construction

Facility construction will occur in 6 phases inclusive of approximately 200 MW of energy infrastructure per phase.

Portions of the site, including substation sites, inverter and battery energy storage system sites, and access roads will be cleared and graded, prior to construction of the applicable facility components. Existing vegetation (e.g., crop stubble, fallow vegetation) and associated root systems in the energy facility footprint are left intact during construction to the maximum

extent practicable to minimize soil and erosion impacts, and that grading in solar arrays is limited to those areas where the slope and gradient are outside of panel and racking tolerances. Typical grading tolerances within the array are 10% maximum on North slopes and 15% maximum in other directions. Following construction, operational requirements include long-term site stabilization and revegetation of disturbed areas.

Adherence to the requirements of a Fugitive Dust Control Plan, as presented in Attachment D of this order, will be required (imposed under Condition PRE-SP-02). Measures implemented under this plan include maintaining existing vegetative root systems, applying dust suppressants, and restricting traffic speeds on-site. Typically, water is applied as a dust suppressant on access roads, but under drought conditions, alternative dust suppressants including synthetic polymer emulsions, chemical suppressants, organic glues, and wood fiber materials may be applied at the site by qualified vendors.

Construction of the facility will generate 910 commuting trips and 250 truck trips per day over approximately 1,224 construction workdays. At the peak of construction, it is estimated a maximum of approximately 1,266 commuting trips per day and 250 truck trips per day. The primary route to the site would be Bombing Range Road via Interstate Highway 84 (I-84) at the I-84/Irrigon Junction. Alternate routes would be via OR-207 via I-84 south of Hermiston.

4.2 Operations and Maintenance

Operation and maintenance activities include routine inspections, replacement of solar modules and battery components, panel washing, and vegetation management. Up to 10 permanent employees would operate and maintain the facility, with occasional delivery truck accessing the site during operations depending on the type of maintenance activity. Individual batteries associated with the BESS will be inspected according to the manufacturer's recommendations and would need to be replaced approximately every 20 years, and every battery will be replaced during the life of the facility. Each type of electrical facility component would have routine inspections as designated in the operational Wildfire Mitigation Plan. The solar panels may require periodic washing during operations, and other incidental water use for sanitation and equipment washing.

Vegetation will be cleared and maintained along access roads to provide a vegetation clearance area for fire safety. This includes mowing to a height no more than 12 inches. Use of the roads may continue after construction, or new roads may be removed, and the land reclaimed to pre-construction conditions.

An aboveground 500-gallon fuel storage tank sized may be installed at each O&M building. Secondary containment and refueling procedures for on-site fuel storage during will continue to follow the SPCC Plan and requirements for secondary containment. No extremely hazardous

materials are anticipated to be produced, used, stored, transported, or disposed of at the facility during operation.

4.3 Retirement

The estimated useful life of the proposed facility is 40 years. Operational jobs would be eliminated after the facility ceased operating; however, some short-term contract jobs to monitor restored areas may be added to facilitate retirement activities. Decommissioning requires similar workforce numbers as required for the construction of the facility and is estimated to require a similar duration of up to 47 months.

Final retirement activities will be designated in a retirement plan, but would begin with disconnecting all electrical equipment disassembling equipment and components such and the battery storage units, solar panels and transformers. Larger containers and equipment would be removed, trucked off-site and recycled and disposed of. Solar panels would be disconnected, and piles would be removed including the excavation of any concrete foundations. Gravel and foundations from the inverters and transformers, O&M building, substations, and battery units would be removed by trenching and excavation. The facility site would then be restored through grading, filling, and revegetation with plants or seed mix consistent with applicable plans and conditions discussed in this order or landowner interests.

5.0 Site Certificate Conditions

The conditions of this Site Certificate are organized and coded to indicate the phase of implementation, the standard the condition is required to satisfy, and an identification number (1, 2, 3, etc.).[3] The table below presents a "key" for phase of implementation:

Key	Type of Conditions/Phase of Implementation
GEN	General Conditions: Design, Construction and Operation
PRE	Pre-Construction Conditions
CON	Construction Conditions
PRO	Pre-Operational Conditions
OPR	Operational Conditions
RET	Retirement Conditions

5.1 General (GEN) Conditions: Design, Construction and Operations

Condition Number	General (GEN) Conditions
STANDARD: GENERAL STANDARD OF REVIEW (GS) [OAR 345-022-0000]	
GEN-GS-01	The certificate holder must design, construct, operate and retire the facility: a. Substantially as described in the site certificate; b. In compliance with the requirements of ORS Chapter 469, applicable Council rules, and applicable state and local laws, rules and ordinances in effect at the time the site certificate was issued; and c. In compliance with all applicable permit requirements of other state agencies. [Mandatory Condition OAR 345-025-0006(10); General Standard Condition 1; Final Order on ASC]
GEN-GS-02	The certificate holder must begin and complete construction of the facility or facility phase by the following dates: a. Construction of the facility or first facility phase must begin on or before [ENTER DATE 3 YEARS FROM ISSUE DATE]. Within 7 days of construction commencement, the certificate holder must provide the Department with written verification that it has met the deadline by satisfying applicable preconstruction conditions and completing at least $250,000 work at the site.

[3] The identification number is not representative of an order that conditions must be implemented; it is intended only to represent a numerical value for identifying the condition.

Condition Number	General (GEN) Conditions
	b. Construction of the final facility phase must begin on or before [ENTER DATE 4 YEARS FROM ISSUE DATE]. Within 7 days of construction commencement, the certificate holder must provide the Department with written verification that it has met the deadline by satisfying applicable preconstruction conditions and completing at least $250,000 work at the site. c. All facility construction must be completed within 2 years after the date construction of the final facility phase (under (b)) begins. Within 7 days after completing construction, the certificate holder shall provide the Department written verification that it has met the deadline. [General Standard Condition 2; Final Order on ASC]
GEN-GS-03	If the certificate holder becomes aware of a significant environmental change or impact attributable to the facility, the certificate holder must, as soon as possible, submit a written report to the Department describing the impact on the facility and any affected site certificate conditions. [Mandatory Condition OAR 345-025-0006(6); General Standard Condition 3; Final Order on ASC]
GEN-GS-04	The certificate holder must prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder. [Mandatory Condition OAR 345-025-0006(7); General Standard Condition 4; Final Order on ASC]
GEN-GS-05	Upon completion of construction, the certificate holder must restore vegetation to the extent practicable and must landscape all areas disturbed by construction in a manner compatible with the surroundings and proposed use. Upon completion of construction, the certificate holder must remove all temporary structures not required for facility operation and dispose of all timber, brush, refuse and flammable or combustible material resulting from clearing of land and construction of the facility. [Mandatory Condition OAR 345-025-0006(11); General Standard Condition 6; Final Order on ASC]
GEN-GS-06	The certificate holder is authorized to construct the 230 kV transmission lines anywhere within the approved transmission line corridors, subject to the conditions in the site certificate. The approved transmission line corridor includes: a. Southern transmission line: Approximately 6.3 miles, extending between the facility switchyard to four collector substations, as further described in ASC Exhibit B and C as presented in Attachment 1 of the site certificate. b. Northern transmission line: Approximately 3.2 miles, extending between the facility switchyard to two collector substations, as further described in ASC Exhibit B and C as presented in Attachment 1 of the site certificate.

Condition Number	General (GEN) Conditions
	[Site Specific Condition OAR 345-025-0010(5); General Standard Condition 7; Final Order on ASC]
STANDARD: Organizational Expertise (OE) [OAR 345-022-0010]	
GEN-OE-01	Before any transfer of ownership of the facility or ownership of the site certificate holder, the certificate holder must inform the Department of the proposed new owners. The requirements of OAR 345-027-0400 apply to any transfer of ownership that requires a transfer of the site certificate. [Organizational Expertise Condition 1; Final Order on ASC]
GEN-OE-02	Any matter of non-compliance under the site certificate is the responsibility of the certificate holder. Any notice of violation issued under the site certificate will be issued to the certificate holder. Any civil penalties under the site certificate will be levied on the certificate holder. [Organizational Expertise Condition 4; Final Order on ASC]
GEN-OE-03	The certificate holder must notify the Department within 72 hours of any occurrence of the following: a. There is an attempt by anyone to interfere with the facility's safe operation. b. There is a significant nature event such as a fire, earthquake, flood, tsunami or tornado, or human-caused event such as a fire or explosion. c. There is any fatal injury at the facility. [Organizational Expertise Condition 5; Final Order on ASC]
GEN-OE-04	The certificate holder shall, as soon as reasonably possible: a. Report incidents or circumstances that may violate the terms or conditions of the site certificate, terms or conditions of any order of the Council, or the terms or conditions of any order issued under OAR 345-027-0230, to the Department. In the report to the Department, the certificate holder shall provide all pertinent facts including an estimate of how long the conditions or circumstances existed, how long they are expected to continue before they can be corrected, and whether the conditions or circumstances were discovered as a result of a regularly scheduled compliance audit; b. Initiate and complete appropriate action to correct the conditions or circumstances and to minimize the possibility of recurrence; c. Submit a written report within 30 days of discovery to the Department. The report must refer to the language in (d) of the condition and contain: i. A discussion of the cause of the reported conditions or circumstances; ii. The date of discovery of the conditions or circumstances by the responsible party; iii. A description of immediate actions taken to correct the reported conditions or circumstances; iv. A description of actions taken or planned to minimize the possibility of recurrence; and

Condition Number	General (GEN) Conditions
	v. For conditions or circumstances that may violate the terms or conditions of a site certificate, an assessment of the impact on the resources considered under the standards of OAR Chapter 345 Divisions 22 and 24 as a result of the reported conditions or circumstances. d. Upon receipt of the written report in sub(c) of this condition, the Department may review the facility record for incidents or circumstances reported or reportable under sub(a) related to public health and safety, the environment, or other resources protected under Council standards. If these incidences are determined by the Department to impact the adequacy of the facility decommissioning cost, the Department or Council may adjust the contingencies identified in Final Order on ASC Table 4 and shall request and receive an updated bond or letter of credit from certificate holder in the adjusted amount. [Organizational Expertise Condition 6; Final Order on ASC]
STANDARD: Structural Standard (SS) [OAR 345-022-0020]	
GEN-SS-01	The certificate holder must design, engineer and construct the facility to avoid dangers to human safety and the environment presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. "Seismic hazards" include ground shaking, ground failure, landslide, liquefaction triggering and consequences (including flow failure, settlement buoyancy, and lateral spreading), cyclic softening of clays and silts, fault rupture, directivity effects and soil-structure interaction. [Mandatory Condition OAR 345-025-0006(12); Structural Standard Condition 1; Final Order on ASC]
GEN-SS-02	The certificate holder must notify the Department, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if site investigations or trenching reveal that conditions in the foundation rocks differ significantly from those described in the application for a site certificate. After the Department receives the notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division to propose and implement corrective or mitigation actions. [Mandatory Condition OAR 345-025-0006(13); Structural Standard Condition 2; Final Order on ASC]
GEN-SS-03	The certificate holder must notify the Department, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if shear zones, artesian aquifers, deformations or clastic dikes are found at or in the vicinity of the site. After the Department receives notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division to propose and implement corrective or mitigation actions. [Mandatory Condition OAR 345-025-0006(14); Structural Standard Condition 3; Final Order on ASC]

Condition Number	General (GEN) Conditions
GEN-SS-04	The certificate holder shall design, engineer, and construct the facility in accordance with the versions of the International Building Code, Oregon Structural Specialty Code, and local building codes in effect at the time of construction. [Structural Standard Condition 5; Final Order on ASC]
STANDARD: Land Use (LU) [OAR 345-022-0030]	
GEN-LU-01	The certificate holder shall provide evidence to the Department of coordination with the owners of adjacent lands dedicated to agricultural use. Coordination must include information about the facility that could impact agricultural activities. The certificate holder must document any recommendations made by adjacent landowners regarding measures to reduce or avoid any adverse impacts to farm practices on surrounding lands and to avoid any increase in farming costs as well as any responses made to these recommendations. [Land Use Condition 9; Final Order on ASC]
GEN-LU-02	The certificate holder must adhere to the terms of the Memorandum of Agreement for Agricultural Mitigation Fund included in Attachment F of the Final Order on the ASC. It is the certificate holder's responsibility to ensure that the Council and Department receive all reports and notifications required by the agreement. [Land Use Condition 12; Final Order on ASC]
STANDARD: Retirement and Financial Assurance (RF) [OAR 345-022-0050]	
GEN-RF-01	The certificate holder shall prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder. [Mandatory Condition OAR 345-025-0006(7); Retirement and Financial Assurance Condition 1; Final Order on ASC]
STANDARD: Public Services (PS) [OAR 345-022-0100]	
GEN-PS-01	Prior to and during construction, the certificate holder shall report to the Department the outcomes of the work completed under the temporary housing plan, including but not limited to the following tasks. a. Outcome of coordination with construction contractors to identify housing options based on an ongoing evaluation of patterns of uses and potential shortages or housing demand. b. Outcome of coordination with local officials such as the Morrow County Planning Department, nearby cities and towns such as Lexington and Ione, the Boardman Community Development Association, the Willow Creek Valley Economic Development Group, and other housing providers on the housing plan, ensuring that impacts to available housing resources are minimized. [Public Services Condition 4; Final Order on ASC]
STANDARD: Siting Standards for Transmission Lines (TL) [OAR 345-024-0090]	
GEN-TL-01	The certificate holder shall:

Condition Number	General (GEN) Conditions
	a. Design, construct and operate the transmission lines in accordance with the requirements of the National Electrical Safety Code as approved by the American National Standards Institute; and b. Develop and implement a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, or other objects or structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line. [Siting Standards for Transmission Line Condition 1; Final Order on ASC]

5.3 Pre-Construction (PRE) Conditions

Condition Number	Preconstruction (PRE) Conditions
STANDARD: General Standard of Review (GS) [OAR 345-022-0000]	
PRE-GS-01	Except as necessary for the initial survey, the certificate holder may not begin construction of the facility or phase, or create a clearing on any part of the site of the facility or phase, as applicable, until the certificate holder has the legal right to engage in construction activities on the relevant parts of the site for the facility or phase. [Mandatory Condition OAR 345-025-0006(5); General Standard Condition 5; Final Order on ASC]
PRE-GS-02	At least 90 days prior to construction of the facility or phase, as applicable (unless otherwise agreed to by the Department), the certificate holder shall submit to the Department a compliance plan documenting and demonstrating actions completed or to be completed to satisfy the requirements of all site certificate terms and conditions and applicable statutes and rules. The plan shall be provided to the Department for review and compliance determination for each requirement. The Department may request additional information or evaluation deemed necessary to demonstrate compliance. [OAR 345-026-0048, General Standard Condition 8; Final Order on ASC]
STANDARD: Organizational Expertise (OE) [OAR 345-022-0010]	
PRE-OE-01	Prior to construction of the facility or phase, as applicable, the certificate holder shall notify the Department of the identity and qualifications of the major design, engineering and construction contractor(s). The certificate holder shall select contractors that have substantial experience in the design, engineering and construction of similar facilities. The certificate holder shall report to the Department any changes of major contractors. [Organizational Expertise Condition 2; Final Order on ASC]
PRE-OE-02	Prior to construction of the facility or phase, as applicable, the certificate holder shall select a construction contractor with a low rate of historic environmental and safety compliance citations. Certificate holder shall provide the following documentation to the Department: a. Qualifications and contact information of the of the major design, engineering and construction contractor(s) and subcontractors, as applicable. b. Construction contractor compliance history. c. Contract excerpt affirming that contractors are required to comply with the terms and conditions of the site certificate, including selecting design layout and construction materials that minimize impacts to resources protected under Council standards. [Organizational Expertise Condition 7; Final Order on ASC]

Condition Number	Preconstruction (PRE) Conditions
PRE-OE-03	Prior to construction of the facility or phase, as applicable, the certificate holder shall provide the Department the qualifications and contact information of the certificate holder's construction manager. [Organizational Expertise Condition 8; Final Order on ASC]
PRE-OE-04	Prior to construction of the facility or phase, as applicable, the certificate holder shall: a. Provide the Department a list of federal, state and local permits, including any third-party permits related to facility siting; and a schedule for obtaining identified permits. b. Once obtained, provide copies of all permits, including third-party permits, required for facility siting to the Department. [Organizational Expertise Condition 12; Final Order on ASC]
STANDARD: Structural (SS) [OAR 345-022-0020]	
PRE-SS-01	Prior to construction of the facility or phase, as applicable, the certificate holder shall submit a site-specific geotechnical investigation report, consistent with the Oregon State Board of Geologist Examiners Guideline for Preparing Engineering Geologic Reports, or newer guidelines if available to the Department, for review in consultation with its third-party consultant. [Structural Standard Condition 4; Final Order on ASC]
STANDARD: Soil Protection (SP) [OAR 345-022-0020]	
PRE-SP-01	Prior to construction of the facility or phase, as applicable, the certificate holder shall provide a Vegetation and Grading Plan that demonstrates contractors are required to adhere to the following: a. Existing vegetation (e.g., crop stubble, fallow vegetation) and associated root systems shall be left intact to the maximum extent practicable. b. Grading within solar arrays shall be limited to areas where the slope and gradient are outside of panel and racking tolerances (typically 10% maximum on North slopes and 15% maximum in other directions). [Soil Protection Condition 1; Final Order on ASC]
PRE-SP-02	Prior to construction of the facility or phase, as applicable, the certificate holder shall: a. Obtain a NPDES 1200-C Pemit from DEQ. A copy of the approved permit and attached Erosion and Sediment Control Plan (ESCP) must be submitted to the Department. b. Finalize the Fugitive Dust Control Plan, as provided in the Final Order on ASC Attachment D. Finalization includes verification of names and contact information of individuals responsible for implementation, measures to be implemented and forms to be used for monitoring and reporting. [Soil Protection Condition 3; Final Order on ASC]

Condition Number	Preconstruction (PRE) Conditions
PRE-SP-03	Prior to construction of the facility or phase, as applicable, the certificate holder must submit to the Department a Construction Spill Prevention Countermeasures and Control (SPCC) Plan. [Soil Protection Condition 6; Final Order on ASC]
STANDARD: Land Use (LU) [OAR 345-022-0030]	
PRE-LU-01	Prior to construction of the facility or phase, as applicable, the certificate holder must provide to the Department a copy of the approved Conditional Use Permit and applicable Zoning Permit(s). [Land Use Condition 1; Final Order on ASC]
PRE-LU-02	Prior to construction of the 230 kV transmission lines, the certificate holder shall demonstrate to the Department that the transmission lines will be sited within the exiting road rights-of-way, unless Morrow County Public Works Department and Oregon Department of Transportation, as applicable, confirm that use of the existing road rights-of-way is not feasible. [Land Use Condition 2; Final Order on ASC]
PRE-LU-03	Prior to construction of the facility or phase, as applicable, the certificate holder shall finalize the draft Noxious Weed Control Plan, as provided in the Final Order on ASC Attachment E, and submit to the Department for review and approval in consultation with the Morrow County Weed Department. [Land Use Condition 2; Final Order on ASC]
PRE-LU-04	Prior to construction of the facility or phase, as applicable, the certificate holder must submit an executed document prohibiting the certificate holder, and the certificate holder's successors in interest, from pursuing a claim for relief or cause of action alleging injury from farming or forest practices as defined in ORS 30.930(2) and (4), and provide evidence that the document has been recorded in the deed records for Morrow County. [Land Use Condition 6; Final Order on ASC]
PRE-LU-05	Prior to construction of the facility or phase, as applicable, the certificate holder shall demonstrate that the final design adheres to the following setbacks: a. All facility structures and above-ground components except the perimeter fenceline must be sited: 1. At least 20 feet from a property line fronting the right-of-way of a local minor collector or marginal access street, including but not limited to Sand Hollow Road, Grieb Lane, Alpine Lane, Doherty Road, or Melville Road. 2. At least 30 feet from a property line fronting the right-of-way, of a major collector, including but not limited to, Bombing Range Road. 3. At least 80 feet from a property line fronting the right-of-way for an arterial road, including but not limited to State Highway 207. b. All facility structures, and all on-site septic systems or other sewage disposal systems must be set back at least 100 feet from delineated waterways.

Condition Number	Preconstruction (PRE) Conditions
	[Land Use Condition 7; Final Order on ASC]
PRE-LU-06	Prior to construction of the facility or phase, as applicable, the certificate holder shall submit a final site plan that includes all information required by MCZO 4.165.E to the County and the Department. The Department may defer review and approval to the County. [Land Use Condition 8; Final Order on ASC]
PRE-LU-07	Prior to construction of the facility or phase, as applicable, the certificate holder must complete the preconstruction requirements identified in the Memorandum of Agreement for Agricultural Mitigation Fund, as provided in the Final Order on ASC Attachment F. [Land Use Condition 11; Final Order on ASC]
STANDARD: Retirement and Financial Assurance (RF) [OAR 345-022-0050]	
PRE-RF-01	Prior to construction of the facility or phase, as applicable, the certificate holder shall submit to the State of Oregon, through the Council, a bond or letter of credit naming the State of Oregon, acting by and through the Council, as beneficiary or payee. The approved bond or letter of credit amount of $117,945,000 (Q1 2023 dollars) may be adjusted based on the design configuration of the facility, or phase of the facility, as provided in Sub(a) and adjusted to the year and quarter of issuance as provided under Sub(b). a. The bond or letter of credit amount may be adjusted based on actual design/number of components of the facility or phase, as applicable, and shall use the same unit costs and contingencies presented in the Final Order on the ASC Table 8. b. Adjust the amount of the bond or letter of credit using the U.S. Gross Domestic Product Implicit Price Deflator, Chain Weight, as published in the Oregon Department of Administrative Services' "Oregon Economic and Revenue Forecast" or by any successor agency by using the index value for the year and quarter of the nominal value and the quarterly index value for the date of issuance of the new bond or letter of credit. If at any time the index is no longer published, the Council shall select a comparable calculation to adjust the amount for inflation. c. The bond or letter of credit must be issued by a financial institution that is included on the Council's pre-approved financial institution list. The certificate holder may request to have a financial institution added to the list at any time. d. The bond or letter of credit must be prepared using the most recent Council-approved template. [Retirement and Financial Assurance Condition 4; Final Order on ASC]
STANDARD: Fish and Wildlife Habitat (FW) [OAR 345-022-0060]	

Condition Number	Preconstruction (PRE) Conditions
PRE-FW-01	Prior to construction of the facility or phase, as applicable, the certificate holder shall finalize the Revegetation and Reclamation Plan, based on Attachment G of the Final Order on the ASC, and submit to the Department for review and approval. [Fish and Wildlife Habitat Condition 1]
PRE-FW-02	Prior to construction of the facility or phase, as applicable, the certificate holder shall submit the draft legal agreement for review and approval by the Department, in consultation with ODFW. The legal agreement shall ensure that payment provided for long-term management and enhancement of the mitigation area is adequate to cover the permanent habitat loss from the facility. [Fish and Wildlife Condition 4, Final Order on ASC]
PRE-FW-03	Prior to construction of the facility or phase, as applicable, the certificate holder shall finalize the Habitat Mitigation Plan, as provided in Attachment H of the Final Order on ASC, based on the impacts associated with the final facility design and the legal agreement, as approved by the Department. [Fish and Wildlife Condition 5, Final Order on ASC]
PRE-FW-04	Prior to construction of the facility or phase, as applicable, the certificate holder shall provide evidence to the Department that the design measures included in the Construction Wildlife Monitoring Plan (Final Order on ASC Attachment I) have been included in the final facility design and construction contractor contracts, as applicable. [Fish and Wildlife Condition 7; Final Order on ASC]
STANDARD: Threatened and Endangered Species (TE) [OAR 345-022-0070]	
PRE-TE-01	If construction commences after April 2025, certificate holder shall, prior to construction of the facility or phase, as applicable, conduct protocol-level Washington ground squirrel (WAGS) surveys within areas of planned facility construction that are within suitable WAGS habitat. The certificate holder shall: a. Submit a protocol-level survey plan for surveys to be conducted within suitable WAGS habitat, for review and approval by the Department in consultation with ODFW. At a minimum, the survey plan shall specify the survey area (all areas of suitable habitat within 1,000 feet of ground disturbing activities except where there is a habitat barrier (e.g., a paved road) or access restrictions); and survey timing (February 15 to May 31, unless otherwise approved by ODFW). b. Complete protocol-level WAGS surveys based on the protocol approved per (a). c. Submit survey reports to the Department and ODFW. The certificate holder shall not begin construction within 1,000 feet of Category 1 or Category 2 WAGS habitat until the identified boundaries of Category 1 WAGS habitat have been approved by the Department, in consultation with ODFW. Category 1 habitat includes a 785-foot buffer from an identified active burrow, and the area within the perimeter of multiple active burrows. Category 2 WAGS habitat consists of a

Condition Number	Preconstruction (PRE) Conditions
	4,136 foot buffer from the exterior boundary of all Category 1 WAGS habitat. The survey results are valid for 3-years. d. Develop maps and worker training materials to inform of sensitive Category 1 and Category 2 habitat. Submit to the Department final facility design maps demonstrating that Category 1 habitat, including 785-buffer from any colonies identified per (b), is avoided. e. Install flagging or other demarcation, as appropriate, to inform workers of sensitive WGS habitat and of avoidance requirement. [Threatened and Endangered Species Condition 1; Final Order on ASC]
STANDARD: Historic, Cultural and Archeological (HC) [OAR 345-022-0090]	
PRE-HC-01	Prior to construction of the facility, or phase, as applicable, the certificate holder shall update the contact information provided in the Final Order on ASC Attachment K, Inadvertent Discovery Plan. [Historic, Cultural and Archeological Condition 1; Final Order on ASC]
STANDARD: Public Services (PS) [OAR 345-022-0100]	
PRE-PS-01	Prior to construction of the facility or phase, as applicable, the certificate holder shall execute a final Road Use Agreement, based on Final Order on ASC Attachment N, and provide copy to the Department. [Public Services Condition 1, Final Order on ASC]
PRE-PS-02	At least 180-days prior to construction of any phase, the certificate holder shall provide to the Department and Morrow County a temporary housing plan for the construction workforce. The plan shall include coordination with contractors and local officials on housing options that minimize impacts to local housing supply. [Public Services Condition 3; Final Order on ASC]
STANDARD: Wildfire Prevention and Risk Mitigation (WF) [OAR 345-022-0115]	
PRE-WF-01	Prior to construction of the facility or phase, as applicable the certificate holder shall finalize the Construction Wildfire Mitigation Plan, as provided in Attachment L to the Final Order on ASC. The final Construction Wildfire Mitigation Plan shall be submitted to the Department for review and approval. [Wildfire Prevention and Risk Mitigation Condition 1; Final Order on ASC]
STANDARD: Waste Minimization (WM) [OAR 345-022-0120]	
PRE-WM-01	Prior to construction of the facility, or phase, as applicable, the certificate holder shall require contractors to develop and submit to the Department for review and approval, Construction Waste Management Plan(s) that, at a minimum, include the following: a. All sources and quantities of construction waste and wastewater, including damaged or dysfunctional energy facility components, and where feasible, estimated quantities that can be recycled.

Condition Number	Preconstruction (PRE) Conditions
	b. Process for disposal and recycling, including use of licensed haulers and disposal/recycling facilities; names and locations of licensed recycling and disposal facilities; collection, hauling and tracking requirements. c. Process for requesting a permit exemption from DEQ pursuant to OAR 340-093-0080 to ensure that concrete washout materials reused in foundation backfill are substantially the same as clean fill. d. Process for training workers and tracking compliance with the requirements of the plan. [Waste Minimization Condition 1; Final Order on ASC]
STANDARD: Noise Control Regulations (NC) [OAR 340-035-0035]	
PRE-NC-01	Prior to construction of the facility or phase, as applicable, the certificate holder shall demonstrate that the operational noise levels comply with OAR 345-035-0035(1)(b), based on an updated acoustic modeling analysis using final design/layout and equipment specifications. [Noise Control Condition 1; Final Order on ASC]
STANDARD: Other – Water Rights (WR)	
PRE-WR-01	Prior to construction of the facility or phase, as applicable, the certificate holder shall: a. Identify all water-related needs and estimate daily and annual water demand for each construction phase, as applicable. b. Provide excerpts of agreements or other similar conveyance from the water providing entity to the Department demonstrating that construction activities will be adequately and legally served by service providers or third-party permits. [Water Rights Condition 1, Final Order on ASC]

5.4 Construction (CON) Conditions

Condition Number	Construction (CON) Conditions
STANDARD: Organizational Expertise (OE) [OAR 345-022-0010]	
CON-OE-01	The certificate holder shall contractually require all contractors and subcontractors to comply with all applicable laws and regulations and with the terms and conditions of the site certificate. The contractual obligation shall be required of each contractor and subcontractor prior to that firm working on the facility. Such contractual provisions shall not operate to relieve the certificate holder of responsibility under the site certificate. [Organizational Expertise Condition 3; Final Order on ASC]
CON-OE-02	During construction, the certificate holder shall: a. Maintain an onsite construction manager. b. Require that the construction manager implement and monitor all applicable construction related site certificate conditions. c. Within six months after beginning construction, and every six months thereafter during construction of the energy facility and related or supporting facilities, the certificate holder shall submit a semiannual construction progress report to the Department. In each construction progress report, the certificate holder shall describe any significant changes to major milestones for construction. The certificate holder shall report on the progress of construction and shall address the following: i. Facility Status: An overview of site conditions, the status of facilities under construction and a summary of the operating experience of facilities that are in operation. The certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the like that occurred during the year and that had a significant adverse impact on the facility. ii. Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period. iii. Compliance Report: A report describing the certificate holder's compliance with all site certificate conditions that are applicable during the reporting period. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate. iv. Facility Modification Report: A summary of changes to the facility that the certificate holder has made during the reporting period without an amendment of the site certificate in accordance with OAR 345-027-0050.

Condition Number	Construction (CON) Conditions
	[Organizational Expertise Condition 9; Final Order on ASC]
STANDARD: Soil Protection (SP) [OAR 345-022-0020]	
CON-SP-01	During construction, as applicable, the certificate holder shall require that contractors adhere to the requirements of the Vegetation and Grading Plan. [Soil Protection Condition 2; Final Order on ASC]
CON-SP-02	During construction of the facility or phase, as applicable, the certificate holder shall: a. Conduct all work in compliance with the NPDES 1200-C Permit and Erosion and Sediment Control Plan (ESCP) or revised ESCP if applicable. The ESCP shall be revised if determined necessary by the certificate holder, certificate holder's contractor(s) or the Department. Any Department-required ESCP revisions shall be implemented within 14-days, unless otherwise agreed to by the Department based on a good faith effort to address erosion issues. b. Conduct all work in compliance with the Fugitive Dust Control Plan. The Fugitive Dust Control Plan may be amended, as needed, to ensure that control measures are effective at the site. [Soil Protection Condition 4; Final Order on ASC]
CON-SP-03	During construction, the certificate holder shall require that all onsite contractors and personnel adhere to the requirements of the SPCC Plan. Any SPCC revisions and updates shall be reported to the Department. [Soil Protection Condition 6; Final Order on ASC]
STANDARD: Land Use (LU) [OAR 345-022-0030]	
CON-LU-01	During construction, the certificate holder shall implement and adhere to the Noxious Weed Control Plan required under Condition PRE-LU-02. [Land Use Condition 4, Final Order on ASC]
STANDARD: Retirement and Financial Assurance (RF) [OAR 345-022-0050]	
CON-RF-01	During construction, the certificate holder shall: a. Describe the status of the bond or letter of credit in the semi-annual report submitted to the Department pursuant to OAR 345-026-0080. b. If construction extends for more than 12 months, the certificate holder shall adjust the amount of the bond or letter of credit on an annual basis thereafter as described in under Condition PRE-RF-01. c. The Department and Council reserve the right to adjust the contingencies, as necessary to ensure that costs to restore the site are adequate. [Retirement and Financial Assurance Condition 5; Final Order on ASC]
STANDARD: Fish and Wildlife Habitat (FW) [OAR 345-022-0060]	
CON-FW-01	During construction, the certificate holder shall implement and adhere to the Revegetation and Reclamation Plan, as applicable. [Fish and Wildlife Habitat Condition 2, Final Order on ASC]

Condition Number	Construction (CON) Conditions
CON-FW-02	During construction, the certificate holder shall adhere to the requirements of the Construction Wildlife Monitoring Plan (Attachment I of the Final Order on the ASC). Monitoring records shall be maintained throughout construction and included in the semi-annual report submitted to the Department pursuant to OAR 345-026-0080. [Fish and Wildlife Condition 8; Final Order on ASC]
STANDARD: Threatened and Endangered Species (TE) [OAR 345-022-0070]	
CON-TE-01	Prior to and during construction of the facility or phase, as applicable, any incidentally identified occurrence(s) of Lawrence's milkvetch shall be avoided using a 100-foot buffer via mapping and flagging. [Threatened and Endangered Species Condition 2; Final Order on ASC]
STANDARD: Historic, Cultural and Archeological (HC) [OAR 345-022-0090]	
CON-HC-01	During construction, the certificate holder shall require all onsite employees and contractors to implement and adhere to the requirements of the Inadvertent Discovery Plan, as submitted to the Department under PRE-HC-01. [Historic, Cultural and Archeological Condition 2; Final Order on ASC]
STANDARD: Public Services (PS) [OAR 345-022-0100]	
CON-PS-01	During construction, the certificate holder shall adhere to the terms and conditions of the Road Use Agreement executed under PRE-PS-01. [Public Services Condition 2; Final Order on ASC]
STANDARD: Wildfire Prevention and Risk Mitigation (WF) [OAR 345-022-0115]	
CON-WF-01	During construction, the certificate holder shall implement and require all onsite contractors and employees to adhere to, the Construction Wildfire Mitigation Plan required under PRE-WF-01. Updates to the Wildfire Mitigation Plan may be required if determined necessary by the certificate holder, certificate holder's contractor(s) or the Department to address wildfire hazard to public health and safety. Any Department required updates shall be implemented within 14 days, unless otherwise agreed to by the Department based on a good faith effort to address wildfire hazard. [Wildfire Prevention and Risk Mitigation Condition 2; Final Order on ASC]
STANDARD: Waste Minimization (WM) [OAR 345-022-0120]	
CON-WM-01	During construction, as applicable, the certificate holder shall require that contractors adhere to the requirements of the Construction Waste Management Plan(s) and maintain records of employee training and tracking compliance onsite and available upon Department request. [Waste Minimization Condition 2; Final Order on ASC]
CON-WM-02	During construction, on-site concrete washwater disposal is prohibited unless DEQ approval of a permit exemption for materials substantially similar to clean fill is obtained. If DEQ approval of a permit exemption is obtained, concrete washwater must be disposed of onsite via infiltration and evaporation in accordance with the DEQ-issued NPDES 1200-C permit required under Condition CON-SP-02. [Waste Minimization Condition 3; Final Order on ASC]

Condition Number	Construction (CON) Conditions
STANDARD: Other – Water Rights (WR)	
CON-WR-01	During construction, if a water right, limited water use license or water rights transfer is needed and would not be obtained by a third-party, the certificate holder shall submit and obtain approval of the applicable water permit through the site certificate amendment process. [Water Rights Condition 2; Final Order on ASC]

5.5 Pre-Operational (PRO) Conditions

Condition Number	Pre-Operational (PRO) Conditions
STANDARD: Organizational Expertise (OE) [OAR 345-022-0010]	
PRO-OE-01	Prior to operation, the certificate holder shall provide to the Department the qualifications and contact information of the individuals responsible for monitoring facility operations, including individuals or third-party entity responsible for onsite maintenance. [Organizational Expertise Condition 10; Final Order on ASC]
STANDARD: Soil Protection (SP) [OAR 345-022-0020]	
PRO-SP-01	Following the termination of the 1200-C, the certificate holder shall update the requirements of the Revegetation and Reclamation Plan, specific to the areas within the fenceline not occupied by facility infrastructure. Certificate holder shall provide evidence to the Department that the permit was terminated by DEQ. [Soil Protection Condition 5; Final Order on ASC]
PRO-SP-02	Prior to operation, the certificate holder shall submit to the Department an Operational Spill Prevention Control and Countermeasures (SPCC) Plan. [Soil Protection Condition 8; Final Order on ASC]
STANDARD: Wildfire Prevention and Risk Mitigation (WF) [OAR 345-022-0115]	
PRO-WF-01	Prior to operation, the certificate holder shall finalize the operational Wildfire Mitigation Plan (WMP), included as Attachment M to the Final Order on ASC. [Wildfire Prevention and Risk Mitigation Condition 3; Final Order on ASC]
STANDARD: Waste Minimization (WM) [OAR 345-022-0120]	
PRO-WM-01	Prior to operation, the certificate holder shall develop an Operational Recycling Plan or protocol requiring that damaged or nonfunctional panels and lithium-ion batteries be recycled to the extent practicable. The certificate holder shall report in its annual report to the Department the quantities of panels and lithium-ion batteries recycled, reused or disposed of in a landfill. Requirements for lithium-ion battery recycling do not apply if the BESS is not constructed. [Waste Minimization Condition 4; Final Order on ASC]

5.6 Operational (OPR) Conditions

Condition Number	Operational (OPR) Conditions
STANDARD: General Standard of Review (GS) [OAR 345-022-0000]	
OPR-GS-01	The certificate holder must submit a legal description of the site to the Department within 90 days after beginning operation of the facility. The legal description must include a description of metes and bounds or a description of the site by reference to a map and geographic data that clearly and specifically identify the outer boundaries that contain all parts of the facility. [Mandatory Condition OAR 345-025-0006(2); General Standard Condition 9]
OPR-GS-02	After January 1 but no later than April 30 of each year after beginning operation of the facility, the certificate holder shall submit an annual report to the Department. The Council Secretary and the certificate holder may, by mutual agreement, change the reporting date. a. The annual report must include the following information for the calendar year preceding the date of the report: 1. Facility Status: An overview of site conditions, the status of facilities under construction and a summary of the operating experience of facilities that are in operation. The certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the like that occurred during the year and that had a significant adverse impact on the facility. 2. Reliability and Efficiency of Power Production: For electric power plants, the plant availability and capacity factors for the reporting year. The certificate holder shall describe any equipment failures or plant breakdowns that had a significant impact on those factors and shall describe any actions taken to prevent the recurrence of such problems. 3. Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period. 4. Monitoring Report: A list and description of all significant monitoring and mitigation activities performed during the previous year in accordance with site certificate terms and conditions, a summary of the results of those activities and a discussion of any significant changes to any monitoring or mitigation program, including the reason for any such changes. 5. Compliance Report: A report describing the certificate holder's compliance with all site certificate conditions that are applicable during the reporting period. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate.

Condition Number	Operational (OPR) Conditions
	6. Facility Modification Report: A summary of changes to the facility that the certificate holder has made during the reporting period without an amendment of the site certificate in accordance with OAR 345-027-0350. b. To the extent that information required by this rule is contained in reports the certificate holder submits to other state, federal or local agencies, the certificate holder may submit excerpts from such other reports to satisfy this rule. The Council reserves the right to request full copies of such excerpted reports. [Mandatory Condition 345-026-0080(1); General Standard Condition 10, Final Order on ASC]
STANDARD: Organizational Expertise (OE) [OAR 345-022-0010]	
OPR-OE-01	During operation, the certificate holder shall provide to the Department the qualifications and contact information of the individuals responsible for monitoring facility operations, including individuals or third-party entity responsible for onsite maintenance. [Organizational Expertise Condition 11; Final Order on ASC]
STANDARD: Soil Protection (SP) [OAR 345-022-0020]	
OPR-SP-01	During operation, the certificate holder shall adhere to the requirements of the Operational SPCC Plan. Any SPCC updates shall be described and included in the Annual Report to the Department. Certificate holder shall report spill and cleanup activities to the Department within 72 hours and shall make inspection records available to the Department upon request. [Soil Protection Condition 9; Final Order on ASC]
STANDARD: Land Use (LU) [OAR 345-022-0030]	
OPR-LU-01	Following the fifth year of monitoring under the Noxious Weed Control Plan required under PRE-LU-03, the certificate holder shall submit a Long-term Noxious Weed Monitoring Plan to the Department, for review and approval. The certificate holder shall implement the plan for the remainder of the facility's operating life. [Land Use Condition 5, Final Order on ASC]
STANDARD: Retirement and Financial Assurance (RF) [OAR 345-022-0050]	
OPR-RF-01	During operation, the certificate holder shall: a. Annually adjust the amount of the bond or letter of credit using the U.S. Gross Domestic Product Implicit Price Deflator, Chain Weight, as published in the Oregon Department of Administrative Services' "Oregon Economic and Revenue Forecast" or by any successor agency by using the index value for the year and quarter of the nominal value and the quarterly index value for the date of issuance of the new bond or letter of credit. If at any time the index is no longer published, the Council shall select a comparable calculation to adjust the amount for inflation. b. Any changes to the template made by the Council must be incorporated into the bond or letter or letter of credit whenever the amount is adjusted under Sub(a).

Condition Number	Operational (OPR) Conditions
	c. The Department and Council reserve the right to adjust the contingencies, as necessary to ensure that costs to restore the site are adequate. [Retirement and Financial Assurance Condition 6; Final Order on ASC]
STANDARD: Fish and Wildlife Habitat (FW) [OAR 345-022-0060]	
OPR-FW-01	During operation, as applicable, the certificate holder shall implement and adhere to the Revegetation and Reclamation Plan. [Fish and Wildlife Habitat Condition 3, Final Order on ASC]
OPR-FW-02	During operation, the certificate holder shall provide reports from The Nature Conservancy on the status of long-term management and enhancement of the habitat mitigation area, consistent with the Habitat Mitigation Plan. [Fish and Wildlife Condition 6, Final Order on ASC]
OPR-FW-03	During operation, the certificate holder shall adhere to the requirements of the Operational Wildlife Monitoring Plan (Attachment J of the Final Order on the ASC). Monitoring records shall be maintained throughout operation and included in the annual report submitted to the Department pursuant to OAR 345-026-0080. [Fish and Wildlife Condition 9; Final Order on ASC]
STANDARD: Historic, Cultural and Archeological (HC) [OAR 345-022-0090]	
OPR-HC-01	During operations, the certificate holder shall require all onsite employees and contractors to implement and adhere to the requirements of the Inadvertent Discovery Plan (IDP), as provided for Condition PRE-HC-01. The IDP shall be reviewed and updated annually for current contact information. [Historic, Cultural and Archeological Condition 3; Final Order on ASC]
STANDARD: Wildfire Prevention and Risk Mitigation (WF) [OAR 345-022-0115]	
OPR-WF-01	During operation, the certificate holder shall: a. Implement the Operational Wildfire Mitigation Plan (Attachment V-1b), finalized under PRO-WF-01. b. Every 5 years after the first operational year, review and update the evaluation of wildfire risk under OAR 345-022-0115(1)(b) and submit the results in the annual report required under Organizational Expertise Condition 9 for that year. c. Submit an updated Operational Wildfire Mitigation Plan to the Department if substantive changes are made to the plan because of the review under sub (b) of this condition, or at any other time substantiative revisions are made to Attachment M. [Wildfire Prevention and Risk Mitigation Condition 4; Final Order on ASC]
STANDARD: Waste Minimization (WM) [OAR 345-022-0120]	
OPR-WM-01	During operation, the certificate holder shall adhere to the requirements of the Operational Recycling Plan or protocol developed under Condition PRO-WM-01. [Waste Minimization Condition 5; Final Order on ASC]
OPR-WM-02	During operation, the certificate holder shall:

Condition Number	Operational (OPR) Conditions
	a. Prohibit use of chemicals, soaps, detergents and heated water unless Chemical Safety Data Sheets for low volatile organic compound/biodegradable cleaning chemicals and solvents are submitted to the Department for review and approval prior to use. b. Ensure that washing is conducted in a manner that does not remove paint or other finishes. c. Discharge wash water through evaporation and infiltration only. [Waste Minimization Condition 6, Final Order on ASC]
STANDARD: Other – Water Rights (WR)	
OPR-WR-01	During operation, the certificate holder shall verify that any onsite exempt wells do not use more than 5,000 gallons of ground water a day, collectively, and shall monitor the volume of groundwater used on a daily basis, maintain a record of such use and make the monitoring records available to the Department upon request. [Water Rights Condition 4; Final Order on ASC]

5.7 Retirement (RET) Conditions

Condition Number	Retirement (RET) Conditions
STANDARD: Retirement and Financial Assurance (RF) [OAR 345-022-0050]	
RET-RF-01	The certificate holder must retire the facility if the certificate holder permanently ceases construction or operation of the facility. The certificate holder must retire the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0410. The certificate holder must pay the actual cost to restore the site to a useful, non-hazardous condition at the time of retirement, notwithstanding the Council's approval in the site certificate of an estimated amount required to restore the site. [Mandatory Condition OAR 345-025-0006(9); Retirement and Financial Assurance Condition 2; Final Order on ASC]
RET-RF-02	If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0410, the Council must notify the certificate holder and request that the certificate holder submit a proposed final retirement plan to the Department within a reasonable time not to exceed 90 days. If the certificate holder does not submit a proposed final retirement plan by the specified date, the Council may direct the Department to prepare a proposed final retirement plan for the Council's approval. Upon the Council's approval of the final retirement plan, the Council may draw on the bond or letter of credit described in Condition PRE-RT-01 to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR chapter 345, division 29. If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder must pay any additional cost necessary to restore the site to a useful, non-hazardous condition. After completion of site restoration, the Council must issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan. [Mandatory Condition OAR 345-025-0006(16); Retirement and Financial Assurance Condition 3; Final Order on ASC]

6.0 Successors and Assigns

To transfer this site certificate or any portion thereof or to assign or dispose of it in any other manner, directly or indirectly, the certificate holder shall comply with OAR 345-027-0400.

7.0 Severability and Construction

If any provision of this agreement and certificate is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and conditions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the agreement and certificate did not contain the particular provision held to be invalid.

8.0 Execution

This site certificate may be executed in counterparts and will become effective upon signature by the Chair of the Energy Facility Siting Council and the authorized representative of the certificate holder.

IN WITNESS THEREOF, this site certificate has been executed by the State of Oregon, acting by and through the Energy Facility Siting Council and Sunstone Solar, LLC (certificate holder).

ENERGY FACILITY SITING COUNCIL

By: _____
Kent Howe, Chair

Date: _____

Sunstone Solar, LLC

By: _____
Authorized Representative

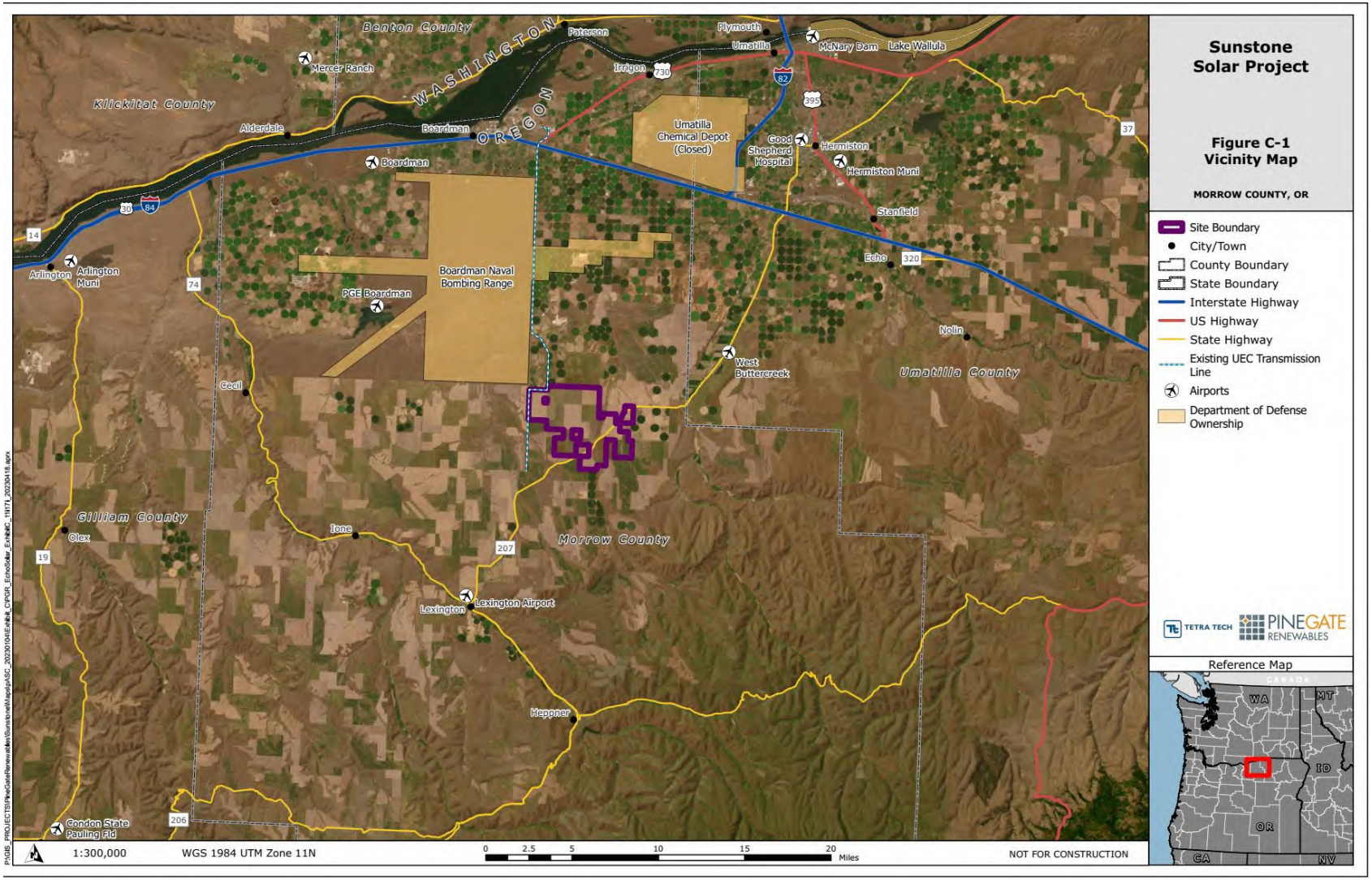
Date:_____

By: _____

Date:_____

ATTACHMENT 1: FIGURES

Figure 1: Regional Location of Facility and Site Boundary



Sunstone Solar Project

Figure C-1 Vicinity Map

MORROW COUNTY, OR

- Site Boundary
- City/Town
- County Boundary
- State Boundary
- Interstate Highway
- US Highway
- State Highway
- Existing UEC Transmission Line
- Airports
- Department of Defense Ownership

TETRA TECH

PINEGATE RENEWABLES

Reference Map

Benton County
Klickitat County
Umatilla County
Morrow County
Gilliam County
WASHINGTON
OREGON
Paterson
Plymouth
Umatilla
McNary Dam
Lake Wallula
Mercer Ranch
Irrigon
730
82
395
37
Alderdale
Boardman
Umatilla Chemical Depot (Closed)
Good Shepherd Hospital
Hermiston
Hermiston Muni
Stanfield
Echo
320
30
84
14
Arlington
Arlington Muni
74
Boardman Naval Bombing Range
PGE Boardman
Nolin
West Buttercreek
Cecil
Olex
19
Ione
207
Lexington
Lexington Airport
Heppner
Condon State Pauling Fld
206

1:300,000 WGS 1984 UTM Zone 11N

0 2.5 5 10 15 20 Miles

NOT FOR CONSTRUCTION

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Sunstone Solar Project

Figure C-2 Facility Layout

MORROW COUNTY, OR

Figure 2.1

Figure 2.2

Figure 2.3

ARRAY 1
ARRAY 2
ARRAY 3
ARRAY 4
ARRAY 5
ARRAY 6
ARRAY 7
ARRAY 8
ARRAY 9
ARRAY 10
ARRAY 11
ARRAY 12
ARRAY 13
ARRAY 14
ARRAY 15
ARRAY 16
ARRAY 17
ARRAY 18
ARRAY 19
ARRAY 20

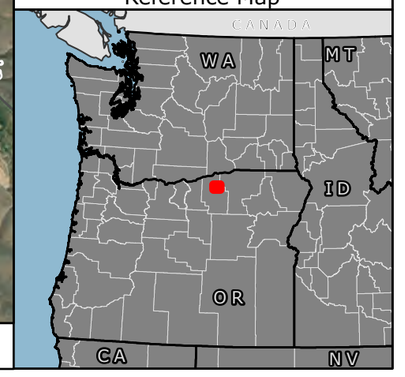
Matheny Tract
Doherty Tract

Grieb-Wood Rd
Wagon Trail Rd
Alpine Ln
Lexington-Echo Hwy
Meder Rust Ln
Hermiston Hwy
Co 1553 Rd
Gordon Creek Rd
Perkins Rd
Butter Creek Rd
Little Juniper Ln
Grieb Ln
Doherty Rd
Melville Rd
Campbell Rd
Bombing Range Rd
Strawberry Ln
Strawberry East Rd
Kilkenny Rd
Kemp Rd
Sand Hollow Rd
Barclay Ln
Little Buttercreek Rd
Big Butter Creek Ln
Myers Ln
207
578

- Site Boundary
- Map Grid
- Portions of Tract Anticipated to Remain Farmland
- Excluded from Development
- Fence Line (Maximum)
- Array Area
- Collection Line (34.5-kV)
- Transmission Line (230-kV)
- Access Road
- Solar Array
- Inverter/Transformer/BESS Sites
- Laydown Yard
- O&M Area
- Switchyard
- Collector Substation
- State Highway
- County Highway
- Local Roads
- In Service Transmission Line

TETRA TECH
PINEGATE RENEWABLES

Reference Map



1:50,000
WGS 1984 UTM Zone 11N
0 0.5 1 2 3 4 Miles
NOT FOR CONSTRUCTION

\\cess706gisfs1\CES\Projects\PDX\PineGateRenewables\SunstoneMaps\RAI_20231113\Exhibit_C\PGR_EchoSolar_ExhibitC_11i7i_20231122.aprx

Sunstone Solar Project

Figure C-2.1 Facility Layout

MORROW COUNTY, OR

- Site Boundary
- Portions of Tract Anticipated to Remain Farmland
- Excluded from Development
- Fence Line (Maximum)
- Array Area
- Collection Line (34.5-kV)
- Transmission Line (230-kV)
- Access Road
- Solar Array
- Inverter/Transformer/BESS Sites
- Laydown Yard
- O&M Area
- Switchyard
- Collector Substation
- Local Roads
- In Service Transmission Line

TETRA TECH PINEGATE RENEWABLES

Reference Map

Figure 2.1
Figure 2.2
Figure 2.3

Bombing Range Rd
Alpine Ln
Grieb-Wood Rd
Matheny Tract
Doherty Rd
ARRAY 1
ARRAY 2
ARRAY 3
ARRAY 4
ARRAY 5
ARRAY 6
ARRAY 7
ARRAY 8
ARRAY 12

1:24,000 1 inch equals 2,000 feet WGS 1984 UTM Zone 11N 0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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Sunstone Solar Project

Figure C-2.2 Facility Layout

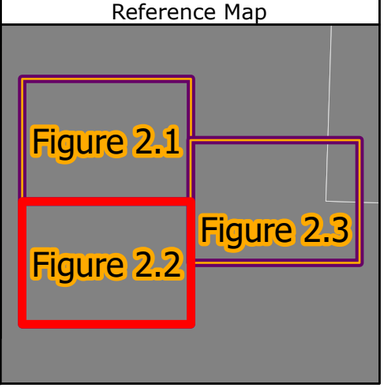
MORROW COUNTY, OR

ARRAY 8
ARRAY 9
ARRAY 10
ARRAY 11
ARRAY 12
ARRAY 16
Doherty Tract
Little Juniper Ln
Bombing Range Rd
Grieb Ln
Doherty Rd
Melville Rd
Lexington-Echo HWY
Strawberry Ln
Strawberry East Rd
Kilkenny Rd
Kemp Rd
Sand Hollow Rd
Barclay Ln
207

- Site Boundary
- Portions of Tract Anticipated to Remain Farmland
- Excluded from Development
- Fence Line (Maximum)
- Array Area
- Collection Line (34.5-kV)
- Transmission Line (230-kV)
- Access Road
- Solar Array
- Inverter/Transformer/BESS Sites
- Laydown Yard
- O&M Area
- Switchyard
- Collector Substation
- State Highway
- Local Roads
- In Service Transmission Line

TETRA TECH
PINEGATE RENEWABLES

Reference Map



1:24,000 1 inch equals 2,000 feet WGS 1984 UTM Zone 11N 0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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Sunstone Solar Project

Figure C-2.3 Facility Layout

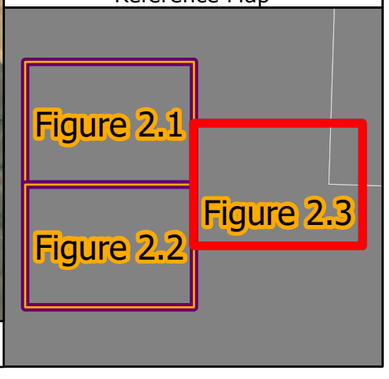
MORROW COUNTY, OR

ARRAY 12
ARRAY 13
ARRAY 14
ARRAY 15
ARRAY 16
ARRAY 17
ARRAY 18
ARRAY 19
ARRAY 20
207
Alpine Ln
Lexington-Echo Hwy
Wagon Trail Rd
Perkins Rd
Lower Sand Hollow Rd
Campbell Rd
Melville Rd
Rust Ln
Hermiston Hwy
Lexington Echo Hwy
Gordon Creek Rd
Co 1353 Rd
Butter Creek Rd
Little Buttercreek Rd

- Site Boundary
- Portions of Tract Anticipated to Remain Farmland
- Excluded from Development
- Fence Line (Maximum)
- Array Area
- Collection Line (34.5-kV)
- Transmission Line (230-kV)
- Access Road
- Solar Array
- Inverter/Transformer/BESS Sites
- Laydown Yard
- O&M Area
- Switchyard
- Collector Substation
- State Highway
- Local Roads
- In Service Transmission Line

TETRA TECH
PINEGATE RENEWABLES

Reference Map



1:24,000 1 inch equals 2,000 feet WGS 1984 UTM Zone 11N

0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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Sunstone Solar Project

Figure C-3
Energy Facilities Within 10 Miles

MORROW COUNTY, OR

- Site Boundary
- Analysis Area (10-mile Buffer)
- Interstate Highway
- US Highway
- State Highway
- County Highway
- County Boundary
- Substation
- Natural Gas Power Plant
- Boardman Coal Plant (Closed)
- Finley Butte Renewable Energy Facility

Transmission Line

- In Service
- Proposed

- Orchard Wind Farm
- Carty Generating Station, Solar and Natural Gas, Operating
- Harp Solar Project, Proposed
- Echo Windfarm, Operating
- Threemile Canyon Wind, Operating
- Wagon Trail Solar Project, Proposed
- Wheatridge Renewable Energy Facility I, Operating
- Wheatridge Renewable Energy Facility II, Operating
- Wheatridge Renewable Energy Facility III, Operating
- Wheatridge Renewable Energy Facility East, Approved

Morrow County
Umatilla County

74
207
578
735
813
30
84

TETRA TECH
PINEGATE RENEWABLES

Reference Map

1:160,000 WGS 1984 UTM Zone 11N

0 2 4 8 12 16 Miles

NOT FOR CONSTRUCTION

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Attachment B: Reviewing Agency Comments on preliminary/complete ASC Relied upon in DPO

From: Peacher, Kimberly N CIV USN NAVFAC NW SVD WA (USA)
Sent: Tuesday, August 29, 2023 4:10 PM
To: CLARK Christopher * ODOE
Cc: ESTERSON Sarah * ODOE
Subject: RE: Comments requested by September 28 on preliminary Application for Site Certificate for Sunstone Solar Project

---

Hello Chris,

Thank you for the quick follow up and zip file. Also appreciate the background.

Luckily, as stated in prior reviews, this proposal is outside of military training areas.

V/R,

Kimberly Peacher
Community Planning & Liaison Officer
Northwest Training Range Complex
(360) 930-4085

From: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Sent: Monday, August 28, 2023 5:10 PM
To: Peacher, Kimberly N CIV USN NAVFAC NW SVD WA (USA) <kimberly.n.peacher.civ@us.navy.mil>
Cc: ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>
Subject: [Non-DoD Source] RE: Comments requested by September 28 on preliminary Application for Site Certificate for Sunstone Solar Project

Hello Kim,

Here is the GIS data that was provided with the NOI (revert to .zip to open). This project was called “Echo Solar” at the NOI stage and it was called Bombing Range Solar before that. I believe you looked at the site boundary during the NOI review and stated that the site was outside of military training airspace. The site boundary hasn’t changed, but it wouldn’t hurt to confirm. I am also working on a wind project (Wheatridge East Amendment 1) in Morrow and Umatilla County, that may have been what Sarah was talking about. I am expecting updated GIS data for that project this week and will send to you as soon as I receive.

Thank you,

OREGON DEPARTMENT OF ENERGY

Christopher M. Clark
Senior Siting Analyst
550 Capitol St. NE | Salem, OR 97301
P: 503-871-7254
P (In Oregon): 800-221-8035
Stay connected!

From: Peacher, Kimberly N CIV USN NAVFAC NW SVD WA (USA) <kimberly.n.peacher.civ@us.navy.mil>
Sent: Monday, August 28, 2023 9:59 AM
To: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Subject: RE: Comments requested by September 28 on preliminary Application for Site Certificate for Sunstone Solar Project

Hello Chris,

Can you please send the shapefiles for Sunstone? I believe this is one I discussed with Sarah – we might need a G/G analysis.

Thank you.

V/R,

Kimberly Peacher
Community Planning & Liaison Officer
Northwest Training Range Complex
(360) 930-4085

From: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Sent: Monday, August 28, 2023 9:43 AM
To: ISAAK Patty * DEQ <Patty.ISAAK@deq.oregon.gov>; MCCLAUGHRY Jason * DGMI <Jason.MCCLAUGHRY@dogami.oregon.gov>; HERT Dawn * DLCD <Dawn.Hert@dlcd.oregon.gov>; FOOTE Hilary * DLCD <Hilary.FOOTE@dlcd.oregon.gov>; jon.jinings@dlcd.oregon.gov; STEVENSON Chris * DSL <Chris.STEVENSON@dsl.oregon.gov>; BLEAKNEY Leann <lbleakney@nwcouncil.org>; Cane, Jason S <Jason.Cane@osp.oregon.gov>; osfm.ofc@osp.oregon.gov; BROWN Jordan A * ODA <Jordan.A.BROWN@oda.oregon.gov>; JOHNSON James * ODA <James.JOHNSON@oda.oregon.gov>; PIKE Brandon <Brandon.PIKE@odav.oregon.gov>; CHERRY Steve P * ODFW <Steve.P.CHERRY@odfw.oregon.gov>; THOMPSON Jeremy L * ODFW <Jeremy.L.THOMPSON@odfw.oregon.gov>; SOMERS Lindsay N * ODFW <Lindsay.N.Somers@odfw.oregon.gov>; HOLSCHBACH Tim J * ODF <Tim.J.HOLSCHBACH@odf.oregon.gov>; TOKARCZYK John A * ODF <John.A.TOKARCZYK@odf.oregon.gov>; LAPP Thomas <Thomas.Lapp@odot.oregon.gov>; john.pouley@orpd.oregon.gov; MULDOON Matt * PUC <Matt.MULDOON@puc.oregon.gov>; BJORK Mary F * WRD <Mary.F.BJORK@water.oregon.gov>; FITZGERALD Richard W * DSL <Richard.W.FITZGERALD@dsl.oregon.gov>; kimberly.peacher@navy.mil
Cc: CORNETT Todd * ODOE <Todd.CORNETT@energy.oregon.gov>; ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>
Subject: [Non-DoD Source] Comments requested by September 28 on preliminary Application for Site Certificate for Sunstone Solar Project
Importance: High

Dear Agency Partners,

You are receiving this message because your agency is a "reviewing agency" for the Energy Facility Siting Council's of the Sunstone Solar Project, a proposed 1,200 MW solar photovoltaic power generation facility that, if approved, would occupy up to 9,442 acres (~15 sq. mi) of land zoned for Exclusive Farm Use in Morrow County, Oregon. In accordance with ORS 469.350, and OAR 345-015-0180 and 345-021-0050(4), the Oregon Department of Energy (Department), as staff to the Energy Facility Siting Council (Council), requests your agency's comments on the completeness of the preliminary Application for Site Certificate for the Sunstone Solar Project (pASC).

More information about the proposed facility and specific information requests for individual agencies are included in the attached memo. A sample response memo and comment table template are also attached to the memo for your convenience; however, please feel free to provide comments in whatever format works best for you. Please provide your comments no later than **Thursday, September 28, 2023**. If you require additional time, please let me know as soon as possible.

The pASC, and other information about the proposed facility, is available at: https://www.oregon.gov/energy/facilities-safety/facilities/Pages/ESP.aspx. Please let me know as soon as possible If you require paper copies of part or all of the pASC, or require any additional information to assist in your review, such as GIS data or confidential information submitted as part of the pASC that is relevant to your subject matter area.

Thank you,

OREGON DEPARTMENT OF ENERGY

Christopher M. Clark
Senior Siting Analyst
550 Capitol St. NE | Salem, OR 97301
P: 503-871-7254
P (In Oregon): 800-221-8035

Oregon
Tina Kotek, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

August 30, 2023

Pine Gate Renewables LLC
Attn: Logan Stephens
130 Roberts Street
Asheville, NC 28801

Re: WD # 2023-0129 **Approved**
Wetland Delineation Report for Sunstone Solar
Morrow County; T1N R26E and T2N R26E;
Multiple Tax Lots (See attached Table 1)

Dear Logan Stephens:

The Department of State Lands has reviewed the wetland delineation report prepared by Tetra Tech, Inc. for the site referenced above. Please note that the study area includes portions of multiple tax lots (see the attached maps and Table 1). Based upon the information presented in the report, and additional information submitted upon request, we concur with the wetland and waterway boundaries as mapped in Figure 4, 4.1 through 4.24 of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the study area, 19 waterways (D-01, ST-01 through ST-08, ST-08b, ST-09, ST-10, ST-11, ST-100 through ST-105) were identified (See Table 5). Normally, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high-water line (OHWL) of the waterway (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). However, these waterways are all exempt per OAR 141-085-0515(3) and therefore, none are subject to these state permit requirements. In addition, 46 waterways identified on either NWI or NHD mapping, were investigated in the field, but no evidence for these mapped features was observed (See Figure 2 and Table 6).

This concurrence is for purposes of the state Removal-Fill Law only. We recommend that you attach a copy of this concurrence letter to any subsequent state permit application to speed application review. Federal, other state agencies or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. If you have any questions, please contact Chris Stevenson, PWS, the Jurisdiction Coordinator for this report, at (503) 798-7622.

Sincerely,

Peter Ryan, SPWS
Aquatic Resource Specialist

Enclosures

ec: Jessica Taylor, Tetra Tech, Inc.
Morrow County Planning Department
Michael Neal, Corps of Engineers
Richard Fitzgerald, DSL
Brown Hobson, Pine Gate Renewables

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

Name changed to Sunstone Solar

A complete report and signed report cover form, along with applicable review fee, are required before a report review timeline can be initiated by the Department of State Lands. All applicants will receive an emailed confirmation that includes the report's unique file number and other information.

Ways to submit report:

- **Under 50MB** - A single unlocked PDF can be emailed to: wetland.delineation@dsl.oregon.gov.
- **50MB or larger** - A single unlocked PDF can be uploaded to DSL's Box.com website. After upload notify DSL by email at: wetland.delineation@dsl.oregon.gov.
- OR a hard copy of the unbound report and signed cover form can be mailed to: Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.

Ways to pay review fee:

- By credit card on DSL's epayment portal after receiving the unique file number from DSL's emailed confirmation.
- By check payable to the Oregon Department of State Lands attached to the unbound mailed hardcopy OR attached to the complete signed cover form if report submitted electronically.

Contact and Authorization Information

☒ Applicant ☐ Owner Name, Firm and Address:
Logan Stephens and Brown Hobson
Sr. Director, Project Development
Pine Gate Renewables LLC

Business phone # (336) 708-5161
Mobile phone # (optional)
E-mail: ~~logan.stephens@pgrenewables.com~~ loganstephens@pgrenewables.com, brownhobson@pgrenewables.com

☐ Authorized Legal Agent, Name and Address (if different):
Jessica Taylor
Restoration Ecologist and Wetland Scientist
Tetra Tech
14 E Main Street, Suite 210, Walla Walla, WA 99362

Business phone # (509) 386-5036
Mobile phone # (optional)
E-mail: Jessica.Taylor@tetratech.com

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: _____ **Signature:** _____
Date: _____ Special instructions regarding site access: _____

Project and Site Information

Project Name: Echo Solar Project

Latitude: 45.608537° Longitude: -119.561660°
decimal degree - centroid of site or start & end points of linear project

Proposed Use:
Solar Facility

Tax Map # see attached report
Tax Lot(s)

Tax Map #
Tax Lot(s)

Project Street Address (or other descriptive location):
Unincorporated Morrow County

Township 1N Range 26E Section QQ
Use separate sheet for additional tax and location information

City: Echo County: Morrow

Waterway: N/A River Mile: N/A

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
Tetra Tech, Inc.
Jessica Taylor
14 E Main Street, Suite 210
Walla Walla WA 99362

Phone # (509) 386-5036
Mobile phone # (if applicable) (509) 386-5036
E-mail: jessica.taylor@tetratech.com

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: Date: 03/07/2023

Primary Contact for report review and site access is ☐ Consultant ☒ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No Study Area size: 10,992 ac Total Wetland Acreage: 0.0000

Check Applicable Boxes Below

☐ R-F permit application submitted
☐ Mitigation bank site
☒ EFSC/ODOE Proj. Mgr: Christopher Clark
☐ Wetland restoration/enhancement project (not mitigation)
☐ Previous delineation/application on parcel
If known, previous DSL # _____

☐ Fee payment submitted **$** _____
☐ Resubmittal of rejected report ($100)
☐ Request for Reissuance. See eligibility criteria. (no fee)
DSL # _____ Expiration date _____
☐ LWI shows wetlands or waters on parcel
Wetland ID code _____

For Office Use Only

DSL Reviewer: JS Fee Paid Date: ____ / ____ / ____ DSL WD # 2023-0129

Date Delineation Received: 03 / 15 / 2023 ☐ ☐ DSL App.# _____

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Sr. Director, Project Development
Pine Gate Renewables LLC

Business phone # (336) 708-5161
Mobile phone # (optional)
E-mail: ~~logan.stephens@pgrenewables.com~~ loganstephens@pgrenewables.com, brownhobson@pgrenewables.com

☒ Authorized Legal Agent, Name and Address (if different):
Jessica Taylor
Restoration Ecologist and Wetland Scientist
Tetra Tech
14 E Main Street, Suite 210, Walla Walla, WA 99362

Business phone # (509) 386-5036
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E-mail: Jessica.Taylor@tetratech.com

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Typed/Printed Name: Logan Stephens **Signature:** DocuSigned by: Logan Stephens 89BBAD67AC4A499...

Date: 3/6/2023 Special instructions regarding site access: _____

Project and Site Information

Project Name: Echo Solar Project

Latitude: 45.608537° Longitude: -119.561660°
decimal degree - centroid of site or start & end points of linear project

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Tax Lot(s)

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☐ Request for Reissuance. See eligibility criteria. (no fee)
DSL # _____ Expiration date _____
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Wetland ID code _____

For Office Use Only

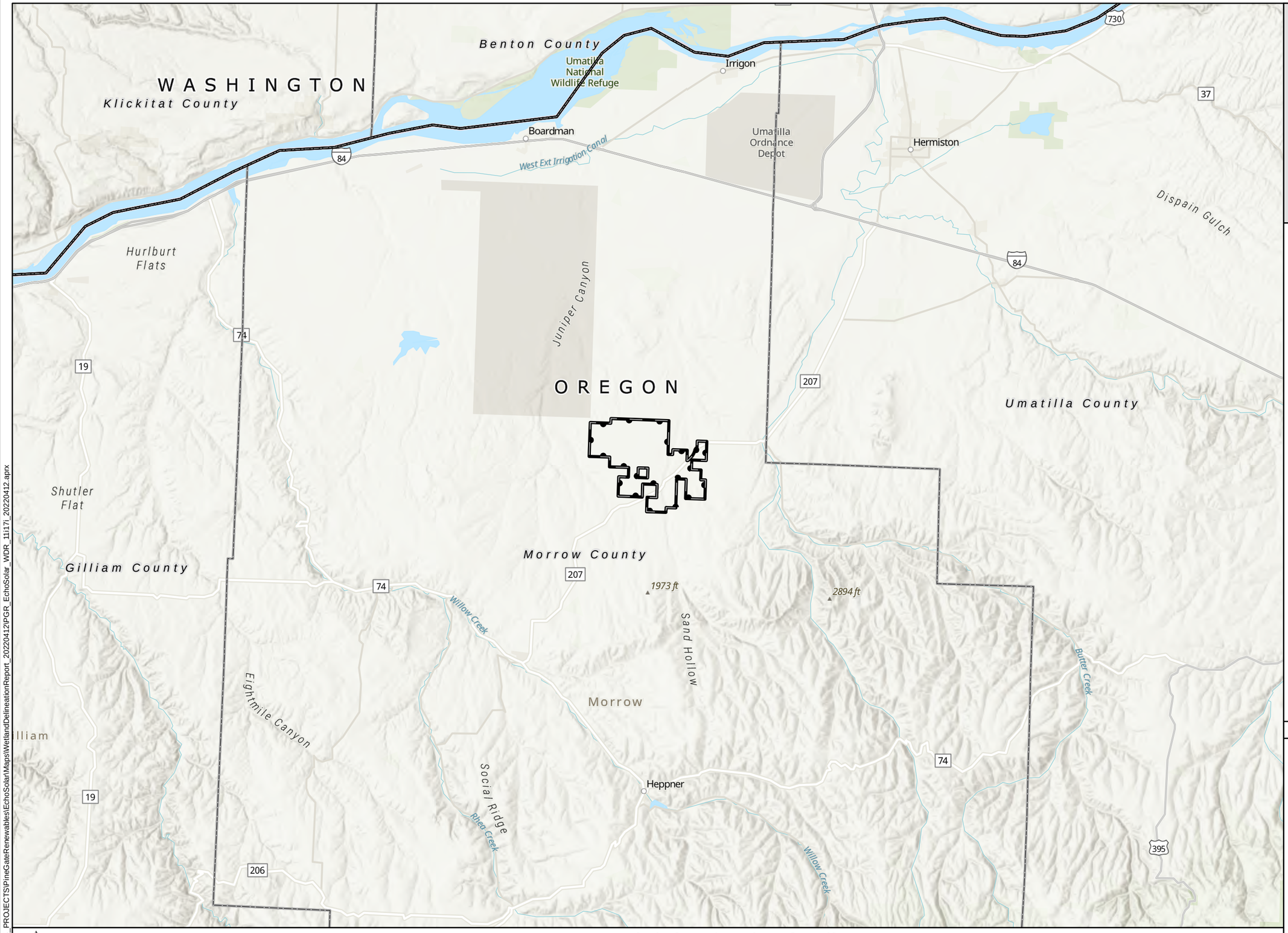
DSL Reviewer: JS Fee Paid Date: ____ / ____ / ____ DSL WD # 2023-0129

Date Delineation Received: 03 / 15 / 2023 DSL App.# _____

Echo Solar Project

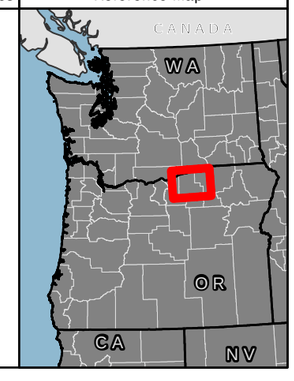
Figure 1
Project Location

MORROW COUNTY, OR



Study Area
County Boundary
State Boundary

TETRA TECH
PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Topographic	

1:300,000

WGS 1984 UTM Zone 10N

0 1 2 4 6 8 10 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 5
Tax Lot Map

MORROW COUNTY, OR

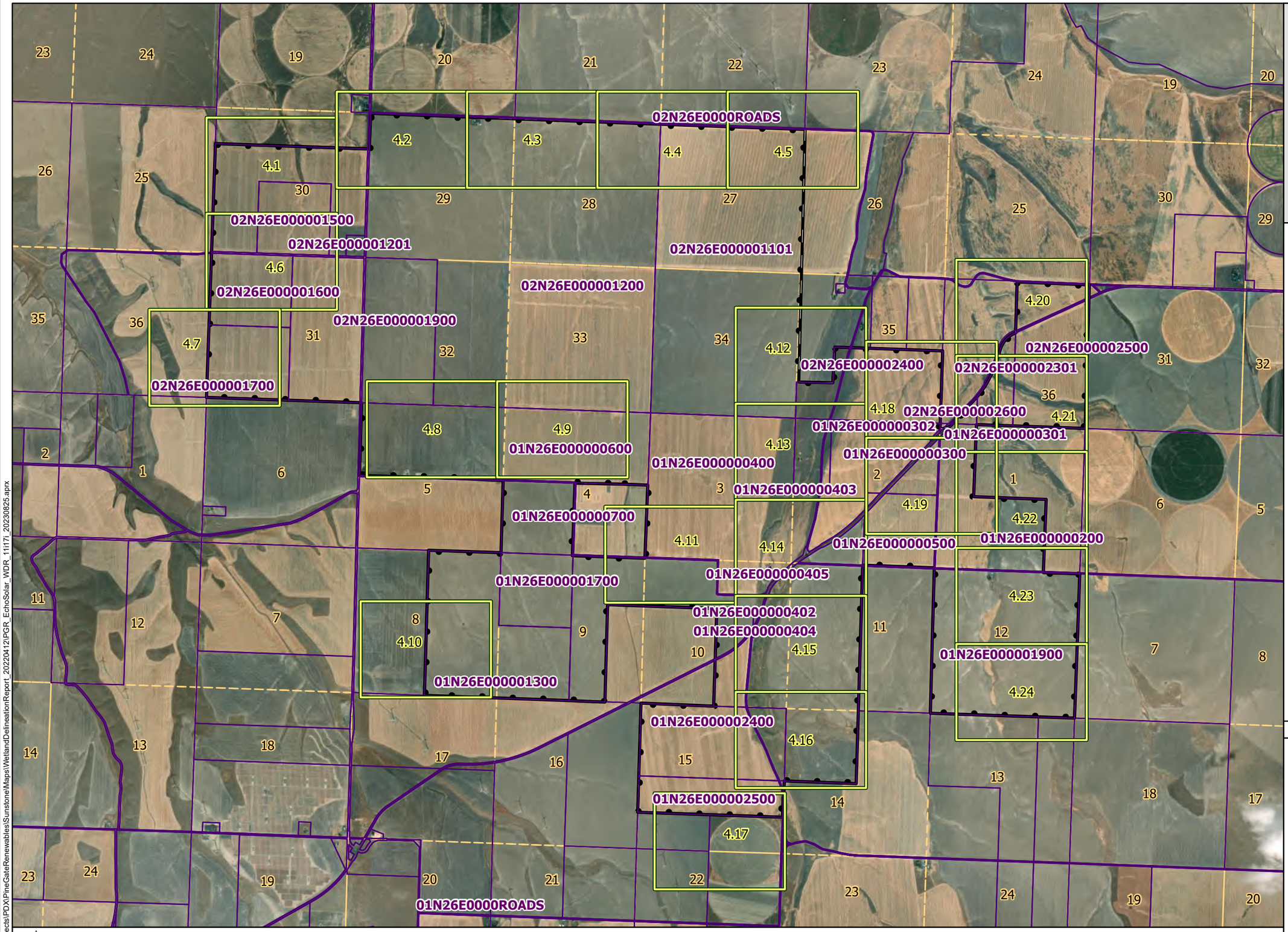
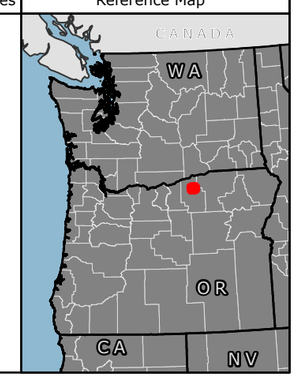


Figure 4 Index Map Grid
Study Area
Township 16S Range 15E Section
Taxlot Boundary

TETRA TECH

AVANGRID RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Lane County-Taxlots	

1:40,000 WGS 1984 UTM Zone 10N

0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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Table 1. Tax Maps - Tax Lots

Tax Map	Tax Lot Numbers
01N26E	1300
01N26E	1700
01N26E	1900
01N26E	200
01N26E	2400
01N26E	2500
01N26E	300
01N26E	301
01N26E	302
01N26E	400
01N26E	402
01N26E	403
01N26E	404
01N26E	405
01N26E	500
01N26E	600
01N26E	700
01N26E	ROADS
02N26E	1101
02N26E	1200
02N26E	1201
02N26E	1500
02N26E	1600
02N26E	1700
02N26E	1900
02N26E	2301
02N26E	2400
02N26E	2500
02N26E	2600
02N26E	ROADS

Table 5. Delineated Waters

Feature Name	Map Number[1]	OHWL Width (feet)	Flow Duration	Flow Direction	Photo Number[2]
D-01 (Ditch)	14	2	Ephemeral	South	32
ST-01	12, 13, 14, 15, 16	2	Ephemeral	North	1, 2, 5, 27
ST-02	16	1	Ephemeral	West	28, 29
ST-03	16	1	Ephemeral	South	30, 31
ST-04	16	1	Ephemeral	East	41
ST-05	16	1	Ephemeral	Northeast	42
ST-06	16	1	Ephemeral	Northeast	44
ST-07	16	1	Ephemeral	Northeast	49
ST-08	16	1	Ephemeral	Northeast	46, 47, 50
ST-08b	16	1	Ephemeral	Northeast	50
ST-09	15	1	Ephemeral	Northeast	51
ST-10	15	1	Ephemeral	East	54
ST-11	19, 22, 23, 24	1.5	Ephemeral	North	60, 61, 62, 85
ST-100	13	1	Ephemeral	East	N/A
ST-101	14	2	Ephemeral	East	3, 4
ST-102	17	1	Ephemeral	Northeast	64
ST-103	17	1	Ephemeral	East	68
ST-104	16	1	Ephemeral	Northeast	70
ST-105	18, 21	1	Ephemeral	East	78, 79, 80, 81

1. See Appendix A.
2. See Appendix B.
OHWL = ordinary high water line

Table 6. Deviations from NWI and NHD

Feature Name	Map Number	Photograph Number	NHD Classification	NWI Classification	Reason for Deviation
XBB-01	2	6	None	None	Orthoimagery showed potential drainage, no bed or banks in active cropland.
XBB-02	3	7	Intermittent Stream	None	No bed or banks in active cropland.
XBB-03	3	8	Intermittent Stream	None	No bed or banks in active cropland.
XBB-04	4	9	Intermittent Stream	None	No bed or banks in active cropland.
XBB-05	2	10	Intermittent Stream	None	No bed or banks in active cropland.
XBB-06	2	11	Intermittent Stream	None	No bed or banks in active cropland.
XBB-07	1	12	Intermittent Stream	None	Orthoimagery showed potential drainage, no bed or banks in active cropland.
XBB-08	1	13	None	None	No bed or banks in area between crop fields.
XBB-09	1	14	Intermittent Stream	None	No bed or banks in active cropland.
XBB-10	1	15	Intermittent Stream	None	No bed or banks in active cropland.
XBB-11	1	16	Intermittent Stream	None	No bed or banks in active cropland.
XBB-12	6	17	Intermittent Stream	None	No bed or banks in active cropland.
XBB-13	6	18	Intermittent Stream	None	No bed or banks in active cropland.
XBB-14	6	19	None	None	Orthoimagery showed potential drainage, no bed or banks in active cropland.
XBB-15	6	20	Intermittent Stream	None	No bed or banks in active cropland.
XBB-16	8	21	Intermittent Stream	None	No bed or banks in active cropland.
XBB-17	9	22	Intermittent Stream	None	No bed or banks in active cropland.
XBB-18	9	23	Intermittent Stream	None	No bed or banks in active cropland.
XBB-19	11	24	Intermittent Stream	None	No bed or banks in active cropland.
XBB-20	11	25	Intermittent Stream	None	No bed or banks in active cropland.
XBB-21	11	26	Intermittent Stream	None	No bed or banks in active cropland.
XBB-22	10	35	Intermittent Stream	None	No bed or banks in active cropland.
XBB-23	10	36	Intermittent Stream	None	No bed or banks in active cropland.
XBB-24	7	37	Intermittent Stream	None	No bed or banks in active cropland.
XBB-25	4	38	None	None	Orthoimagery showed potential drainage, no bed or banks in active cropland.
XBB-26	4	39	Intermittent Stream	None	No bed or banks in active cropland.
XBB-27	5	40	Intermittent Stream	None	No bed or banks in active cropland.
XBB-28	16	43	None	None	Drainage has no bed or banks beyond this point.
XBB-29	16	45	None	None	Drainage has no bed or banks beyond this point.
XBB-30	16	48	None	None	Drainage has no bed or banks beyond this point.
XBB-31	15	52	None	None	Drainage has no bed or banks beyond this point.
XBB-32	15	53	None	None	Drainage has no bed or banks beyond this point.
XBB-33	18	56	Intermittent Stream	None	No bed or banks on NHD.
XBB-34	18	57	Intermittent Stream	None	No bed or banks on NHD.

Feature Name	Map Number	Photograph Number	NHD Classification	NWI Classification	Reason for Deviation
XBB-35	19	58	None	None	Orthoimagery showed potential drainage, no bed or banks in active cropland.
XBB-36	23	59	Intermittent Stream	None	No bed or banks in active cropland.
XBB-37	11	63	Intermittent Stream	None	No bed or banks in active cropland.
XBB-107	17	66	Intermittent Stream	None	No bed or banks in active cropland.
XBB-108	17	67	Intermittent Stream	None	No bed or banks in active cropland.
XBB-110	17	69	None	None	Drainage has no bed or banks beyond this point.
XBB-112	16	71	None	None	Drainage has no bed or banks beyond this point.
XBB-113	5	72	Intermittent Stream	None	No bed or banks in active cropland.
XBB-117	18	76	Intermittent Stream	None	No bed or banks in active cropland.
XBB-118	20	77	None	None	Orthoimagery showed potential drainage, no bed or banks in active cropland.
XBB-123	21	82	Intermittent Stream	None	No bed or banks in area with shallow soils between crop fields.
XBB-125	23	84	Intermittent Stream	None	No bed or banks in active cropland.

Echo Solar Project

Figure 2 National Wetlands Inventory Map

MORROW COUNTY, OR

- Figure 4 Index Map Grid
- Study Area
- Township 16S Range 15E Section
- State Highway
- Local Roads
- City/Town

Wetlands and Waters

- Freshwater Emergent Wetland (NWI)
- Riverine (NWI)
- Lake/Pond (NHD)
- Intermittent Stream (NHD)
- Perennial Stream (NHD)

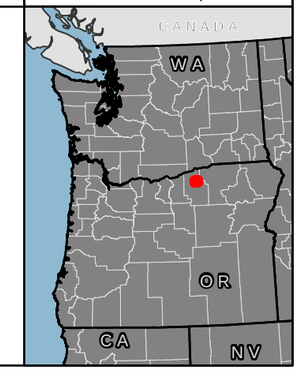
TETRA TECH

PINEGATE RENEWABLES

Data Sources

Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; USGS-NHD; USFWS-NWI

Reference Map



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WGS 1984 UTM Zone 10N

0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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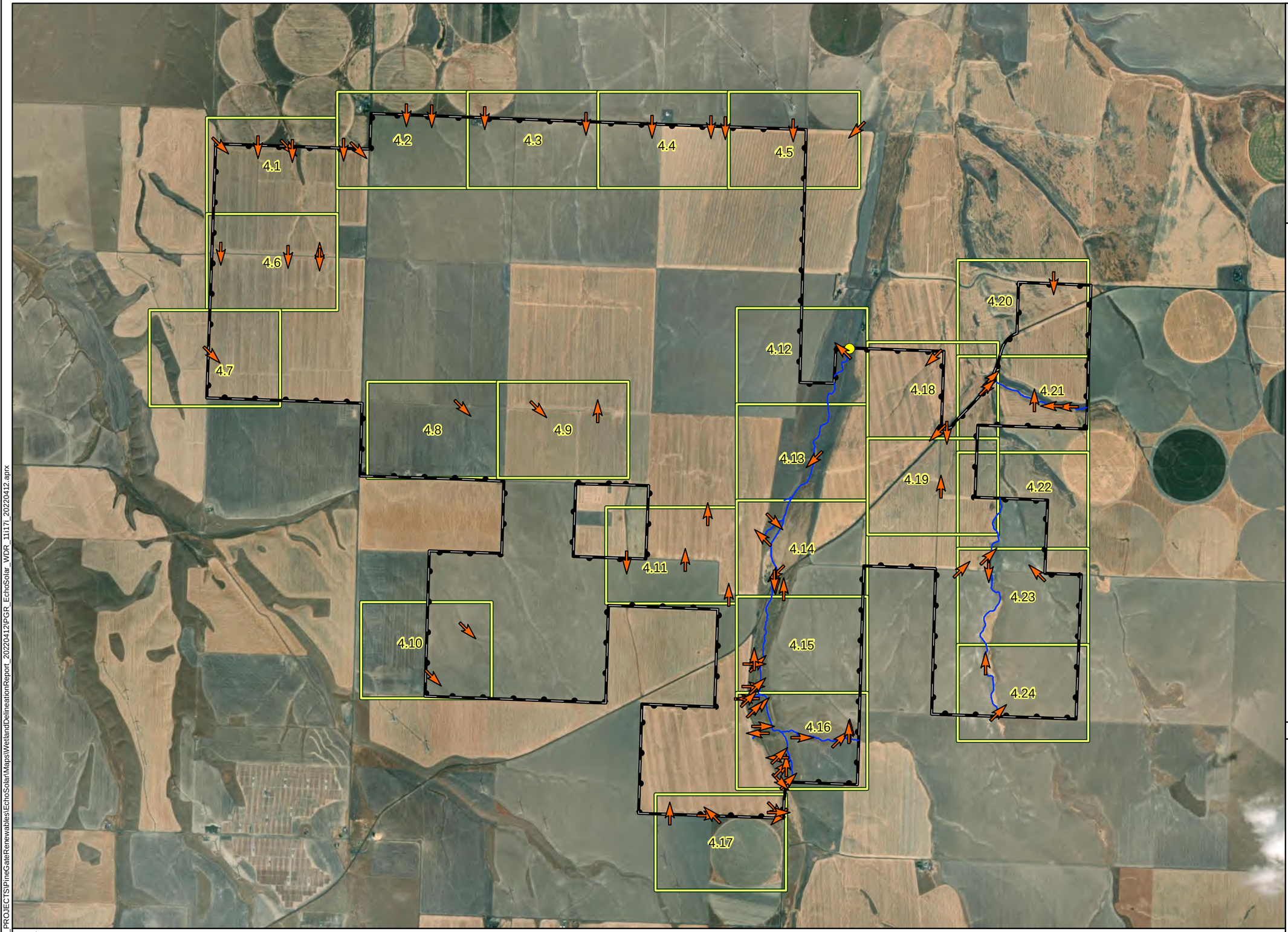
Echo Solar Project

Figure 4 Wetland Delineation Index Map

MORROW COUNTY, OR



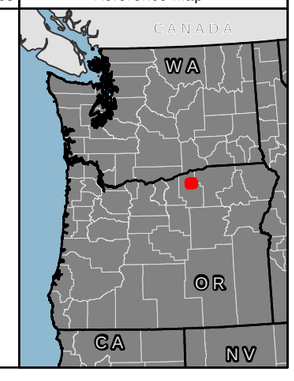
- Figure 4 Index Map Grid
- Study Area
- Sample Plot
- Photo Point
- Culvert
- Field Delineated Stream* (Maximum OHWL Width)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Wetland and stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Topographic	

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WGS 1984 UTM Zone 10N

0 0.5 1 2 Miles

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Echo Solar Project

Figure 4.1 Wetland Delineation Map

MORROW COUNTY, OR

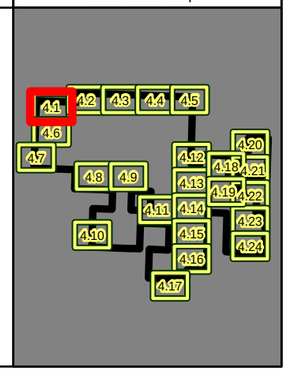
- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.2 Wetland Delineation Map

MORROW COUNTY, OR

- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
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TETRA TECH

PINEGATE RENEWABLES

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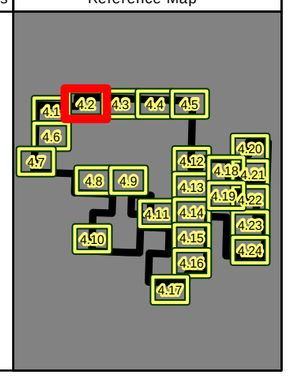
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N

0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.3 Wetland Delineation Map

MORROW COUNTY, OR

XBB-02 (#7)

XBB-03 (#8)

Taxlot 02N26E0000ROADS

Taxlot 02N26E000001200

- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

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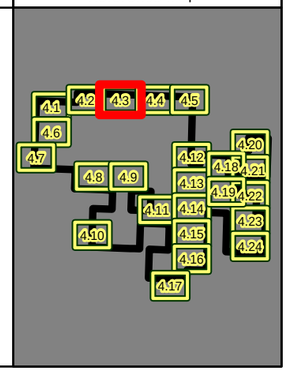
TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N

0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.4 Wetland Delineation Map

MORROW COUNTY, OR

Study Area

Taxlot Boundary

Photo Point (# Photo Number)

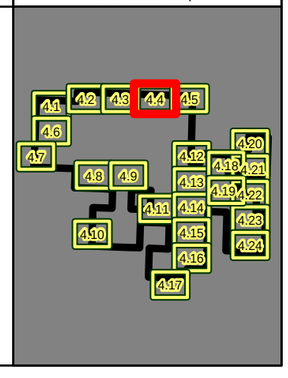
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N

0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.5 Wetland Delineation Map

MORROW COUNTY, OR

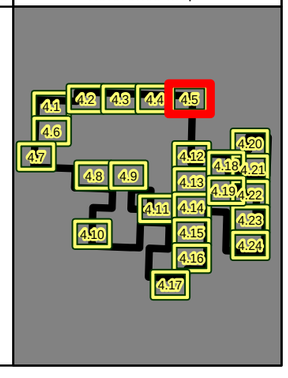
- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.6 Wetland Delineation Map

MORROW COUNTY, OR

Taxlot 02N26E000001500

Taxlot 02N26E000001201

Taxlot 02N26E0000ROADS

Taxlot 02N26E000001600

Taxlot 02N26E000001200

XBB-15 (#20)

XBB-14 (#19)

XBB-13 (#18)

XBB-12 (#17)

- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

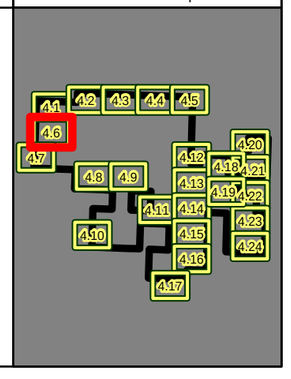
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

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Echo Solar Project

Figure 4.7 Wetland Delineation Map

MORROW COUNTY, OR

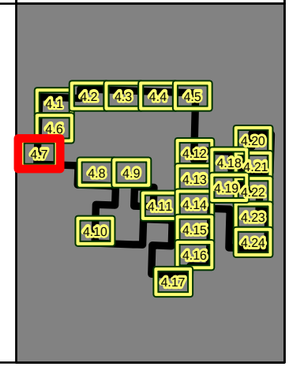
- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.8 Wetland Delineation Map

MORROW COUNTY, OR

- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

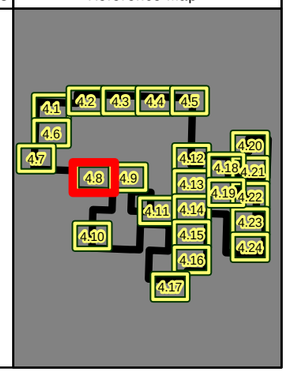
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

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Echo Solar Project

Figure 4.9 Wetland Delineation Map

MORROW COUNTY, OR

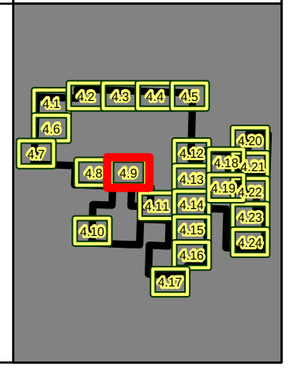
- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.10 Wetland Delineation Map

MORROW COUNTY, OR

Taxlot 01N26E000001700

Taxlot 01N26E0000ROADS

Taxlot 01N26E000001300

XBB-22 (#36)

XBB-23 (#35)

- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

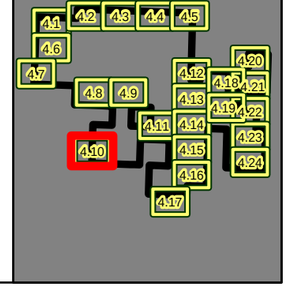
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N

0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.11 Wetland Delineation Map

MORROW COUNTY, OR

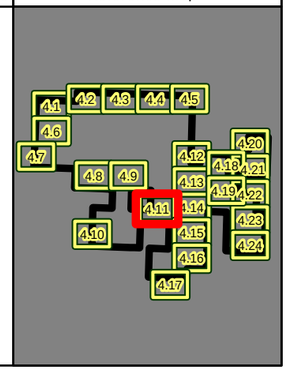
- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.12 Wetland Delineation Map

MORROW COUNTY, OR

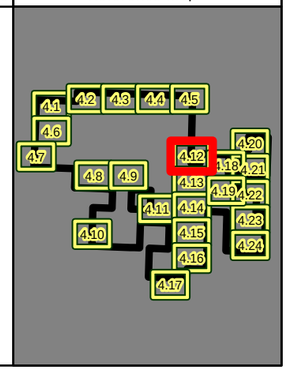
- Study Area
- Taxlot Boundary
- Field Delineated Stream* (Maximum OHWL Width)
- Sample Plot
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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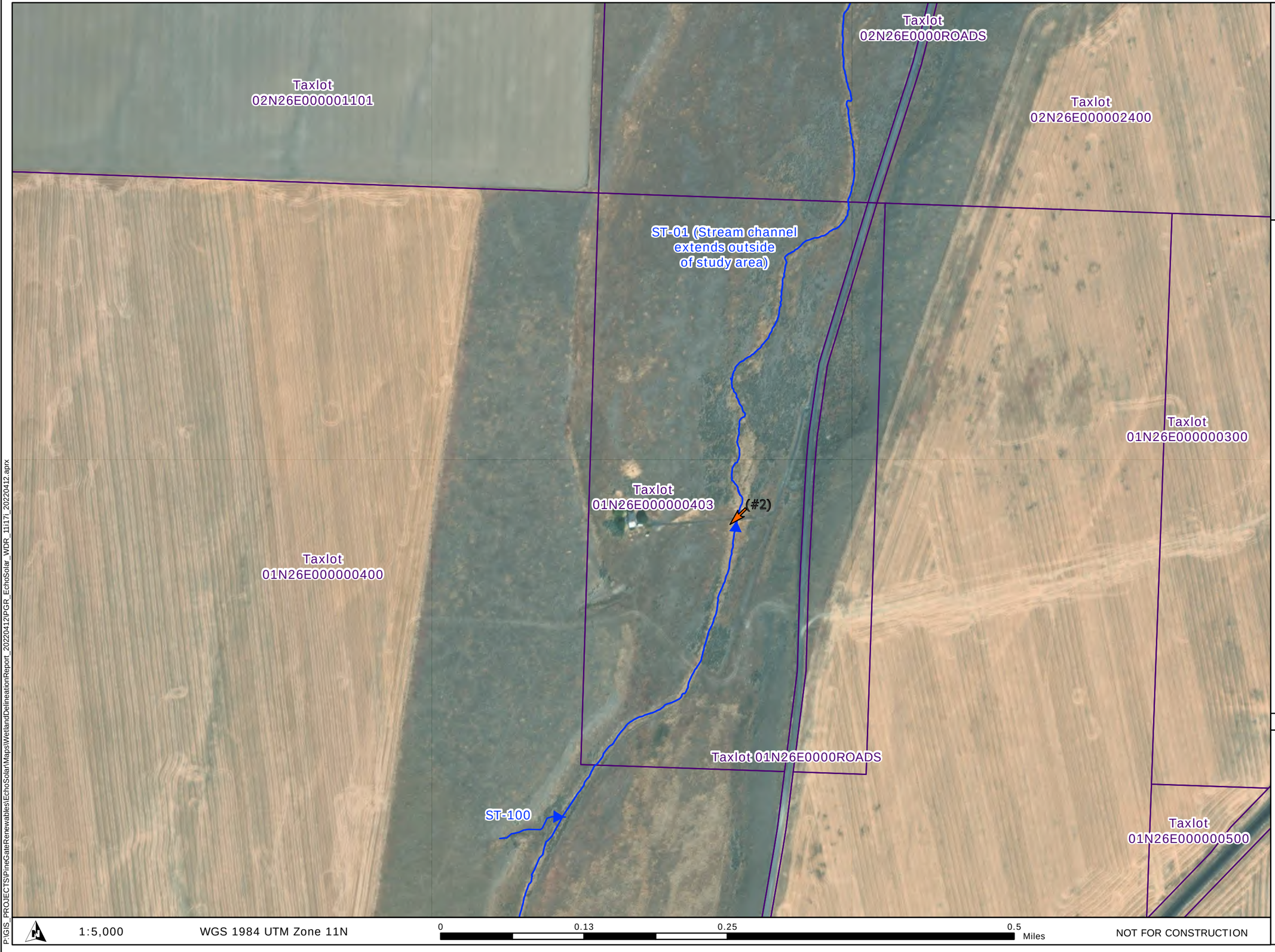
Echo Solar Project

Figure 4.13 Wetland Delineation Map

MORROW COUNTY, OR



- Study Area
- Taxlot Boundary
- Culvert
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

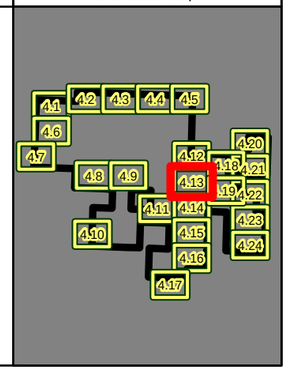
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N

0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.14
Wetland Delineation Map

MORROW COUNTY, OR

Taxlot 01N26E000000403

Taxlot 01N26E000000300

ST-100

(#4)

ST-101

(#3)

Taxlot 01N26E0000ROADS

Taxlot 01N26E000000500

Taxlot 01N26E000000400

Taxlot 01N26E000000405

(#5)

(#33)

(#32)

D-01

(#34)

XBB-21 (#26)

- Study Area
- Taxlot Boundary
- Culvert
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

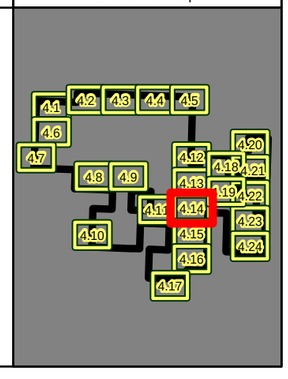
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.15 Wetland Delineation Map

MORROW COUNTY, OR

- Study Area
- Taxlot Boundary
- Culvert
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

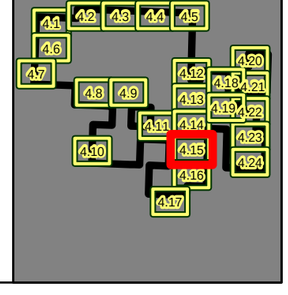
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.16 Wetland Delineation Map

MORROW COUNTY, OR

XBB-31 (#52)
(#51)
ST-09
(#47)
(#46)
(#50)
ST-08
ST-08b
XBB-30 (#48)
ST-07
(#49)
XBB-112 (#71)
(#70)
ST-104
Taxlot
01N26E000000400
(#28)
(#31)
(#30)
ST-03
(#29)
ST-02
Taxlot
01N26E000002400
Taxlot 01N26E0000ROADS
XBB-29 (#45)
ST-06
(#44)
XBB-28 (#43)
ST-05
(#42)
ST-01 (Stream channel extends outside of study area)
ST-04 (Stream channel extends outside of study area)
(#41)
(#27)
Taxlot
01N26E000002500

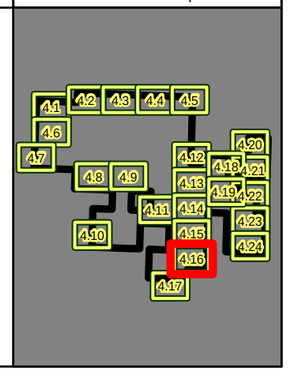
- Study Area
- Taxlot Boundary
- Culvert
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH
PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.17 Wetland Delineation Map

MORROW COUNTY, OR

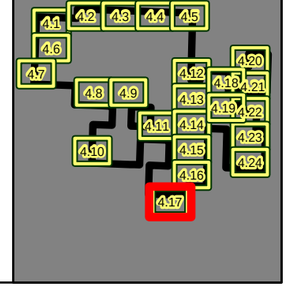
- Study Area
- Taxlot Boundary
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.18 Wetland Delineation Map

MORROW COUNTY, OR

Taxlot 02N26E000001101

XBB-117 (#76)

Taxlot 02N26E000002400

Taxlot 02N26E0000ROADS

ST-105 (Stream channel extends outside of study area)

(#81)

(#83)

XBB-123 (#82)

Taxlot 02N26E000002301

Taxlot 02N26E000002600

Taxlot 01N26E000000302

XBB-34 (#57)

XBB-33 (#56)

Taxlot 01N26E000000301

Taxlot 01N26E0000ROADS

Taxlot 01N26E000000300

Taxlot 01N26E000000200

Taxlot 01N26E000000400

- Study Area
- Taxlot Boundary
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

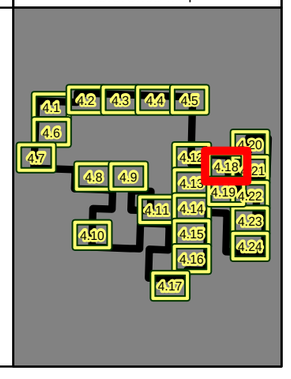
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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XBB-34 (#57)
Taxlot 01N26E000000302
XBB-33 (#56)
Taxlot 01N26E000000301
Taxlot 01N26E000000400
Taxlot 01N26E000000300
XBB-35 (#58)
Taxlot 01N26E0000ROADS
Taxlot 01N26E000000200
Taxlot 01N26E000000500
ST-11 (Stream channel extends outside of study area)

Echo Solar Project

Figure 4.19 Wetland Delineation Map

MORROW COUNTY, OR

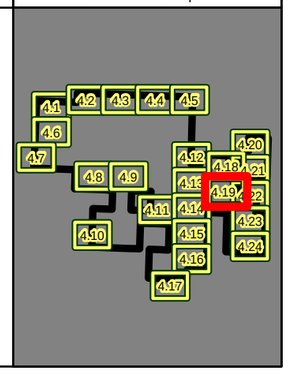
- Study Area
- Taxlot Boundary
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH
PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N

0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.20 Wetland Delineation Map

MORROW COUNTY, OR

XBB-118 (#77)

Taxlot 02N26E0000ROADS

Taxlot 02N26E000002500

Taxlot 02N26E000002400

Taxlot 02N26E000002301

- Study Area
- Taxlot Boundary
- Photo Point (# Photo Number)

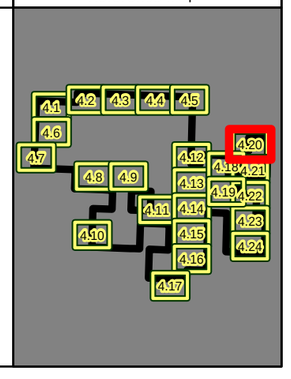
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N

0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

P:\GIS_PROJECTS\PineGateRenewables\EchoSolar\Maps\WetlandDelineationReport_20220412\PGR_EchoSolar_WDR_11x17l_20220412.aprx

Echo Solar Project

Figure 4.21 Wetland Delineation Map

MORROW COUNTY, OR

- Study Area
- Taxlot Boundary
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

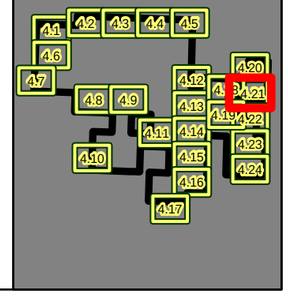
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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Echo Solar Project

Figure 4.22 Wetland Delineation Map

MORROW COUNTY, OR

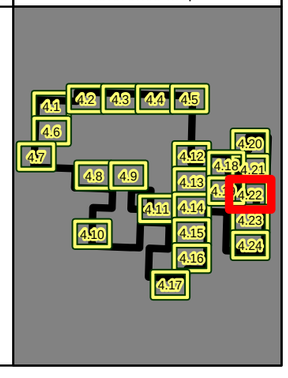
- Study Area
- Taxlot Boundary
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

P:\GIS_PROJECTS\PineGateRenewables\EchoSolar\Maps\WetlandDelineationReport_20220412\PGR_EchoSolar_WDR_11x17l_20220412.aprx

Echo Solar Project

Figure 4.23 Wetland Delineation Map

MORROW COUNTY, OR

- Study Area
- Taxlot Boundary
- Culvert
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

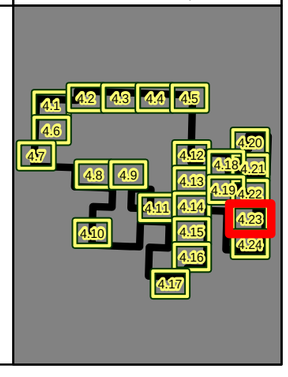
DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH

PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

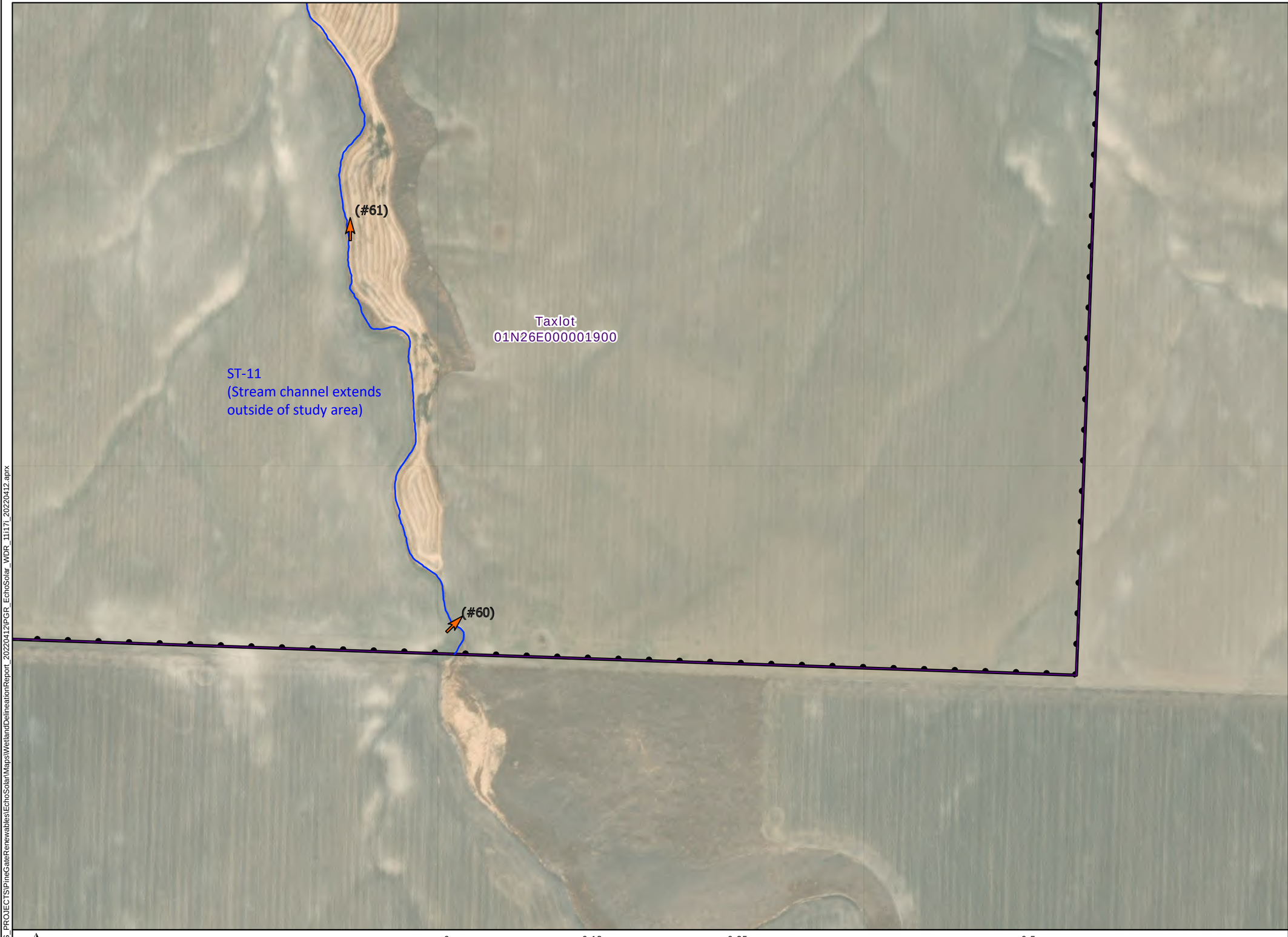
NOT FOR CONSTRUCTION

P:\GIS_PROJECTS\PineGateRenewables\EchoSolar\Maps\WetlandDelineationReport_20220412\PGR_EchoSolar_WDR_11x17L_20220412.aprx

Echo Solar Project

Figure 4.24 Wetland Delineation Map

MORROW COUNTY, OR



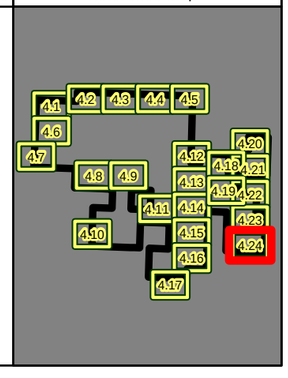
- Study Area
- Taxlot Boundary
- Field Delineated Stream* (Maximum OHWL Width)
- Photo Point (# Photo Number)

DSL WD # 2023-0129
Approval Issued 8/30/2023
Approval Expires 8/30/2028

Stream channel boundaries, sample plots, and photo points were collected using sub-meter grade GPS devices collecting real-time, sub-meter GNSS data. Mapped features are </= 1 meter of the ground location.

**All delineated streams are considered completely contained within the study area unless otherwise noted.*

TETRA TECH PINEGATE RENEWABLES

Data Sources	Reference Map
Pine Gate Renewables-Project Infrastructure; Tiger-Roads; ESRI-Aerial; Morrow County-Taxlots	

1:5,000 WGS 1984 UTM Zone 11N 0 0.13 0.25 0.5 Miles

NOT FOR CONSTRUCTION

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From: Fossum, Linnea
Sent: Thursday, August 31, 2023 2:12 PM
To: CLARK Christopher * ODOE
Cc: Logan Stephens; Bensted, Amy; Maddi McMullen; Taylor, Jess1
Subject: FW: Echo/Sunstone
Attachments: WD20230129 AgencyDecision.pdf

Chris, FYI, we received the attached concurrence letter from DSL today.

Linnea Fossum, PE | she/her
Senior Project Manager
Direct **+1 (425) 482-7823** | Main **+1 (425) 482-7600** | Mobile **+1 (425) 765-3043** |
linnea.fossum@tetratech.com

Tetra Tech | Complex World, Clear Solutions™ | Environmental Services Divisions
19803 North Creek Parkway | Bothell, WA 98011 | tetratech.com

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From: HOWARD Heather * DSL <Heather.HOWARD@dsl.oregon.gov>
Sent: Thursday, August 31, 2023 10:30 AM
Subject: WD2023-0129 Mailout

We have completed our review of the wetland delineation report that was prepared for the **Sunstone Solar Project in Morrow County**. The report was submitted to the Department for approval, given the file number **WD2023-0129**, and assigned to Chris Stevenson for review.

The results and conclusions from that review are explained in the final agency decision document found in the following link, http://docs.dsl.state.or.us/PublicReview/ElectronicFile.aspx?docid=3949034&&dbid=0. You may contact the Department and request a paper copy. Otherwise, please review the attachment carefully and direct any questions or comments to Chris at (503) 986-5246 or chris.stevenson@dsl.oregon.gov. Thank you for your interest in this project.

Heather Howard
Support Services Specialist

Oregon Department of State Lands
775 Summer St. NE, Ste. 100
Salem, OR 97301
(971) 707-2985
www.oregon.gov/dsl
**Online Payment Portal, https://www.oregon.gov/dsl/Pages/payments.aspx

MORROW COUNTY

BOARD OF COMMISSIONERS

110 N Court St. • P.O. Box 788
Heppner, OR 97836
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www.co.morrow.or.us

David Sykes, Chair
Jeff Wenholz, Commissioner
Roy Drago Jr., Commissioner

September 20, 2023

Christopher Clark, Siting Officer
Oregon Department of Energy
550 Capitol Street N.E. 1st Floor
Salem, OR 97301

RE: Morrow County Board of Commissioners Comments on the Preliminary Application for Site Certificate for the Sunstone Solar Project (formerly known as Echo Solar).

Dear Mr. Clark,

Morrow County wishes to emphasize that the Board of Commissioners endorses the advancement of solar energy within the County. The construction of the Sunstone Solar Project will continue to grow and enhance energy production in Morrow County. These developments bring value to farming families and jobs to eastern Oregon.

The specific purpose of this letter is to provide focused comments on various Exhibits included in the preliminary Application for Site Certificate (pASC), and will provide comment to and local interpretation of the Oregon Department of Energy (ODOE) Siting Council Standards, local applicable Ordinances and local interpretation and application of both.

Exhibit K: Land Use
Morrow County acknowledges that Sunstone Solar LLC, the applicant, has satisfactorily addressed all relevant substantive criteria as outlined in Exhibit K. The County does not identify any additional criteria at this time.

Exhibit K includes findings for an exception to Statewide Planning Goal 3 (Farmland protection). Unique to this pASC is an Economic and Agricultural Impact Analysis, developed, in part, to quantify the value of agriculture for purposes of mitigation for the Goal 3 exception. Morrow County agrees with Sunstone Solar's proposal to provide mitigation funds and investment to offset anticipated impacts from the approximately 10,000-acre Sunstone Solar project to the local agricultural economy. The local agricultural economy expects to be indirectly impacted by the proposed facility. The lands proposed for development include approximately 10,000 acres currently in dryland wheat production.

Morrow County has reviewed Land Use Exhibit K section 5.5.1, which includes an exception to Statewide Planning Goal 3, specifically demonstrating that the facility is 'compatible with existing adjacent uses and other relevant factors are met.' The reasons for the exception include reason #4, which states that Sunstone Solar will mitigate its impacts to dryland agriculture.

Morrow County has also reviewed the Economic Impact Analysis included as an attachment to Exhibit K and has reviewed a preliminary list of potential agricultural mitigation projects Sunstone Solar could help to fund through contributions to local agricultural organizations. Morrow County agrees with the agricultural mitigation concept proposed by Sunstone Solar and looks forward to furthering discussions with ODOE and Sunstone Solar to best refine and identify the optimal organizations, projects, and programs to receive funding. Assuming the appropriate funding and investments can be structured and committed by Sunstone Solar, Morrow County anticipates such a mitigation package would address local concerns about impacts to the local agricultural economy and provide sufficient "reasons" for the Siting Council to grant an exception to Goal 3.

Morrow County supports the concept of mitigation for purposes of complying with the Goal 3 farmland exception. However, Morrow County would like additional time to consider the various options and will make a recommendation to ODOE at a later date.

Post-Acknowledgement Plan Amendment

The application includes a Goal exception, technically an amendment to a local comprehensive plan. While County supports the proposed Goal 3 exception, County requests that the applicant file a plan amendment application after the Energy Facility Siting Council issues a final Site Certificate (SC). This will ensure the exception is appropriately incorporated into the County Comprehensive Plan.

Housing

Sunstone has been proactively working with cities and County to encourage the development of new housing and also to encourage development of additional recreational vehicle (RV) parks. Given the number of construction employees[i] and the likelihood that construction for other large projects will coincide, Morrow County has some concerns about the ability to absorb the significant demands on housing. County Zoning Ordinance Section 3.010(D)(10) allows temporary RV parking for workforce housing for "power generation facilities" on lands zoned Exclusive Farm Use. County encourages the applicant to consider adding a map of lands that are potential lands for temporary workforce.

Exhibit O: Water Use

Morrow County takes no issue with the currently identified water sources designated for construction and ongoing operation. However, it is essential to acknowledge that should these designated sources become unavailable or insufficient in the future, the County will require the utilization of licensed commercial water sources as a replacement.

Exhibit U: Public Services

The applicant's submission lacks consideration for the significant impact of local weather conditions on traffic safety, particularly concerning increased left-hand turn traffic along Bombing Range Road during construction. Morrow County experiences challenging weather conditions, such as dense fog and freezing fog, frequently during the winter months. These weather phenomena can severely impair visibility and road conditions, which, in turn, may exacerbate the safety risks associated with heightened left-hand turn traffic. Therefore, it is imperative that the applicant revisit its assessment to incorporate a thorough evaluation of the potential implications of adverse weather conditions on traffic safety in the project area.

Further, we advise the applicant to work with Morrow County Public Works to address safety concerns related to increased left-hand turn traffic on Bombing Range Road (primary haul route) during construction, especially considering the impact of local weather conditions like winter fog/freezing fog. This collaboration is essential for implementing effective safety measures and traffic management strategies to ensure the safety of all road users.

We acknowledge this exhibit includes reference to a Road Use Agreement which we support and expect to be adopted by Morrow County prior to construction.

Thank you for the opportunity to comment on the Sunstone Solar Project's preliminary Application for Site Certificate (pASC). Please direct questions about these comments to Planning Director, Tamra Mabbott at 541-922-4624, or tmabbott@co.morrow.or.us or to Public Works Director, Eric Imes at 541-989-8584 or eimes@co.morrow.or.us.

Sincerely,

David Sykes
Chair

Jeff Wenholz
Commissioner

Roy Drago Jr.
Commissioner

Cc: Erik Imes, Public Works Director
Corey Sweeney, Weed Supervisor

[i] "Sunstone Solar Project Economic and Agricultural Impact Analysis," ECONorthwest, June 2023 estimate is combined construction of 440 workers at peak.

From: BROWN Jordan A * ODA
Sent: Tuesday, January 2, 2024 11:35 AM
To: CLARK Christopher * ODOE
Subject: Re: Request for Comments on Sunstone Solar Project Rare Plant Surveys

---

Hello Christopher,
It looks like I may have never provided comment earlier, and I just noticed during my start of the year house cleaning.

Based on my review of their survey timing and approach, they should have detected any Lawrence's milkvetch if it was present on site. Since none was reported, we can expect the project will have no impact on Lawrence's milkvetch.

Happy new year to you!

Jordan Brown, Program Lead Conservation Biologist
Oregon Department of Agriculture – Native Plant Conservation
635 Capitol St NE, Salem, OR 97301-2532
PH: 541.737.2346 | CELL: 541.224.2245 | WEB: Oregon.gov/ODA
Pronouns: he, him, his

*Please note my email address has changed to jordan.a.brown@oda.oregon.gov

---

From: CLARK Christopher * ODOE <christopher.clark@energy.oregon.gov>
Date: Wednesday, October 4, 2023 at 4:20 PM
To: BROWN Jordan A * ODA <Jordan.A.BROWN@oda.oregon.gov>
Cc: ODA_listedplants <listedplants@oda.oregon.gov>, ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>
Subject: Request for Comments on Sunstone Solar Project Rare Plant Surveys

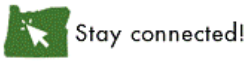
Hi Jordan,

We are hoping to get your input on whether or not the information provided in the attached survey reports for the Echo Solar Project (now renamed Sunstone Solar) is sufficient to conclude that there are no state listed plants likely to be present at the site. If you provided any comments in response to Tetra Tech's request below, would you mind forwarding those to me so I can include them in our record? If you didn't provide any comments, could you let me know if you have any concerns about the timing or methods for the surveys they used? For a little context, this project is in the same general area as some of the other facilities that have Lawrence's Milkvetch on site, however, the majority of the Sunstone site is currently in active dryland wheat production.

Please let me know if you need any additional information, or if it would be helpful to have a call to discuss.

Thank you,

OREGON DEPARTMENT OF ENERGY

Christopher M. Clark
Senior Siting Analyst
550 Capitol St. NE | Salem, OR 97301
P: 503-871-7254
P (In Oregon): 800-221-8035


From: Bensted, Amy <Amy.Bensted@tetratech.com>
Sent: Monday, April 10, 2023 12:41 PM
To: BROWN Jordan A * ODA <Jordan.A.BROWN@oda.oregon.gov>; ODA_listedplants <listedplants@oda.oregon.gov>
Cc: Fossum, Linnea <Linnea.Fossum@tetratech.com>; Logan Stephens <loganstephens@pgrenewables.com>; Brian Munger <brianmunger@pgrenewables.com>; Brown Hobson <brownhobson@pgrenewables.com>; CLARK Christopher * ODOE <christopher.clark@energy.oregon.gov>
Subject: RE: ODA contact for Morrow County rare plant surveys

Hello Jordan,

Following up on this survey report delivery, please let me know if you have any question or comments at this time. We are wrapping up Exhibit Q for an anticipated ASC submittal next month and it would be great to incorporate your input, if any, into the submittal.

Thanks!
Amy

Amy Bensted | Senior Biologist
Cell: **503.459.7989**
Amy.Bensted@tetratech.com

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1750 S Harbor Way, Suite 400 | Portland, OR 97201 | tetratech.com

TETRA TECH

From: Bensted, Amy
Sent: Monday, March 20, 2023 2:54 PM
To: 'BROWN Jordan A * ODA' <Jordan.A.BROWN@oda.oregon.gov>; 'listedplants@oda.oregon.gov' <listedplants@oda.oregon.gov>
Cc: Fossum, Linnea <Linnea.Fossum@tetratech.com>; Logan Stephens <loganstephens@pgrenewables.com>; Brian Munger <brianmunger@pgrenewables.com>; Brown Hobson <brownhobson@pgrenewables.com>; CLARK Christopher * ODOE <christopher.clark@energy.oregon.gov>
Subject: RE: ODA contact for Morrow County rare plant surveys

Jordan,

Thank you for the response. I've attached our survey report to this email, and copied listedplants@oda.oregon.gov. The report contains the methods and results of our rare plant survey, along with the methods and results of our habitat categorization survey (also provided to ODFW).

Let us know if you have any questions or comments.

Thanks!
Amy

Amy Bensted | Senior Biologist
Cell: **503.459.7989**
Amy.Bensted@tetratech.com

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1750 S Harbor Way, Suite 400 | Portland, OR 97201 | tetratech.com

TETRA TECH

From: BROWN Jordan A * ODA <Jordan.A.BROWN@oda.oregon.gov>
Sent: Monday, March 20, 2023 1:43 PM
To: Bensted, Amy <Amy.Bensted@tetratech.com>
Cc: Fossum, Linnea <Linnea.Fossum@tetratech.com>; Logan Stephens <loganstephens@pgrenewables.com>; Brian Munger <brianmunger@pgrenewables.com>; Brown Hobson <brownhobson@pgrenewables.com>; CLARK Christopher * ODOE <christopher.clark@energy.oregon.gov>
Subject: Re: ODA contact for Morrow County rare plant surveys

Hello Amy,
I am the appropriate contact at ODA for these kinds of consultation issues. I would recommend actually sending correspondence and results to our listedplants@oda.oregon.gov email address since it goes to multiple staff in case I'm unavailable. Thanks!

Jordan Brown, Program Lead Conservation Biologist
Oregon Department of Agriculture – Native Plant Conservation

635 Capitol St NE, Salem, OR 97301-2532
PH: 541.737.2346 | CELL: 541.224.2245 | WEB: Oregon.gov/ODA
Pronouns: he, him, his

*Please note my email address has changed to jordan.a.brown@oda.oregon.gov

---

From: "Bensted, Amy" <Amy.Bensted@tetratech.com>
Date: Friday, March 17, 2023 at 3:45 PM
To: BROWN Jordan A * ODA <Jordan.A.BROWN@oda.oregon.gov>
Cc: "Fossum, Linnea" <Linnea.Fossum@tetratech.com>, Logan Stephens <loganstephens@pgrenewables.com>, Brian Munger <brianmunger@pgrenewables.com>, Brown Hobson <brownhobson@pgrenewables.com>, CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Subject: ODA contact for Morrow County rare plant surveys

Jordan,

Pine Gate Renewables is proposing to construct and operate the Echo Solar Project in Morrow County, Oregon. Tetra Tech conducted a botanical survey in 2022 to support the Project's upcoming Application for Site Certificate. Are you the appropriate person at ODA to coordinate with regarding botanical resources for the project? Let me know and if so I'll send along the botanical survey report for your review.

Thanks,
Amy

Amy Bensted | Senior Biologist
Cell: **503.459.7989**
Amy.Bensted@tetratech.com

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1750 S Harbor Way, Suite 400 | Portland, OR 97201 | tetratech.com

From: KOWITZ Chris C * WRD
Sent: Tuesday, February 13, 2024 10:58 AM
To: CLARK Christopher * ODOE
Subject: FW: Solar Facility in Butter Creek CGWA

Hi Chris,

I am SO sorry for the delay in getting this information back to you. It's been an incredibly hectic few months and admittedly my inbox has gotten away from me. Please see Greg's comments below and let me know if you have any follow up questions. I'm happy to set up some time for us to discuss via Teams if that would be helpful.

Thanks – and again, please accept my apology on my very tardy response.
Chris

From: SILBERNAGEL Greg M * WRD <Greg.M.SILBERNAGEL@water.oregon.gov>
Sent: Wednesday, December 13, 2023 12:15 PM
To: KOWITZ Chris C * WRD <Chris.C.KOWITZ@water.oregon.gov>; HACKETT Joshua A * WRD <Joshua.A.HACKETT@water.oregon.gov>
Cc: SEYMOUR Timothy R * WRD <Timothy.R.SEYMOUR@water.oregon.gov>; KIEFER Andrew B * WRD <Andrew.B.KIEFER@water.oregon.gov>
Subject: RE: Solar Facility in Butter Creek CGWA

See my comments in blue below. Greg

From: KOWITZ Chris C * WRD <Chris.C.KOWITZ@water.oregon.gov>
Sent: Wednesday, December 13, 2023 10:29 AM
To: HACKETT Joshua A * WRD <Joshua.A.HACKETT@water.oregon.gov>; SILBERNAGEL Greg M * WRD <Greg.M.SILBERNAGEL@water.oregon.gov>
Cc: SEYMOUR Timothy R * WRD <Timothy.R.SEYMOUR@water.oregon.gov>; KIEFER Andrew B * WRD <Andrew.B.KIEFER@water.oregon.gov>
Subject: FW: Solar Facility in Butter Creek CGWA

Josh and Greg,

ODOE has asked us to weigh in on a potential solar facility in the Butter Creek drainage – please see Chris's narrative/questions below and let me know if have any feedback that you'd like me to pass back to him.

I don't believe this is public information yet so please don't share outside of this group.

Thank you!
Chris

From: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Sent: Tuesday, December 12, 2023 4:35 PM
To: KOWITZ Chris C * WRD <Chris.C.KOWITZ@water.oregon.gov>
Subject: Solar Facility in Butter Creek CGWA

Hi Chris,

It was good talking with you yesterday! As I mentioned during our conversation, I could use some input on a somewhat novel water rights situation. I am currently reviewing an application for a proposed solar facility that would be sited on approximately 10,900 acres of EFU land in Morrow County. The solar arrays and associated components would occupy about 9,442 acres, nearly all of which are currently in dryland wheat production. The applicant has requested land use approval from the Energy Facility Siting Council rather than from the local government, and due to the size of the proposed facility and its location on arable land, the Council would have to take an exception to Statewide Planning Goal 3 to grant the land use approval for the facility and approve the application for site certificate.

Based on information in the application, the site includes the authorized place of use for three groundwater rights:

- Water Right Certificate 43515 authorizes the irrigation of 2,831.9 acres of land within the site. The certificate has a priority date of July 19, 1967, and is the most senior water right in the West subarea of the Butter Creek Critical Groundwater Area. The water associated with this right was historically applied as supplemental water for wheat crops, but no water has been used since at least 2017. Between 2007 and 2023, the permit holder has requested between 1,00 and 1,300 acre feet of water most years but has only been allocated 500 acre feet. The landowner says the allocation is too small to justify the investment in irrigation equipment that

would be needed to regularly use it. The reason they weren't allocated more is because they hadn't used any previous years. They are the most senior water right holder within The BCCA West sub-area and could be using the entirety of certificate 43515 if they wished to. Either they do not understand the allocation process or they are incorrectly stating that the allocation is to small to justify irrigation equipment. As the senior water right holder, they could use more than their allocation, which would only impact junior users in future years.

- Water Right Certificate 38473 authorizes the irrigation of 36.3 acres of land within the site boundary. The certificate has a priority date of March 13, 1967 and is junior to 16 other groundwater rights in the Pine City subarea of the Butter Creek CGWA. The water associated with this right was historically used to water livestock and pasture. The place of use will not be affected by the energy facility, but the landowner has indicated that the source well is not viable and has not requested or been allocated groundwater since at least 2005. MORR 419 is the source well. Our records indicate no flowmeter reading use since 1981 from this well. Their location on the allocation table would grant them irrigation water if they were using it. I'm not sure what they question is related to this water right as it appears to be in non-use status. Is it possible this ground was enrolled in CRP? It does not appear to be in agricultural production in my arial photography.

- Water Right Certificate 62326 authorizes the irrigation of 494.6 acres, half of which are in the site boundary and half of which are in the site boundary of another energy facility. This certificate has a priority date of June 24, 1970, and is the most junior water right in the Pine City subarea of the Butter Creek CGWA. The water associated with this right was used for pivot irrigation, but lack of water led the landowner to shift to dryland wheat production in the early 1980s and no water has been allocated since 1997. MORR 416 – No documented use since 1993. It does not appear they have requested any allocation in many years and therefore, I am unable to determine the significance of being the most junior user within the BCCA – Pine City Subarea.

There are about 869 acres within the subject property that will be reserved for farm use, but the applicant has not indicated that the landowners plan to transfer or use any of the water rights, so it does seem likely that approval of the facility could result in the forfeiture of WR 62326 and WR 43515.
What would initiate the forfeiture process? They appear to already be subject to forfeiture if the proceedings were filed.

The applicant has provided two "reasons" in support of their exception request that are related to the water rights: (1) the facility does not impact irrigated crops due to lack of available irrigation water and (2) the facility will preserve groundwater supply for better uses elsewhere.
In my past reviews for County planning, they evaluate the historical use as much as the current use. Meaning – if it had ever been irrigated, it is classified as irrigated whether it currently is in production or not.

I am leaning towards rejecting the first reason. The Council has previously found that the authorized place of use for a junior water right in a Critical Groundwater Area can be considered functionally not irrigated for the purposes of an exception request if there is no recent

history of irrigation. That all holds true for WR 62326 but not WR 43515, and it seems like the potential forfeiture of a senior water right with current allocations could be considered an adverse impact on irrigated agriculture, especially since it is very unlikely that new water rights within the CGWA could be obtained in the future. The second reason seems somewhat more supportive. The applicant has argued that if the facility is constructed, the 500 acre feet currently allocated to WR 43515 will be available to other water users in the West subarea which seems reasonable.

My main questions for you are whether or not WRD would view the non-use of Water Right 43515 as a benefit to other water users in the subarea, and if so, if the applicant or landowner would need to take any action (i.e. cancellation of the right) to rely on the non-use to support their goal exception request? I'm not sure I understand what you are asking – Do they need to cancel the water right for the LUD to go through? It seems to me that it is already in the subject of forfeiture arena and would help us clean up our records if they voluntarily cancelled it. It would not qualify for a transfer due to the landowners inability to provide proof of use within the past 5 years.

I think you also mentioned that they may be able to lease the right to another landowner or use, do you think they could do that in a way that preserved the water right for the site after the facility is decommissioned in 40+ years? A transfer could not occur without providing evidence of use within he past five years.

I realize that is a lot of information, so please feel free to give me a call or schedule a teams call if you would like to discuss. I would be more than happy to get any other general feedback or questions you have on this as well.

Thanks so much,

OREGON DEPARTMENT OF ENERGY

Christopher M. Clark
Senior Siting Analyst
550 Capitol St. NE | Salem, OR 97301
P: 503-871-7254
P (In Oregon): 800-221-8035
Stay connected!

BOARD OF COMMISSIONERS

110 N Court St. • P.O. Box 788
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541-676-5613
www.co.morrow.or.us

David Sykes, Chair

March 21, 2024

Christopher Clark, Siting Officer
Oregon Department of Energy
550 Capitol Street NE 1st Floor
Salem, Oregon 97301

RE: Morrow County Board of Commissioners Support for Pinegate Renewables Agricultural Mitigation Plan for the Sunstone Solar Project

Dear Mr. Clark:

The Morrow County Board of Commissioners is in support of the agricultural mitigation program Pinegate Renewables has developed for their Sunstone solar energy project in Morrow County. Specifically, today the Board voted to sign the Memorandum of Agreement for Agricultural Mitigation Fund and approve the Mitigation Plan.

The Mitigation Plan is an exemplary program and, together with the Findings included in their Site Certificate application, satisfies any negative impacts to the agricultural economy and satisfies any concerns about any potential impacts. Morrow County recognizes that the Findings and Mitigation Plan satisfy the Goal 3 exception standards for the solar project.

Sincerely,

David Sykes, Chair
CHAIR, MORROW COUNTY BOARD OF COMMISSIONERS

Confederated Tribes *of the*
Umatilla Indian Reservation

Board of Trustees & General Council

46411 Timíne Way • Pendleton, OR 97801
(541) 429-7030 • fax (541) 276-3095
https://ctuir.org

March 25, 2024

Christopher Clark, Senior Siting Analyst
Oregon Department of Energy
550 Capital Street NE
Salem, Oregon 97301

Sent electronically to: Christopher.clark@energy.oregon.gov

Dear Mr. Clark:

Sunstone Solar, LLC has consulted with the Confederated Tribes of the Umatilla Indian Reservation ("CTUIR") regarding their proposed solar project, known as Sunstone Solar Project, in Morrow County, Oregon, southeast of the Boardman Bombing Range (the "Project"). The CTUIR has been in discussions with Sunstone Solar, LLC regarding the Project and we have come to a mutual agreement to mitigate the adverse effects the Project will have on historic property of religious and cultural significance to the CTUIR (the "Agreement"). The CTUIR is taking the initiative to inform the Oregon Department of Energy that the CTUIR's concerns have been addressed by the Agreement and we have no further concerns with the Project with respect to historic properties of religious and cultural significance to the CTUIR and no concerns with respect to National Register of Historic Places ("NRHP") eligible historic properties that will be affected by the Project. Further, the Agreement is sufficient to satisfy the CTUIR's concerns in relation to the Oregon Energy Facility Siting Council's Historic, Cultural, and Archaeological Resources Standard.

Should you have questions or concerns, please feel free to contact Teara Farrow Ferman, Program Manager, Cultural Resources Protection Program, at (541) 429-7230 or TearaFarrowFerman@ctuir.org.

Respectfully,

Gary I. Burke, Chairman
Board of Trustees

cc: Logan Stephens, Vice President, Project Development, Sunstone Solar, LLC

From: PIKE Brandon
Sent: Wednesday, June 12, 2024 4:05 PM
To: CLARK Christopher * ODOE
Subject: RE: Sunstone Solar Project - Comments Requested on Complete Application for Site Certificate by June 21, 2024

Good afternoon,

Thank you for providing the opportunity for the Oregon Department of Aviation (ODAV) to comment on this application.

ODAV has reviewed the proposal and prepared the following comment(s):

1. In accordance with FAR Part 77.9 and OAR 738-070-0060, the proposed transmission lines may be required to undergo aeronautical evaluations by the FAA and ODAV. The applicant can use the FAA's Notice Criteria Tool to determine if the proposed transmission lines (or any other proposed tall structure) warrant a *notice of construction*. If so, they are required to provide separate notices of construction to both the FAA and ODAV. The applicant should receive the resulting aeronautical determination letters from the FAA and ODAV prior to approval of any building permits.

Please reach out if you have questions or concerns. I'm available if the applicant has any questions or wants our input at this stage.

Best,

BRANDON PIKE
OREGON DEPARTMENT OF AVIATION
AVIATION PLANNER

PHONE 971-372-1339
EMAIL brandon.pike@odav.oregon.gov
3040 25TH STREET SE, SALEM, OR 97302
WWW.OREGON.GOV/AVIATION

From: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Sent: Wednesday, May 22, 2024 10:40 AM
To: Peacher, Kimberly N CIV USN NAVFAC NW SVD WA (USA) <kimberly.peacher@navy.mil>; Jeff_Everett@fws.gov; ISAAK Patty * DEQ <Patty.ISAAK@deq.oregon.gov>; MCCLAUGHRY Jason * DGMI <Jason.MCCLAUGHRY@dogami.oregon.gov>; HERT Dawn * DLCD <Dawn.Hert@dlcd.oregon.gov>; FOOTE Hilary * DLCD <Hilary.FOOTE@dlcd.oregon.gov>; jon.jinings@dlcd.oregon.gov; STEVENSON Chris * DSL <Chris.STEVENSON@dsl.oregon.gov>; BLEAKNEY Leann <lbleakney@nwcouncil.org>; HAWKINS Chad * OSFM <Chad.Hawkins@osfm.oregon.gov>; ANDRESEN Craig * OSFM <Craig.Andresen@osfm.oregon.gov>; STUART Kyle * OSFM <Kyle.Stuart@osfm.oregon.gov>; BROWN Jordan A * ODA <jordan.a.brown@oda.oregon.gov>; JOHNSON James * ODA <James.JOHNSON@oda.oregon.gov>; PIKE Brandon <Brandon.PIKE@odav.oregon.gov>; CHERRY Steve P * ODFW <Steve.P.CHERRY@odfw.oregon.gov>; THOMPSON Jeremy L * ODFW <Jeremy.L.THOMPSON@odfw.oregon.gov>; SOMERS Lindsay N * ODFW <Lindsay.N.Somers@odfw.oregon.gov>; HOLSCHBACH Tim J * ODF <tim.j.holschbach@odf.oregon.gov>; TOKARCZYK John A * ODF <John.A.TOKARCZYK@odf.oregon.gov>; HOPKINS Levi A * ODF <Levi.A.HOPKINS@odf.oregon.gov>; LAPP Thomas <Thomas.Lapp@odot.oregon.gov>; john.pouley@orpd.oregon.gov; MULDOON Matt * PUC <matt.muldoon@puc.oregon.gov>; BJORK Mary F * WRD <mary.f.bjork@water.oregon.gov>; FITZGERALD Richard W * DSL <Richard.W.FITZGERALD@dsl.oregon.gov>
Cc: CORNETT Todd * ODOE <Todd.CORNETT@energy.oregon.gov>; ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>
Subject: Sunstone Solar Project - Comments Requested on Complete Application for Site Certificate by June 21, 2024

Dear Agency Partners,

The Oregon Department of Energy (ODOE), as staff to the Energy Facility Siting Council (EFSC), received a complete Application for Site Certificate (ASC) for the Sunstone Solar Project on May 16, 2024. You are receiving this message because your agency has been identified as a "reviewing agency" for the review of the ASC under OAR 345-001-0010(52). Pursuant to ORS 469.350(2) and OAR 345-015-0200, the Department requests an agency report including your comments associated with the proposed facility's compliance with applicable statues, rules and ordinances and recommended site certificate conditions. In accordance with ORS 469.350(3), please reply to this request as soon as possible, but no later than **Friday, June 21, 2024**. Additional details about the project and specific requests for comments are included in the attached memo.

The complete application is available for download at: https://www.oregon.gov/energy/facilities-safety/facilities/Pages/ESP.aspx. Please contact me if you need assistance downloading materials or would like to obtain

printed copies from the applicant.

The Department intends to follow up with all agencies via email or phone to schedule a time to present issues and proposed conditions in more detail to support your review and comments; however, please feel free to reach out to me at any time if you have any questions about the project or your responsibilities as a reviewing agency.

Thank you,

Christopher M. Clark
Senior Siting Analyst
550 Capitol St. NE | Salem, OR 97301
P: 503-871-7254
P (In Oregon): 800-221-8035

From: BROWN Jordan A * ODA
Sent: Monday, June 17, 2024 9:33 AM
To: ESTERSON Sarah * ODOE
Cc: CLARK Christopher * ODOE
Subject: Re: Sunstone Solar Project - ODOE:ODAg Consultation on T&E Plants

---

Follow Up Flag: Follow up
Flag Status: Flagged

Hello All,
I have had a chance to review the Sunstone Solar 2022 Habitat Characterization and Rare Plant Report and can concur that their literature review and surveys for rare plants were sufficient to detect listed plants with the potential of occurring within the project area. Since unsurveyed portions of the project area were small enough that they could be observed from adjacent property, and the habitat was deemed unsuitable and no Lawrence's milkvetch was detected, the 2 unsurveyed acres can be deemed unsuitable and don't need to be surveyed. With no current detections, no additional preconstruction surveys for T&E plants are needed. We should still include a condition that if T&E plants happen to be encountered in the future, they will be flagged and avoided as necessary.
Thanks!

Jordan Brown, Program Lead Conservation Biologist
Oregon Department of Agriculture – Native Plant Conservation
635 Capitol St NE, Salem, OR 97301-2532
PH: 541.737.2346 | CELL: 541.224.2245 | WEB: Oregon.gov/ODA
Pronouns: he, him, his

*Please note my email address has changed to jordan.a.brown@oda.oregon.gov

---

From: ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>
Date: Thursday, June 13, 2024 at 5:36 PM
To: BROWN Jordan A * ODA <Jordan.A.BROWN@oda.oregon.gov>
Cc: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Subject: Sunstone Solar Project - ODOE:ODAg Consultation on T&E Plants

Hi Jordan,

Happy almost Friday!

We would like to coordinate with you on Sunstone Solar Project – this is a follow up to Chris's email sent on May 22 (see email chain below).

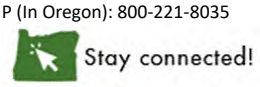
The Sunstone Solar Project is a 1200 MW solar project proposed in Morrow County (proposed to occupy up to 9,442 acres). Through the applicant's literature review, Laurence's milkvetch was identified as the state listed T&E plant species with a potential to occur within the facility site; Tetra Tech conducted rare plant surveys with the facility site in June 2022, where there were no T&E plants identified.

We would like to get your input on whether you agree with the survey methods and results, and whether you think any additional surveys are necessary at the site (as a preconstruction reverification) or to address 2 unsurveyed areas. In the attached word document, we have provided a summary of the project, the applicant's analysis and results and the specific questions we would like your input on.

I am going to TEAMs you the 2022 Survey Report now – the applicant indicates that they already provided it to you, so please let me know if you do not actually have it/receive it.

Let me know if you want to have a quick call to discuss; or feel free to respond via email or directly in the attached Word doc.

Thank you!

Sarah T. Esterson
Pronouns: She|Her|Hers
Senior Policy Advisor
550 Capitol St. NE | Salem, OR 97301
M: 971-239-7087
P (In Oregon): 800-221-8035


From: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Sent: Wednesday, May 22, 2024 10:40 AM
To: Peacher, Kimberly N CIV USN NAVFAC NW SVD WA (USA) <kimberly.peacher@navy.mil>; Jeff_Everett@fws.gov; ISAAK Patty * DEQ <Patty.ISAAK@deq.oregon.gov>; MCCLAUGHRY Jason * DGMI <Jason.MCCLAUGHRY@dogami.oregon.gov>; HERT Dawn * DLCD <dawn.hert@dlcd.oregon.gov>; FOOTE Hilary * DLCD <hilary.foote@dlcd.oregon.gov>; jon.jinings@dlcd.oregon.gov; STEVENSON Chris * DSL <Chris.STEVENSON@dsl.oregon.gov>; BLEAKNEY Leann <lbleakney@nwcouncil.org>; HAWKINS Chad * OSFM <chad.hawkins@osfm.oregon.gov>; ANDRESEN Craig * OSFM <craig.andresen@osfm.oregon.gov>; STUART Kyle * OSFM <Kyle.Stuart@osfm.oregon.gov>; BROWN Jordan A * ODA <Jordan.A.BROWN@oda.oregon.gov>; JOHNSON James * ODA <James.JOHNSON@oda.oregon.gov>; PIKE Brandon <Brandon.PIKE@odav.oregon.gov>; CHERRY Steve P * ODFW <Steve.P.CHERRY@odfw.oregon.gov>; THOMPSON Jeremy L * ODFW <Jeremy.L.THOMPSON@odfw.oregon.gov>; SOMERS Lindsay N * ODFW <Lindsay.N.SOMERS@odfw.oregon.gov>; HOLSCHBACH Tim J * ODF <Tim.J.HOLSCHBACH@odf.oregon.gov>; TOKARCZYK John A * ODF <John.A.TOKARCZYK@odf.oregon.gov>; HOPKINS Levi A * ODF <Levi.A.HOPKINS@odf.oregon.gov>; LAPP Thomas <Thomas.Lapp@odot.oregon.gov>; john.pouley@orpd.oregon.gov; MULDOON Matt * PUC <Matt.MULDOON@puc.oregon.gov>; BJORK Mary F * WRD <Mary.F.BJORK@water.oregon.gov>; FITZGERALD Richard W * DSL <Richard.W.FITZGERALD@dsl.oregon.gov>
Cc: CORNETT Todd * ODOE <Todd.CORNETT@energy.oregon.gov>; ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>
Subject: Sunstone Solar Project - Comments Requested on Complete Application for Site Certificate by June 21, 2024

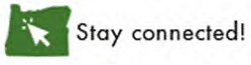
Dear Agency Partners,

The Oregon Department of Energy (ODOE), as staff to the Energy Facility Siting Council (EFSC), received a complete Application for Site Certificate (ASC) for the Sunstone Solar Project on May 16, 2024. You are receiving this message because your agency has been identified as a "reviewing agency" for the review of the ASC under OAR 345-001-0010(52). Pursuant to ORS 469.350(2) and OAR 345-015-0200, the Department requests an agency report including your comments associated with the proposed facility's compliance with applicable statues, rules and ordinances and recommended site certificate conditions. In accordance with ORS 469.350(3), please reply to this request as soon as possible, but no later than **Friday, June 21, 2024**. Additional details about the project and specific requests for comments are included in the attached memo.

The complete application is available for download at: https://www.oregon.gov/energy/facilities-safety/facilities/Pages/ESP.aspx. Please contact me if you need assistance downloading materials or would like to obtain printed copies from the applicant.

The Department intends to follow up with all agencies via email or phone to schedule a time to present issues and proposed conditions in more detail to support your review and comments; however, please feel free to reach out to me at any time if you have any questions about the project or your responsibilities as a reviewing agency.

Thank you,

Christopher M. Clark
Senior Siting Analyst
550 Capitol St. NE | Salem, OR 97301
P: 503-871-7254
P (In Oregon): 800-221-8035


ESTERSON Sarah * ODOE

From: Sarah.ESTERSON@energy.oregon.gov
Subject: ODOE:ODFW Coord on SSP T&E Wildlife (WAGS)

From: SOMERS Lindsay N * ODFW <Lindsay.N.Somers@odfw.oregon.gov>
Sent: Tuesday, June 18, 2024 11:45 AM
To: ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>; THOMPSON Jeremy L * ODFW <Jeremy.L.THOMPSON@odfw.oregon.gov>
Cc: WOODS Ash * ODOE <ash.woods@energy.oregon.gov>; CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>
Subject: RE: ODOE:ODFW Coord on SSP T&E Wildlife (WAGS)

Hi Sarah, I have responded below in red.

- Does ODFW concur that the 2022 WAGS surveys were completed consistent with current guidance? (see notes in attached Word doc for summary, or let me know if you need the survey reports; also available in ASC Exhibit P Attachment P-1 here: https://www.oregon.gov/energy/facilities-safety/facilities/Facility%20Exhibits/SSP/2024-05-16-SSPAPPDoc25-16-ASC-Exhibit-P-Fish-and-Wildlife.pdf
  The survey protocol was within an appropriate time frame and buffer and as written are consistent with current guidance. The only concern I had was the 31 acres of unsurveyed property, but that was surveyed to protocol on the same year for a separate project (see below).
- WAGS surveys were completed in 2022; the validity of the surveys will expire in 2025; does ODFW consider preconstruction protocol surveys necessary to verify if WAGS are present within the site boundary or because there were no detections in 2022, are further survey efforts unnecessary? No surveys would be necessary within 3 years, outside of that timeframe I would recommend resurveying for WGS because there are historical observations in proximity and the project area has connectivity to other suitable habitat. There are some areas within the project boundary that have limited connectivity that could be excluded from future surveys, but I would like to review those in detail to ensure that there was no possible movement corridors for WGS.
- The 2022 WAGS surveys did not include 31 acres of potentially suitable habitat due to access restrictions. During review of the preliminary ASC, ODOE and ODFW expressed concerns about the omission of these acres from current/future survey. ODOE and ODFW requested additional information to support the conclusion that these acres were unlikely suitable habitat, to which the applicant responded, “In an email dated December 13, 2023 Lindsay Somers/ODFW confirmed that ODFW no longer has concerns about WAGS presence in the indicated area.” Could you forward that email/and or provide basis for ODFW’s position? I forwarded the email chain to you all, the area was surveyed to protocol in 2022 for the B2H project. Would you like a map of the B2H survey area overlap? Or is that sufficient?

Let me know if you need anything else on this,

Lindsay

From: ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>
Sent: Tuesday, June 18, 2024 5:56 AM
To: SOMERS Lindsay N * ODFW <Lindsay.N.Somers@odfw.oregon.gov>; THOMPSON Jeremy L * ODFW <Jeremy.L.THOMPSON@odfw.oregon.gov>
Cc: WOODS Ash * ODOE <ash.woods@energy.oregon.gov>; CLARK Christopher * ODOE

<Christopher.CLARK@energy.oregon.gov>
Subject: ODOE:ODFW Coord on SSP T&E Wildlife (WAGS)

Hi Lindsay and Jeremy,

In our efforts to consult on potential impacts to WAGS from the construction/operation of the proposed Sunstone Solar Project, we are seeking input on the following questions:

- Does ODFW concur that the 2022 WAGS surveys were completed consistent with current guidance? (see notes in attached Word doc for summary, or let me know if you need the survey reports; also available in ASC Exhibit P Attachment P-1 here: https://www.oregon.gov/energy/facilities-safety/facilities/Facility%20Exhibits/SSP/2024-05-16-SSPAPPDoc25-16-ASC-Exhibit-P-Fish-and-Wildlife.pdf
- WAGS surveys were completed in 2022; the validity of the surveys will expire in 2025; does ODFW consider preconstruction protocol surveys necessary to verify if WAGS are present within the site boundary or because there were no detections in 2022, are further survey efforts unnecessary?
- The 2022 WAGS surveys did not include 31 acres of potentially suitable habitat due to access restrictions. During review of the preliminary ASC, ODOE and ODFW expressed concerns about the omission of these acres from current/future survey. ODOE and ODFW requested additional information to support the conclusion that these acres were unlikely suitable habitat, to which the applicant responded, "In an email dated December 13, 2023 Lindsay Somers/ODFW confirmed that ODFW no longer has concerns about WAGS presence in the indicated area." Could you forward that email/and or provide basis for ODFW's position?

Please see attached consultation outline with key facts regarding survey area, survey/survey results and questions. Also attached is the WAGS survey area map.

Please feel free to respond via email or you can modify the attached consultation notes summary with your comments and/or any additional condition related requests related to WAGS.

Thanks,
Sarah

OREGON DEPARTMENT OF ENERGY

Sarah T. Esterson
Senior Policy Advisor
550 Capitol St. NE | Salem, OR 97301
P: 971-239-7087
1-800-221-8035
Stay connected!

ESTERSON Sarah * ODOE

From: Sarah.ESTERSON@energy.oregon.gov
Subject: Sunstone_WGS

From: SOMERS Lindsay N * ODFW <Lindsay.N.SOMERS@odfw.oregon.gov>
Sent: Tuesday, June 18, 2024 11:12 AM
To: ESTERSON Sarah * ODOE <Sarah.ESTERSON@energy.oregon.gov>
Cc: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>; WOODS Ash * ODOE <ash.woods@energy.oregon.gov>; THOMPSON Jeremy L * ODFW <Jeremy.L.THOMPSON@odfw.oregon.gov>
Subject: FW: Sunstone_WGS

Hi Sarah,

I have attached the email you requested regarding WGS and sunstone. We talked about the area during a call with Tetra tech and ODOE in December, Amy had mentioned during the meeting that Tetratech had been surveying in the area in 2022 and I confirmed. The area that was not surveyed for the sunstone project was surveyed as part of the B2H project in 2022 and no WGS were found.
I will respond to your other questions within the original email chain.

Lindsay

From: SOMERS Lindsay N * ODFW
Sent: Wednesday, December 13, 2023 3:07 PM
To: Bensted, Amy <Amy.Bensted@tetratech.com>
Cc: CLARK Christopher * ODOE <Christopher.CLARK@energy.oregon.gov>; CHERRY Steve P * ODFW <Steve.P.CHERRY@odfw.oregon.gov>
Subject: Sunstone_WGS

Hi Amy,

I checked the 2022 B2H surveys adjacent to the sunstone project boundary, and there are no concerns with potential impacts to WGS with the current sunstone facility design.

We do use both Rejuvra and Imazapic on our wildlife areas and have several years of monitoring data to help guide both use and success criteria, but this is for areas with different precipitation and soils. We don't typically use Rejuvra on sites that have <50% perennial cover because it can create a moonscape of bare soil for several years until perennial grass repopulates.
Imazapic does not have a residual, so the effects are shorter lived, but reseeding can be done in a shorter time frame. Imazapic in the basin was evaluated in the fall of 2021, and there was a 15% decrease in annual grass cover the first summer post treatment (Gianella 2023).

I will get some more information for you,

Lindsay

Lindsay Somers
Habitat Biologist-John Day Watershed
Oregon Department of Fish and Wildlife
73471 Mytinger Ln

Pendleton, OR 97801
Office: 541-388-6294
Cell: 541-314-1236

HISTORICAL RESEARCH ASSOCIATES, INC.

MEMORANDUM

To:	Ian Johnson and John Pouley, Oregon State Historic Preservation Office, Department of Parks and Recreation
CC:	Kathleen Sloan, Oregon Department of Energy Jennifer Casler, Haley & Aldrich
From:	Bradley Bowden and Natalie K. Perrin, Historical Research Associates, Inc.
Subject:	Sunstone Solar Project, Cultural Resources Review
Date:	July 9, 2024

Introduction

Pine Gate Renewables (Applicant) proposes to construct and construct and operate the Sunstone Solar Project (Facility), a solar energy generation facility and related or supporting facilities in Morrow County, Oregon. Prior to construction, the Applicant must receive a site certificate from the Energy Facility Siting Council (EFSC or the Council), and they have submitted to the Oregon Department of Energy (ODOE) a Preliminary Application for Site Certificate (pASC), which seeks authorization for project features within Oregon in accordance with the EFSC process. The Applicant has specifically submitted Exhibit S and its confidential attachments to the ODOE, and ODOE has requested that Historical Research Associates, Inc. (HRA), review these materials.

Regulatory Requirements

Oregon Administrative Rules (OAR) 345-021-0010(s) requires the Applicant to provide evidence of:

A. Historic and cultural resources within the analysis area that have been listed, or would likely be eligible for listing, in the National Register of Historic Places (NRHP).

B. For private lands, archaeological objects, as defined in Oregon Revised Statutes (ORS) 358.905(1)(a), and archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area.

C. For public lands, archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area.

D. The significant potential impacts, if any, of the construction, operation, and retirement of the proposed facility on the resources described in paragraphs (A), (B), and (C) and a plan for protection of those resources that includes at least the following:

   i. A description of any identification measures, such as surveys, inventories, and limited subsurface testing work, recommended by the State Historical Preservation Office (SHPO) or the National Park Service (NPS) of the U.S. Department of the Interior for the purpose of locating, identifying, and assessing the significance of resources listed in paragraphs (A), (B), and (C).

ii. The results of the identification measures described in subparagraph (i), together with an explanation by the Applicant of any variations from the survey, inventory, or testing recommended.

iii. A list of measures to prevent destruction of the resources identified during surveys, inventories, and subsurface testing referred to in subparagraph (i) or identified during construction.

E. The Applicant's proposed monitoring program, if any, for impacts to historic, cultural, and archaeological resources during construction and operation of the proposed facility.

As noted in OAR 345-022-0090, with certain exceptions, in order to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:

a) Historic, cultural, or archaeological resources that have been listed, or would likely be listed, in the NRHP;

b) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in ORS 358.905(1)(c); and

c) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).

The Council may issue a site certificate for a facility that would produce power from wind, solar, or geothermal energy without making the findings described above. However, the Council may impose conditions on a site certificate issued for such a facility.

Completeness Review

In support of the completeness review, HRA identified the following items for consideration.

Exhibit S

- Exhibit S does not include Figure S-1, the analysis areas. While it is included in Figure S-2, which also shows cultural resources, there should also be a public version of the analysis areas that accompanies Exhibit S.
- Section 5 should discuss the monitoring plan referenced in Section 4.4.
- Two of the isolated resources recorded during the survey would now be considered archaeological sites based on SHPO guidance as of July 1, 2023. The survey was completed prior to this guidance, but Exhibit S was completed and submitted after. As such, Exhibit S should state that there are 10 sites and 1 isolate in the direct analysis area and explain that two of these were recorded as isolates based on SHPO guidance at that time. This does not affect the results, since EFSC guidance treats sites and objects on private lands the same.
- Throughout Exhibit S, in the analysis of built/architectural resources, the term *site* is used seemingly erroneously, as it is not the NPS's NRHP definition/classification of *site*, nor is it an *archaeological site* as defined in ORS 358.905. This is a semantics issue, not a salient one, though it could lead to confusion as to what types of cultural resources are being discussed. This is also true for the use of the word *historic*, which, as a general rule, means "listed in or eligible for listing in the NRHP." I believe the intent here and throughout the text is "historic-era," which is (sometimes) utilized in the technical report (Attachment S-1).

Attachment S-1

- As with Exhibit S, throughout Attachment S-1, the terms *site* and *historic* are used seemingly erroneously as pertains to built/architectural resources. However, this does not limit the report's completeness.
- Site EO-MK-03 appears to be an isolate/object according to SHPO's Reporting Guidelines. It is not a feature; it is a historic object (machinery-farm equipment) per Appendix C: Site Type Table. Additionally, in the NRHP evaluation on page 6-29, in the evaluation under Criterion C, the report erroneously states that the site is the remnants of a destroyed building and standard grain processor.
- Section 6.8.6, Historic(-era) Site ES-KB-06 neglects to consider the resources as being eligible under Criterion C as typical examples of a type, period, and method of construction, that of ca. 1960s prefabricated Butler/Arco buildings. However, HRA generally concurs that the resources are not eligible because they were ubiquitous prefabricated storage buildings. There is also a typo on page 6-31, in that the third paragraph repeats much of the second paragraph and can be eliminated.
- Section 6.8.7, Historic(-era) Site ES-KB-07, notes that both the house and the second storage building were "constructed between 1971 and 1981, meaning that it is less than 50 years old and not historic." As the survey was conducted in 2022, anything constructed in 1972 or earlier should have been assessed as a potential historic property within the NRHP's general 50-year threshold for eligibility. Also in this section, there is conflicting information as to if the potentially eligible Quonset Hut was moved. This is relevant, as the evaluation purports that the resource "retains all seven aspects of integrity." However, if it was moved, it would no longer retain integrity of location. Further, as the resource is no longer associated with the military, regardless of its original location, it would also no longer retain integrity of association and, arguably, feeling. HRA does not concur that the subject Quonset Hut is individually eligible for listing.
- It is unclear why this Quonset Hut at Historic(-era) Site ES-KB-07 was specifically assessed as eligible, when those at Sites ES-KB-06 and ES-KB-12 were dismissed without further consideration. However, HRA generally concurs the resources are not eligible because the subject examples are ubiquitous prefabricated storage buildings that lack sufficient significance or integrity.
- In Section 7.1, the possibility of a district associated with the Doherty family seems to be limited to archaeological sites only. A potential district should consider the aboveground structures as well. However, HRA concurs with the conclusion that the resources associated with the Doherty family are unlikely to be a NRHP-eligible historic district.

Compliance Review

OAR 345-022-0090 states that, except for certain facility types including wind, solar, geothermal, and certain special criteria facilities under OAR 345-015-0310, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:

- Historic, cultural or archaeological resources that have been listed in, or would likely be listed in the NRHP;
- For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in 358.905(1)(c); and
- For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).

The Council may issue a site certificate for a facility that would produce power from wind, solar, or geothermal energy or for special criteria facilities under OAR 345-015-0310 without making these findings; however, the Council may apply the requirements to impose conditions on a site certificate issued for such a facility.

HRA finds that Exhibit S and the associated survey report meet Oregon SHPO guidelines for survey and reporting, provided that the issues discussed in the completeness review are resolved.

Conclusion

HRA has reviewed the Applicant's Exhibit S and associated cultural resources report for completeness and compliance in accordance with the EFSC process (OAR 345-021-0010[s] and OAR 345-022-0090). HRA concurs that the identified archaeological isolates and sites are not eligible for listing in the NRHP; thus, impacts to these resources will not be significant adverse impacts; and that no mitigation is needed. HRA further concurs that the 14 historic-period architectural resources (historic resources per OAR 345-022-0090) recommended not eligible for listing in the NRHP are not eligible and thus any impacts on them would not be significant adverse impacts. HRA further concurs that historic resource ES-KB-03 is eligible for listing in the NRHP and, provided that it is avoided and that topography will prevent visibility, there will be no significant adverse impacts to this resource as concluded in Exhibit S. HRA does not concur and recommends ES-KB-07 not eligible for the NRHP; thus, the project will not result in a significant adverse impact to ES-KB-07. Finally, HRA agrees that significant adverse impacts to the two HPRCSITs are likely, but that those impacts can be mitigated as described in Exhibit S.

Provided that all appropriate mitigation measures are enacted in regards to the two HPRCSITs, HRA recommends that the Council should find that, taking into account mitigation, the construction and operation of the Facility will not likely result in significant adverse impacts to historic, cultural, or archaeological resources per OAR 345-022-0090.

References

Rooke, Lara, Kaley Brown, Jessie McCaig, and Brady Berger
2023 *Draft Final Cultural Resources Pedestrian Survey Report Echo Solar Project, Morrow County, Oregon*. Tetra Tech, Portland, Oregon. Submitted to Pine Gate Renewables, Asheville, North Carolina. On file at the ODOE, Salem.

Tetra Tech
2024 *Exhibit S Historic, Cultural, and Archaeological Resources Sunstone Solar Project*. Submitted to Pine Gate Renewables, Asheville, North Carolina. On file at the ODOE, Salem.

Attachment C: Draft Proposed Order Index/Comments (placeholder)

Attachment D: Draft Fugitive Dust Control Plan

Sunstone Solar Project

Draft Fugitive Dust Control Plan

Prepared for

Sunstone Solar, LLC

Prepared by

Tetra Tech, Inc.

November 2023

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Table of Contents

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List of Attachments

1.0 Introduction

This Fugitive Dust Control Plan (Plan) has been developed by Sunstone Solar, LLC (Sunstone Solar), a subsidiary of Pine Gate Renewables, LLC, for the proposed Sunstone Solar Project (Facility) in Morrow County, Oregon (Figure 1). The purpose of this Plan is to reduce fugitive dust emissions associated with construction-related activities of a photovoltaic energy generation facility with up to 1,200 megawatts (MW) alternating current and related or supporting facilities, as well as a 1,200 MW distributed battery energy storage system. The majority of the site consists of a mix of fallow fields and fields in small grain production, primarily dryland wheat; no farmlands within the site boundary receive irrigation (the application of water to land for purposes of growing agricultural products; Sunstone Solar 2023a). This Plan summarizes the sources of and regulatory issues that relate to fugitive dust emissions; identifies responsibilities, monitoring, and training; and provides reasonable available control methods for fugitive dust in a table for easy reference in the field (Attachment 1).

This is an owner-imposed Plan that is expected to be implemented, maintained, and adaptively managed by the selected contractor throughout all phases of construction. The performance criteria and suggested measures identified in this Plan are minimums, and the contractor is expected to identify and implement additional measures as needed to fully meet all regulatory and public safety performance criteria. As identified in this Plan, the contractor may propose alternative approaches for consideration by the owner.

1.1 Fugitive Dust Sources

The Natural Resources Conservation Service (NRCS) Web Soil Survey identified 13 major soil types within the project area (NRCS 2023; see Sunstone Solar 2023b). Approximately 64 percent of the site is composed of Warden silt loam (Sunstone Solar 2023a), which is moderately or severely susceptible to erosion from ground disturbance, wind, and vehicle traffic on unpaved roads due to its composition of hemic organic soil materials and very fine sand (Sunstone Solar 2023b; NRCS 2011). Additionally, 20 percent of the site is composed of Ritzville silt loam, which is also moderately or severely susceptible to erosion from ground disturbance, wind, and vehicle traffic due to its composition of silt and fibric organic material (Sunstone Solar 2023b; NRCS 2011). Due to their composition, the retention of moisture in these sediments is thus restricted. Furthermore, these sediment particles have a low resistance to dust propagation and would be transported or drift to adjacent lands due to the lack of water through irrigation; thus, these soils are considered at high risk for fugitive dust.

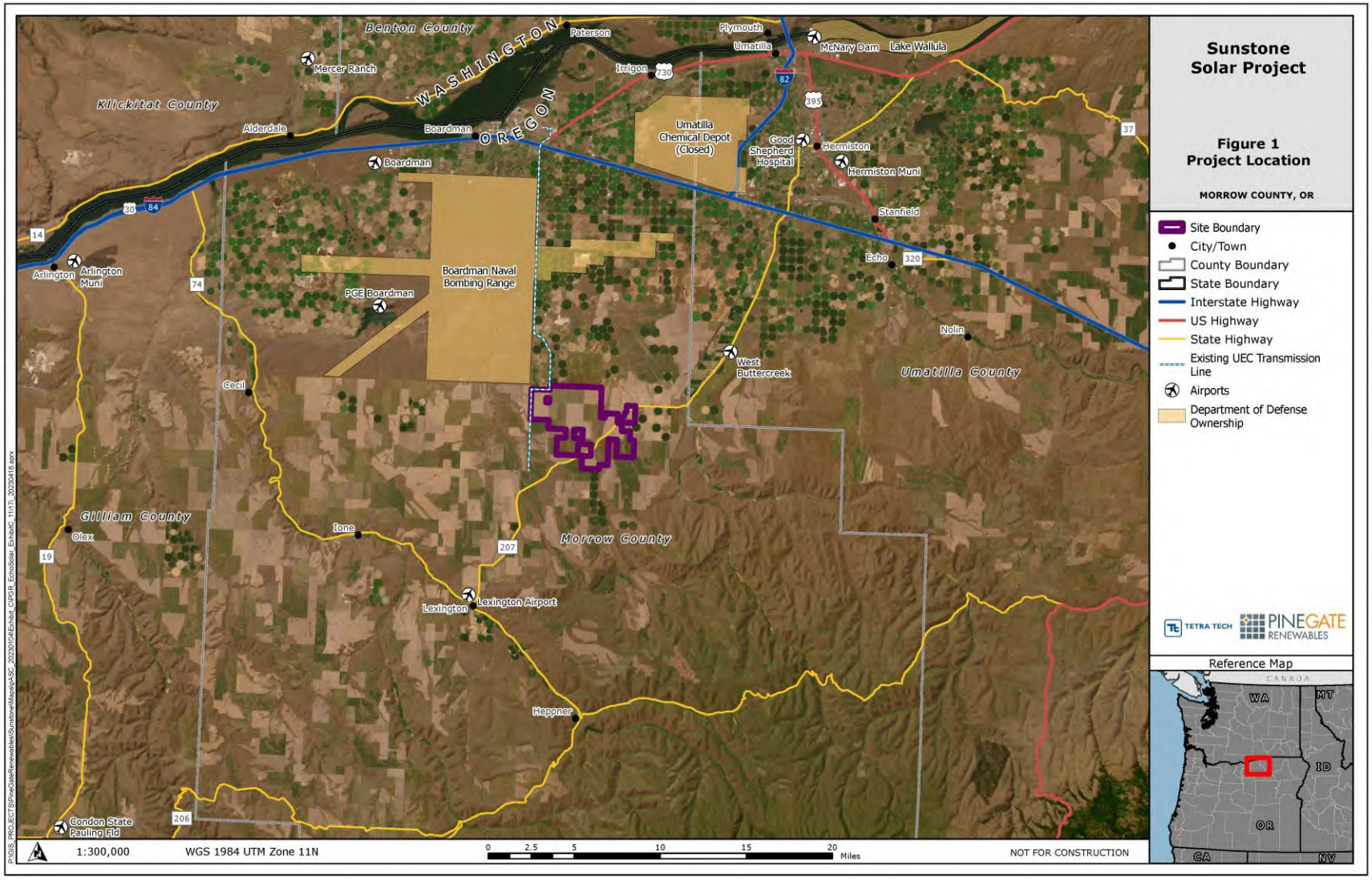

Figure 1. Project Location

Fugitive dust can arise from a variety of construction and operational activities associated with solar development. The sources can be grouped into three general categories: dust created from ground-disturbing activities such as clearing and grading, dust created from wind action on bare soils and stockpiles such as those not fully stabilized post-construction with either vegetation or a tackifier, and dust created from traffic on unpaved roads. Sediment is the basis for fugitive dust, meaning that sediment particles can become fugitive dust if they are windborne. Therefore, the thresholds for treating sediment and erosion on the site will be similar if not the same as the thresholds for treating fugitive dust. Maintaining existing vegetation and root systems is the single most effective method for avoiding fugitive dust and sediment. Where existing vegetation and root systems are disturbed, quickly reestablishing vegetation is critical.

1.2 Regulatory Compliance

Fugitive dust is a source of particulate matter with a mean diameter less than 10 microns (PM_{10}) which is one of the seven air pollutants the U.S. Environmental Protection Agency (EPA) regulates under the National Ambient Air Quality Standards (NAAQS). To a lesser extent, fugitive dust is a source of particulate matter with a mean diameter less than 2.5 microns ($PM_{2.5}$), which has proposed regulations pending under NAAQS. These soil particles are very small, can remain suspended in the air for long periods of time, and are easily inhaled into the lungs. Increased risks of death and disease have been linked to periods of high outdoor PM_{10} and $PM_{2.5}$ concentrations. These fine particles can potentially be lifted thousands of feet into the atmosphere and transported across continents and oceans creating global health, ecological, and climate change impacts.

The EPA shares responsibility with the Oregon Department of Environmental Quality (ODEQ) for the implementation of Clean Air Act (CAA) criteria in Oregon. ODEQ implements the CAA rules under the EPA-approved Oregon Administrative Rules (Chapter 340, Division 21 General Emission Standards for Particulate Matter). Fugitive dust is the primary concern related to the CAA at the Project. Fugitive dust is defined by ODEQ as dust that visibly leaves the project site for a period of more than **18 seconds in a 6-minute period,** determined by the attached EPA Method 22 (ODEQ 2019) at the downwind property boundary (Oregon Administrative Rules [OAR] 340-208-0210 (2)-a and -b).

The ODEQ Rule 340-208-0210 contains the following requirements for fugitive dust:

- Reasonable precautions must be taken to prevent particulate matter from becoming airborne. This includes, but is not limited to, the use of water or other chemicals to control dust during construction, on unpaved roads, and during the transport of materials; enclosure of materials stockpiles and covering of open-body trucks; and prompt removal from paved streets of earth or other material.
- If fugitive dust is discovered, ODEQ may require the Facility to cease work until the fugitive dust emissions are controlled. Emissions are considered controlled when fugitive dust is no longer leaving the Facility site for more than 18 seconds in a 6-minute period.

Further, ODEQ Rule 340-208-0300 specifies that it is prohibited to cause or allow any air contaminants (e.g., fugitive dust) to create a nuisance. If ODEQ determines that a nuisance has been created, the agency may pursue informal or formal enforcement actions to abate the nuisance.

A National Pollutant Discharge Elimination System Construction Stormwater Discharge Permit (Oregon 1200-C Construction Stormwater Permit), pursuant to Oregon Revised Statutes 468.050 and Section 402 of the federal Clean Water Act, will be obtained from ODEQ. This permit requires the permit holder to "Prevent wind-blown soil and dust from areas with exposed soil through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged in stormwater from the site" (Section 2.2.9) and requires permit holders to implement measures including monitoring, record keeping, reporting of exceedances, and installation, maintenance, and adaptive management of best management practices (BMPs) to control both stormwater and fugitive dust discharges. Implementation of these measures is intended to reduce fugitive dust to a negligible impact and ensure compliance with applicable air quality regulations.

The Morrow County Code regulates nuisances through the Oregon State Statute Chapter 203. Controlling fugitive dust emissions is required to avoid creating a public nuisance, which is defined as "any thing, substance, or act that is a threat to the public health, safety or welfare" (Morrow County Code Enforcement Ordinance ORD-2021-4).

2.0 Fugitive Dust Control Plan

2.1 Responsibility

The expectation is that the Contractor will implement and adaptively manage this Plan, controlling fugitive dust emissions and meeting all regulatory and public safety performance criteria throughout construction. As described in Section 1.2 above, the holder of the Oregon 1200-C permit is required to control fugitive dust emissions, including ensuring compliance by all subcontractors and outside service providers.

If Sunstone Solar identifies that the regulatory and public safety performance criteria are not being met, Sunstone Solar will implement enforcement measures, including but not limited to:

- Issuance of a Non-Conformance and/or Non-Compliance Report.
- Contractor to prepare and submit a corrective action plan.
- Contractor to document corrective actions taken and performance criteria met.
- Partial or full stoppage of work on site through activation of shut-down clause in contract.
- At Sunstone Solar's sole discretion, an outside contractor may be contracted to implement corrective actions, to be reimbursed by the Contractor.

Additionally, Sunstone Solar may establish a Community Action Council to create an open and ongoing pathway for communication with stakeholders for the Project, including controlling

fugitive dust emissions and avoiding the creation of nuisances. The Community Action Council could include representatives from the Morrow County Commissioners' Office, Morrow County Planning Department, Oregon Department of Transportation, and neighboring landowners. The Contractor will work with Sunstone Solar to determine whether this Community Action Council will be established, and if so, the details of its establishment.

2.2 Monitoring

As required by the 1200-C permit, the permit holder will perform visual monitoring and recordkeeping by a Certified Erosion and Sediment Control or Storm Water Quality Inspector (inspector). The Contractor's construction site manager and inspector will be responsible for ensuring that the measures in this Plan are implemented, monitored, and adaptively managed, and that any exceedances are immediately reported to Sunstone Solar.

The visual monitoring required by the 1200-C permit must occur at least once every 14 calendar days. However, because OAR 340-208-0210 restricts visible fugitive emissions on a continuous standard to a maximum of 18 seconds in a given 6-minute period, and because fugitive dust emissions may provide an immediate public safety concern in this location, this Plan requires that fugitive dust be monitored and controlled on an ongoing basis.

Monitoring for fugitive dust emissions shall include:

- Use of EPA Method 22 (ODEQ 2019; see Attachment 2) as specified in OAR 340-208-0210, at least once a day.
- The observation shall be performed during times of peak construction activity at the downwind property boundary.
- Recording of observations in a fugitive dust inspection log that is kept on site and shall be available digitally to Sunstone Solar. This log shall include all information required in EPA Method 22 and shall also include photos and/or video taken during the observation period to document conditions.
- Installation and operation of a weather station, recording (at a minimum) wind speed and direction.

Triggers for additional, more frequent monitoring will include:

- Observation of visible fugitive dust emissions by Contractor, agency, or Sunstone Solar staff.
- Request by a member of the Community Action Council established by Sunstone Solar.
- Wind speeds greater than 15 miles per hour.
- Receipt of complaints or concerns through the Project Dust Control Hotline.

2.3 Training

EPA Method 22 (ODEQ 2019) does not require a specific certification, but it is necessary that the person responsible for observations completed for this method be knowledgeable with respect to

the general procedures for determining the presence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. This training is to be obtained from written materials found in the references cited in Method 22 (EPA 2019) or from the lecture portion of the EPA Method 9 certification course. The Contractor shall document in the inspection log how the person responsible for observations meets this requirement.

Construction workers will attend a Worker Environmental Awareness Program training prior to conducting construction activities. This training will include a summary of fugitive dust control measures included in this Plan and the responsibilities of personnel working on the Facility related to fugitive dust control.

2.4 Fugitive Dust Prevention and Management

This document and the attached table are intended to provide guidance to construction personnel on measures intended to minimize impacts and control fugitive dust emissions during construction. It is the responsibility of the Contractor to monitor and adaptively manage the site to maintain compliance with all local, state, and federal requirements. Additionally, this Plan is supplemental to the Contractor's Erosion and Sediment Control Plan and does not substitute for any requirements of ODEQ or other agencies.

This Plan is performance-based. As shown in the flow chart in Figure 2, if fugitive dust emissions in excess of the ODEQ criteria of **18 seconds in a 6-minute period** occur, the Contractor shall:

- Implement adaptive management actions, including altering work operations and/or pause work until the fugitive dust emissions are controlled.
- Document that fugitive dust emissions have been controlled, including monitoring with EPA Method 22.
- In addition to any reporting requirements required in the 1200-C permit, report noncompliance incidents and adaptive management actions taken by Sunstone Solar within 24 hours of occurrence.

The Contractor shall maintain and implement this Plan during all phases of construction. The table in Attachment 1 provides suggested Reasonable Available Control Measures (RACMs) for anticipated fugitive dust sources based on industry-standard BMPs and reasonable precautions specified in the Oregon 1200-C permit, ODEQ's Construction Stormwater Best Management Practices Manual (Manual) (ODEQ 2021), and OAR 340-208-0210. Supplemental RACMs are identified in the table in case initial RACMs are not effective in controlling fugitive dust or are not feasible to implement (Attachment 1).

The Contractor shall identify and implement additional RACMs as needed to control fugitive dust emissions. Additionally, the Contractor may propose alternative approaches and RACMs for controlling fugitive dust. This proposal shall be made in writing and is subject to the approval of Sunstone Solar.

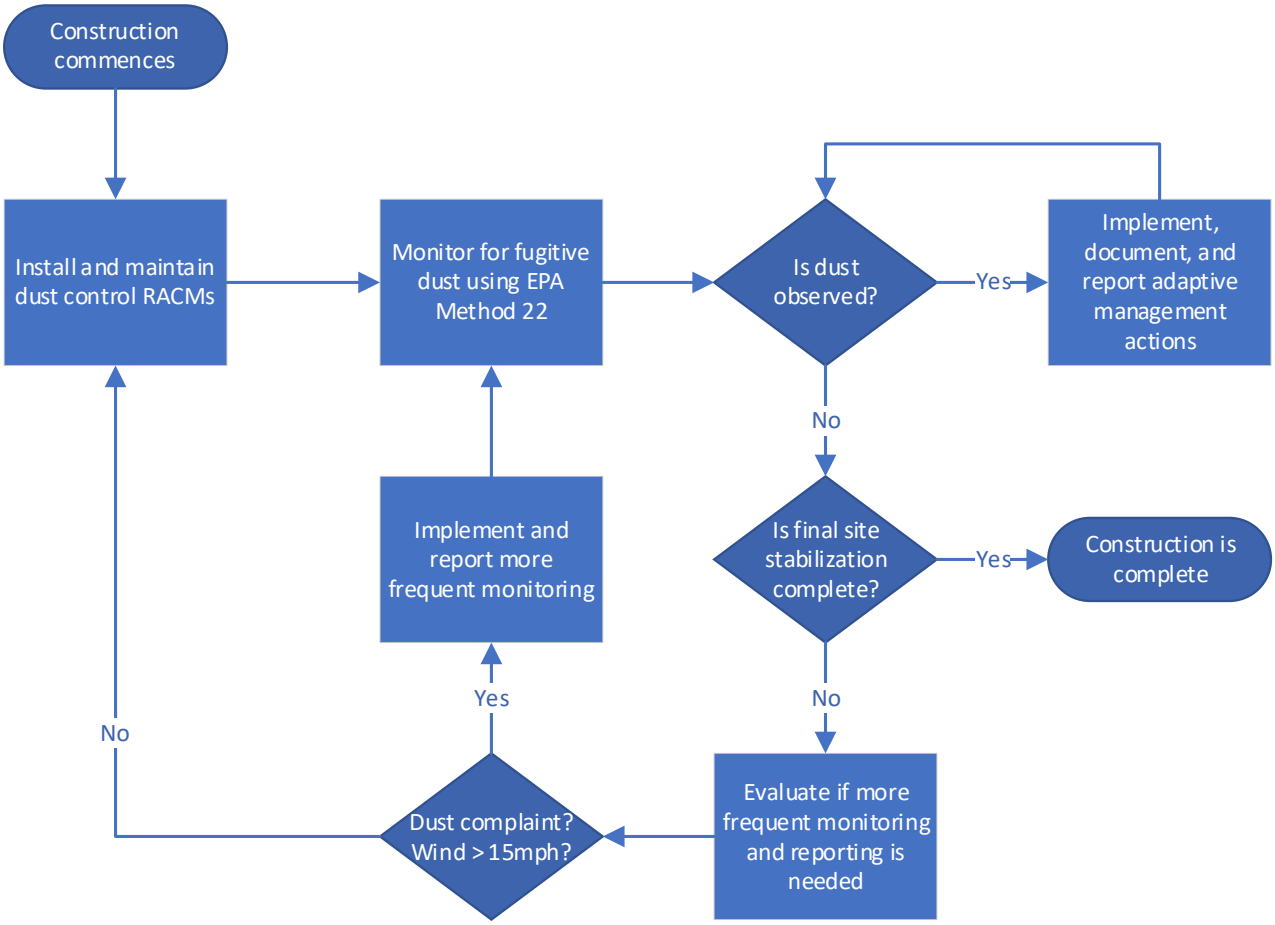

Figure 2. Dust Control Plan Flow Chart

3.0 References

NRSC (Natural Resources Conservation Service). 2011. United States Department of Agriculture, Natural Resources Conservation Service, National Agronomy Manual 190-V-NAM, 4th Edition.

NRCS. 2023. Web Soil Survey. Available online at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed February 2023.

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Attachment 1: Fugitive Dust Sources and Reasonable Available Control Measures

Sunstone Solar: Fugitive Dust Sources and Reasonable Available Control Measures

Construction Phase	RACM(s)	Supplemental RACM(s)
All Phases of Construction	Daily fugitive dust monitoring and record keeping.	Increase frequency of monitoring.
	Prominent display of Dust Control Hotline signs, providing direct access to the Contractor's site manager or inspector.	If established, proactive engagement with Community Action Council.
	If established, Worker Environmental Awareness Program training for all construction employees.	Additional trainings and refreshers for employees.
	Maintain stockpile of BMPs on site, including sufficient palliatives for a single treatment of all site access roads and sufficient palliatives, mulch, and/or hydromulch for a minimum of 25 percent of the total disturbed area, and machinery for application.	Increase stockpile of palliatives, mulch, and/or hydromulch and add additional BMPs.
	Documentation and reporting of adaptive management actions.	Development and submittal of revised Fugitive Dust Control Plan.
Site Access	Install and maintain stabilized construction entrances at ingress/egress locations and restrict traffic to these locations.	Add additional construction entrance BMPs (e.g., wheel wash).
	Daily sweeping up of sediment from paved surfaces utilizing vacuum sweeper with HEPA filtration.	Increase sweeper frequency.
	Access roads shall be graveled.	Road maintenance and reapplication of gravel.
	Access roads will be stabilized with water or palliative sufficient to eliminate visible and sustained dust from vehicular travel and wind erosion. Reapply stabilization as necessary to maintain dust-free condition.	If water is unavailable or ineffective, or if water use is limited by any agency or regulation, access roads will be stabilized with longer-lasting palliatives.
	Restrict construction traffic to established and stabilized access routes.	Install fencing or barricades to prevent traffic outside of established routes.
	Limit traffic speeds to 15 miles per hour on stabilized unpaved roads within the site as long as such speeds do not create significant visible dust emissions. Traffic speed signs shall be displayed prominently at all site entrances and exits.	Limit traffic speeds within the site to 5 or 10 miles per hour.

Construction Phase	RACM(s)	Supplemental RACM(s)
Clearing, Grading, and Unstable Surfaces	Maintain the natural topography and vegetation of the site to the extent possible, including by limited grading and limited establishment of temporary access roads.	Reduce area being actively worked and stabilize unworked areas.
	Phase construction to expose the minimum amount of soil necessary.	Increase construction phasing to further minimize exposed soil.
	Leave existing vegetation intact to the extent possible.	Utilize mowing and rolling techniques to maintain plant root systems for soil stabilization.
	Minimize disturbance areas and soil exposure to the maximum extent feasible.	Limit work to a portion of the disturbed area until all disturbed areas receive temporary or final stabilization.
	When wind speeds exceed 15 miles per hour, minimize new disturbances to the extent possible and/or mobilize additional water trucks or palliatives to minimize fugitive dust from exposed surfaces.	Stop all ground disturbing activities and apply additional dust control measures until measures are effective or wind speeds slow and fugitive emissions stop.
	Separate and cover topsoil.	Increase maintenance frequency for topsoil cover. Combine methods, such as mulch plus tackifier.
	Stabilize exposed soils within the timeframes established in the 1200-C permit. Stabilize exposed soils in stages based on site conditions and weather.	Stabilize exposed soils more frequently, even if additional work is anticipated within the timeframe established in the 1200-C permit. Reapply stabilization measures following any additional disturbances.
	Temporarily stabilize exposed surfaces to prohibit significant and sustained visible fugitive dust from wind erosion. Utilize BMPs such as mulch, hydromulch with or without seeds, tackifier, spreading stone or gravel, and trackwalking.	Combine stabilization methods, such as mulch plus tackifier, or trackwalking plus hydromulch. Increase frequency of maintenance of stabilization.
	Seed exposed surfaces during the appropriate season with approved temporary or permanent seed mixes.	Reapply seed to newly disturbed areas or areas with poor germination. Use temporary seeding even if additional work is anticipated before final stabilization. Use irrigation to enhance seeding success.
	Gate seals should be tight on dump trucks. Soil load shall be kept below 6 inches of the freeboard of the truck. Drop heights shall be minimized when loaders dump soil into trucks.	Cover haul trucks with a tarp or other suitable cover.

Attachment 2: EPA Method 22

Appendix 2: EPA Method 22

State of Oregon Department of Environmental Quality

OAR 340-208-0210
EPA Method 22

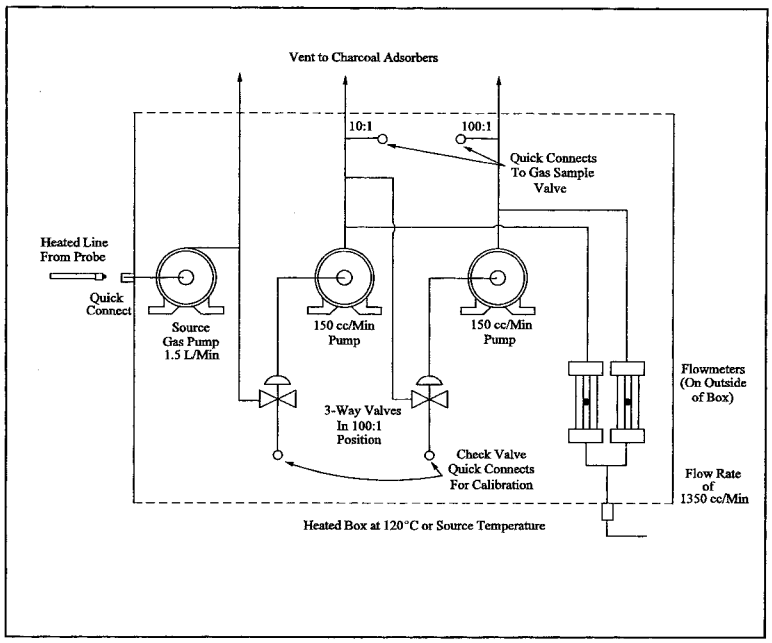

Figure 18-13. Schematic Diagram of the Heated Box Required for Dilution of Sample Gas.

GASEOUS ORGANIC SAMPLING AND ANALYSIS CHECK LIST

[Respond with initials or number as appropriate]

1. Presurvey data:		
A. Grab sample collected	☐	_____
B. Grab sample analyzed for composition	☐	_____
Method GC	☐	_____
GC/MS	☐	_____
Other	☐	_____
C. GC-FID analysis performed	☐	_____
2. Laboratory calibration data:		
A. Calibration curves prepared	☐	_____
Number of components	☐	_____
Number of concentrations/component (3 required).	☐	_____
B. Audit samples (optional):		
Analysis completed	☐	_____
Verified for concentration	☐	_____
OK obtained for field work	☐	_____
3. Sampling procedures:		
A. Method:		
Bag sample	☐	_____
Direct interface	☐	_____
Dilution interface	☐	_____
B. Number of samples collected	☐	_____
4. Field Analysis:		
A. Total hydrocarbon analysis performed	☐	_____
B. Calibration curve prepared	☐	_____
Number of components	☐	_____
Number of concentrations per component (3 required).	☐	_____

Gaseous Organic Sampling and Analysis Data

Date _____
Location _____

Plant _____

GASEOUS ORGANIC SAMPLING AND ANALYSIS CHECK LIST (RESPOND WITH INITIALS OR NUMBER AS APPROPRIATE)

	Date
1. Pre-survey data	
A. Grab sample collected	_____
B. Grab sample analyzed for composition	_____
Method GC	_____
GC/MS	_____
Other_____	_____
C. GC–FID analysis performed	_____
2. Laboratory calibration curves prepared	_____
A. Number of components	_____
B. Number of concentrations per component (3 required)	_____
C. OK obtained for field work	_____
3. Sampling procedures.	
A. Method.	
Bag sample	_____
Direct interface	_____
Dilution interface	_____
B. Number of samples collected	_____
4. Field Analysis.	
A. Total hydrocarbon analysis performed	_____
B. Calibration curve prepared	_____
Number of components	_____
Number of concentrations per component (3 required)	_____

Figure 18–14. Sampling and Analysis Sheet

[36 FR 24877, Dec. 23, 1971]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting appendix A–6 to part 60, see the List of CFR sections Affected, which appears in the Finding Aids section of the printed volume and at *www.fdsys.gov*.

APPENDIX A–7 TO PART 60—TEST METHODS 19 THROUGH 25E

Method 19—Determination of sulfur dioxide removal efficiency and particulate, sulfur dioxide and nitrogen oxides emission rates

Method 20—Determination of nitrogen oxides, sulfur dioxide, and diluent emissions from stationary gas turbines

Method 21—Determination of volatile organic compound leaks

Method 22—Visual determination of fugitive emissions from material sources and smoke emissions from flares

Method 23—Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans From Stationary Sources

Method 24—Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings

Method 24A—Determination of volatile matter content and density of printing inks and related coatings

Method 25—Determination of total gaseous nonmethane organic emissions as carbon

Method 25A—Determination of total gaseous organic concentration using a flame ionization analyzer

Method 25B—Determination of total gaseous organic concentration using a nondispersive infrared analyzer

Method 25C—Determination of nonmethane organic compounds (NMOC) in MSW landfill gases

Method 25D—Determination of the Volatile Organic Concentration of Waste Samples

Method 25E—Determination of Vapor Phase Organic Concentration in Waste Samples

The test methods in this appendix are referred to in §60.8 (Performance Tests) and §60.11 (Compliance With Standards and Maintenance Requirements) of 40 CFR part 60, subpart A (General Provisions). Specific uses of these test methods are described in the standards of performance contained in the subparts, beginning with Subpart D.

Within each standard of performance, a section title ''Test Methods and Procedures'' is provided to: (1) Identify the test methods to be used as reference methods to the facility subject to the respective standard and (2) identify any special instructions or conditions to be followed when applying a method to the respective facility. Such instructions (for example, establish sampling rates, volumes, or temperatures) are to be used either in addition to, or as a substitute for procedures in a test method. Similarly, for sources subject to emission monitoring requirements, specific instructions pertaining to any use of a test method as a reference method are provided in the subpart or in Appendix B.

Inclusion of methods in this appendix is not intended as an endorsement or denial of their applicability to sources that are not subject to standards of performance. The methods are potentially applicable to other sources; however, applicability should be confirmed by careful and appropriate evaluation of the conditions prevalent at such sources.

The approach followed in the formulation of the test methods involves specifications for equipment, procedures, and performance. In concept, a performance specification approach would be preferable in all methods because this allows the greatest flexibility to the user. In practice, however, this approach is impractical in most cases because performance specifications cannot be established. Most of the methods described herein, therefore, involve specific equipment specifications and procedures, and only a few methods in this appendix rely on performance criteria.

Minor changes in the test methods should not necessarily affect the validity of the results and it is recognized that alternative and equivalent methods exist. section 60.8 provides authority for the Administrator to specify or approve (1) equivalent methods, (2) alternative methods, and (3) minor changes in the methodology of the test methods. It should be clearly understood that unless otherwise identified all such methods and changes must have prior approval of the Administrator. An owner employing such methods or deviations from the test methods without obtaining prior approval does so at the risk of subsequent disapproval and retesting with approved methods.

Within the test methods, certain specific equipment or procedures are recognized as being acceptable or potentially acceptable and are specifically identified in the methods. The items identified as acceptable options may be used without approval but must be identified in the test report. The potentially approvable options are cited as ''subject to the approval of the Administrator'' or as ''or equivalent.'' Such potentially approvable techniques or alternatives may be used at the discretion of the owner without prior approval. However, detailed descriptions for applying these potentially approvable techniques or alternatives are not provided in the test methods. Also, the potentially approvable options are not necessarily acceptable in all applications. Therefore, an owner electing to use such potentially approvable techniques or alternatives is responsible for: (1) assuring that the techniques or alternatives are in fact applicable and are properly executed; (2) including a written description of the alternative method in the test report (the written method must be clear and must be capable of being performed without additional instruction, and the degree of detail should be similar to the detail contained in the test methods); and (3) providing any rationale or supporting data necessary to show the validity of the alternative in the particular application. Failure to meet these requirements can result in the Administrator's disapproval of the alternative.

Method 19—Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxide Emission Rates

1.0 Scope and Application

1.1 Analytes. This method provides data reduction procedures relating to the following pollutants, but does not include any sample collection or analysis procedures.

Analyte	CAS No.	Sensitivity
Nitrogen oxides (NO_X), including:		
Nitric oxide (NO)	10102–43–9	N/A
Nitrogen dioxide (NO_2)	10102–44–0.	
Particulate matter (PM)	None assigned	N/A
Sulfur dioxide (SO_2)	7499–09–05	N/A

1.2 Applicability. Where specified by an applicable subpart of the regulations, this method is applicable for the determination of (a) PM, SO_2, and NO_X emission rates; (b) sulfur removal efficiencies of fuel pretreatment and SO_2 control devices; and (c) overall reduction of potential SO_2 emissions.

2.0 Summary of Method

2.1 Emission Rates. Oxygen (O_2) or carbon dioxide (CO_2) concentrations and appropriate F factors (ratios of combustion gas volumes to heat inputs) are used to calculate pollutant emission rates from pollutant concentrations.

2.2 Sulfur Reduction Efficiency and SO_2 Removal Efficiency. An overall SO_2 emission reduction efficiency is computed from the efficiency of fuel pretreatment systems, where applicable, and the efficiency of SO_2 control devices.

2.2.1 The sulfur removal efficiency of a fuel pretreatment system is determined by fuel sampling and analysis of the sulfur and heat contents of the fuel before and after the pretreatment system.

2.2.2 The SO_2 removal efficiency of a control device is determined by measuring the SO_2 rates before and after the control device.

2.2.2.1 The inlet rates to SO_2 control systems (or, when SO_2 control systems are not used, SO_2 emission rates to the atmosphere) are determined by fuel sampling and analysis.

3.0 Definitions [Reserved]

4.0 Interferences [Reserved]

5.0 Safety [Reserved]

6.0 Equipment and Supplies [Reserved]

7.0 Reagents and Standards [Reserved]

8.0 Sample Collection, Preservation, Storage, and Transport [Reserved]

9.0 Quality Control [Reserved]

10.0 Calibration and Standardization [Reserved]

11.0 Analytical Procedures [Reserved]

12.0 Data Analysis and Calculations

12.1 Nomenclature

B_{wa} = Moisture fraction of ambient air, percent.

B_{ws} = Moisture fraction of effluent gas, percent.

%C = Concentration of carbon from an ultimate analysis of fuel, weight percent.

C_d = Pollutant concentration, dry basis, ng/scm (lb/scf)

$\%CO_{2d}$,$\%CO_{2w}$ = Concentration of carbon dioxide on a dry and wet basis, respectively, percent.

C_w = Pollutant concentration, wet basis, ng/scm (lb/scf).

D = Number of sampling periods during the performance test period.

E = Pollutant emission rate, ng/J (lb/million Btu).

E_a = Average pollutant rate for the specified performance test period, ng/J (lb/million Btu).

E_{ao}, E_{ai} = Average pollutant rate of the control device, outlet and inlet, respectively, for the performance test period, ng/J (lb/million Btu).

E_{bi} = Pollutant rate from the steam generating unit, ng/J (lb/million Btu)

E_{bo} = Pollutant emission rate from the steam generating unit, ng/J (lb/million Btu).

E_{ci} = Pollutant rate in combined effluent, ng/J (lb/million Btu).

E_{co} = Pollutant emission rate in combined effluent, ng/J (lb/million Btu).

E_d = Average pollutant rate for each sampling period (*e.g.*, 24-hr Method 6B sample or 24-hr fuel sample) or for each fuel lot (*e.g.*, amount of fuel bunkered), ng/J (lb/million Btu).

E_{di} = Average inlet SO_2 rate for each sampling period d, ng/J (lb/million Btu)

E_g = Pollutant rate from gas turbine, ng/J (lb/million Btu).

E_{ga} = Daily geometric average pollutant rate, ng/J (lbs/million Btu) or ppm corrected to 7 percent O_2.

E_{jo},E_{ji} = Matched pair hourly arithmetic average pollutant rate, outlet and inlet, respectively, ng/J (lb/million Btu) or ppm corrected to 7 percent O_2.

E_h = Hourly average pollutant, ng/J (lb/million Btu).

E_{hj} = Hourly arithmetic average pollutant rate for hour ''j,'' ng/J (lb/million Btu) or ppm corrected to 7 percent O_2.

EXP = Natural logarithmic base (2.718) raised to the value enclosed by brackets.

F_d, F_w, F_c = Volumes of combustion components per unit of heat content, scm/J (scf/million Btu).

GCV = Gross calorific value of the fuel consistent with the ultimate analysis, kJ/kg (Btu/lb).

GCV_p, GCV_r = Gross calorific value for the product and raw fuel lots, respectively, dry basis, kJ/kg (Btu/lb).

%H = Concentration of hydrogen from an ultimate analysis of fuel, weight percent.

H = Total number of operating hours for which pollutant rates are determined in the performance test period.

H_b = Heat input rate to the steam generating unit from fuels fired in the steam generating unit, J/hr (million Btu/hr).

H_g = Heat input rate to gas turbine from all fuels fired in the gas turbine, J/hr (million Btu/hr).

$\%H_2O$ = Concentration of water from an ultimate analysis of fuel, weight percent.
H_r = Total numbers of hours in the performance test period (*e.g.*, 720 hours for 30-day performance test period).
K = Conversion factor, 10^{-5} (kJ/J)/(%) [10^6 Btu/million Btu].
K_c = (9.57 scm/kg)/% [(1.53 scf/lb)/%].
K_{cc} = (2.0 scm/kg)/% [(0.321 scf/lb)/%].
K_{hd} = (22.7 scm/kg)/% [(3.64 scf/lb)/%].
K_{hw} = (34.74 scm/kg)/% [(5.57 scf/lb)/%].
K_n = (0.86 scm/kg)/% [(0.14 scf/lb)/%].
K_o = (2.85 scm/kg)/% [(0.46 scf/lb)/%].
K_s = (3.54 scm/kg)/% [(0.57 scf/lb)/%].
K_w = (1.30 scm/kg)/% [(0.21 scf/lb)/%].
ln = Natural log of indicated value.
L_p,L_r = Weight of the product and raw fuel lots, respectively, metric ton (ton).
%N = Concentration of nitrogen from an ultimate analysis of fuel, weight percent.
N = Number of fuel lots during the averaging period.
n = Number of fuels being burned in combination.
n_d = Number of operating hours of the affected facility within the performance test period for each E_d determined.
n_t = Total number of hourly averages for which paired inlet and outlet pollutant rates are available within the 24-hr midnight to midnight daily period.
%O = Concentration of oxygen from an ultimate analysis of fuel, weight percent.
$\%O_{2d}$, $\%O_{2w}$ = Concentration of oxygen on a dry and wet basis, respectively, percent.
P_s = Potential SO_2 emissions, percent.
$\%R_f$ = SO_2 removal efficiency from fuel pretreatment, percent.
$\%R_g$ = SO_2 removal efficiency of the control device, percent.
$\%R_{ga}$ = Daily geometric average percent reduction.
$\%R_o$ = Overall SO_2 reduction, percent.
%S = Sulfur content of as-fired fuel lot, dry basis, weight percent.
S_e = Standard deviation of the hourly average pollutant rates for each performance test period, ng/J (lb/million Btu).
$\%S_f$ = Concentration of sulfur from an ultimate analysis of fuel, weight percent.
S_i = Standard deviation of the hourly average inlet pollutant rates for each performance test period, ng/J (lb/million Btu).
S_o = Standard deviation of the hourly average emission rates for each performance test period, ng/J (lb/million Btu).
$\%S_p$, $\%S_r$ = Sulfur content of the product and raw fuel lots respectively, dry basis, weight percent.
$t_{0.95}$ = Values shown in Table 19–3 for the indicated number of data points n.
X_k = Fraction of total heat input from each type of fuel k.

12.2 Emission Rates of PM, SO_2, and NO_X. Select from the following sections the applicable procedure to compute the PM, S_{O2}, or NO_X emission rate (E) in ng/J (lb/million Btu). The pollutant concentration must be in ng/scm (lb/scf) and the F factor must be in scm/J (scf/million Btu). If the pollutant concentration (C) is not in the appropriate units, use Table 19–1 in section 17.0 to make the proper conversion. An F factor is the ratio of the gas volume of the products of combustion to the heat content of the fuel. The dry F factor (F_d) includes all components of combustion less water, the wet F factor (F_w) includes all components of combustion, and the carbon F factor (F_c) includes only carbon dioxide.

NOTE: Since F_w factors include water resulting only from the combustion of hydrogen in the fuel, the procedures using F_w factors are not applicable for computing E from steam generating units with wet scrubbers or with other processes that add water (*e.g.*, steam injection).

12.2.1 Oxygen-Based F Factor, Dry Basis. When measurements are on a dry basis for both O ($\%O_{2d}$) and pollutant (C_d) concentrations, use the following equation:

$$E = C_d F_d \frac{20.9}{(20.9 - \%O_{2d})} \qquad \text{Eq. 19-1}$$

12.2.2 Oxygen-Based F Factor, Wet Basis. When measurements are on a wet basis for both O_2 ($\%O_{2w}$) and pollutant (C_w) concentrations, use either of the following:

12.2.2.1 If the moisture fraction of ambient air (B_{wa}) is measured:

$$E = C_w F_w \frac{20.9}{\left[20.9(1 - B_{wa}) - \%O_{2w}\right]} \qquad \text{Eq. 19-2}$$

Instead of actual measurement, B_{wa} may be estimated according to the procedure below.

NOTE: The estimates are selected to ensure that negative errors will not be larger than −1.5 percent. However, positive errors, or over-estimation of emissions by as much as 5 percent may be introduced depending upon the geographic location of the facility and the associated range of ambient moisture.

12.2.2.1.1 B_{wa} = 0.027. This value may be used at any location at all times.

12.2.2.1.2 B_{wa} = Highest monthly average of B_{wa} that occurred within the previous calendar year at the nearest Weather Service Station. This value shall be determined annually and may be used as an estimate for the entire current calendar year.

12.2.2.1.3 B_{wa} = Highest daily average of Bwa that occurred within a calendar month at the nearest Weather Service Station, calculated from the data from the past 3 years. This value shall be computed for each month and may be used as an estimate for the current respective calendar month.

12.2.2.2 If the moisture fraction (B_{ws}) of the effluent gas is measured:

$$E = C_w F_d \frac{20.9}{\left[20.9\left(1 - B_{ws}\right) - \%O_{2w}\right]} \qquad \text{Eq. 19-3}$$

12.2.3 Oxygen-Based F Factor, Dry/Wet Basis.

12.2.3.1 When the pollutant concentration is measured on a wet basis (C_w) and O_2 concentration is measured on a dry basis ($\%O_{2d}$), use the following equation:

$$E = \frac{\left(C_w F_d\right)(20.9)}{\left(1 - B_{ws}\right)\left(20.9 - \%O_{2d}\right)} \qquad \text{Eq. 19-4}$$

12.2.3.2 When the pollutant concentration is measured on a dry basis (C_d) and the O_2 concentration is measured on a wet basis ($\%O_{2w}$), use the following equation:

$$E = \frac{C_d F_d 20.9}{\frac{\left(20.9 - \%O_{2w}\right)}{\left(1 - B_{ws}\right)}} \qquad \text{Eq. 19-5}$$

12.2.4 Carbon Dioxide-Based F Factor, Dry Basis. When measurements are on a dry basis for both CO_2 ($\%CO_{2d}$) and pollutant (C_d) concentrations, use the following equation:

$$E = C_d F_c \frac{100}{\%CO_{2d}} \qquad \text{Eq. 19-6}$$

12.2.5 Carbon Dioxide-Based F Factor, Wet Basis. When measurements are on a wet basis for both CO_2 ($\%CO_{2w}$) and pollutant (C_w) concentrations, use the following equation:

$$E = C_w F_c \frac{100}{\%CO_{2w}} \qquad \text{Eq. 19-7}$$

12.2.6 Carbon Dioxide-Based F Factor, Dry/Wet Basis.

12.2.6.1 When the pollutant concentration is measured on a wet basis (C_w) and CO_2 concentration is measured on a dry basis ($\%CO_{2d}$), use the following equation:

$$E = \frac{C_w F_c}{\left(1 - B_{ws}\right)} \frac{100}{\%CO_{2d}} \qquad \text{Eq. 19-8}$$

12.2.6.2 When the pollutant concentration is measured on a dry basis (C_d) and CO_2 concentration is measured on a wet basis ($\%CO_{2w}$), use the following equation:

$$E = C_d F_c \left(1 - B_{ws}\right) \frac{100}{\%CO_{2w}} \qquad \text{Eq. 19-9}$$

12.2.7 Direct-Fired Reheat Fuel Burning. The effect of direct-fired reheat fuel burning (for the purpose of raising the temperature of the exhaust effluent from wet scrubbers to above the moisture dew-point) on emission rates will be less than 1.0 percent and, therefore, may be ignored.

12.2.8 Combined Cycle-Gas Turbine Systems. For gas turbine-steam generator combined cycle systems, determine the emissions from the steam generating unit or the percent reduction in potential SO_2 emissions as follows:

12.2.8.1 Compute the emission rate from the steam generating unit using the following equation:

$$E_{bo} = E_{co} + \frac{H_g}{H_b}\left(E_{co} - E_g\right) \qquad \text{Eq. 19-10}$$

12.2.8.1.1 Use the test methods and procedures section of 40 CFR Part 60, Subpart GG to obtain E_{co} and E_g. Do not use F_w factors for determining E_g or E_{co}. If an SO_2 control device is used, measure E_{co} after the control device.

12.2.8.1.2 Suitable methods shall be used to determine the heat input rates to the steam generating units (H_b) and the gas turbine (H_g).

12.2.8.2 If a control device is used, compute the percent of potential SO_2 emissions (P_s) using the following equations:

$$E_{bi} = E_{ci} - \frac{H_g}{H_b}\left(E_{ci} - E_g\right) \qquad \text{Eq. 19-11}$$

$$P_s = 100\left(1 - \frac{E_{bo}}{E_{bi}}\right) \qquad \text{Eq. 19-12}$$

NOTE: Use the test methods and procedures section of Subpart GG to obtain E_{ci} and E_g. Do not use F_w factors for determining E_g or E_{ci}.

12.3 F Factors. Use an average F factor according to section 12.3.1 or determine an applicable F factor according to section 12.3.2. If combined fuels are fired, prorate the applicable F factors using the procedure in section 12.3.3.

12.3.1 Average F Factors. Average F factors (F_d, F_w, or F_c) from Table 19–2 in section 17.0 may be used.

12.3.2 Determined F Factors. If the fuel burned is not listed in Table 19–2 or if the owner or operator chooses to determine an F factor rather than use the values in Table 19–2, use the procedure below:

12.3.2.1 Equations. Use the equations below, as appropriate, to compute the F factors:

$$F_d = \frac{K\left(K_{hd}\%H + K_c\%C + K_s\%S + K_n\%N - K_o\%O\right)}{GCV} \qquad \text{Eq. 19-13}$$

$$F_w = \frac{K\left[K_{hw}\%H + K_c\%C + K_s\%S + K_n\%N - K_o\%O + K_w\%H_2O\right]}{GCV_w} \qquad \text{Eq. 19-14}$$

$$F_c = \frac{K\left(K_{cc}\%C\right)}{GCV} \qquad \text{Eq. 19-15}$$

NOTE: Omit the $\%H_2O$ term in the equations for F_w if %H and %O include the unavailable hydrogen and oxygen in the form of H_2O.)

12.3.2.2 Use applicable sampling procedures in section 12.5.2.1 or 12.5.2.2 to obtain samples for analyses.

12.3.2.3 Use ASTM D 3176–74 or 89 (all cited ASTM standards are incorporated by reference—see §60.17) for ultimate analysis of the fuel.

12.3.2.4 Use applicable methods in section 12.5.2.1 or 12.5.2.2 to determine the heat content of solid or liquid fuels. For gaseous fuels, use ASTM D 1826–77 or 94 (incorporated by reference—see §60.17) to determine the heat content.

12.3.3 F Factors for Combination of Fuels. If combinations of fuels are burned, use the following equations, as applicable unless otherwise specified in an applicable subpart:

$$F_d = \sum_{k=1}^{n}\left(X_k F_{dk}\right) \qquad \text{Eq. 19-16}$$

$$F_w = \sum_{k=1}^{n}\left(X_k F_{wk}\right) \qquad \text{Eq. 19-17}$$

$$F_c = \sum_{k=1}^{n}\left(X_k F_{ck}\right) \qquad \text{Eq. 19-18}$$

12.4 Determination of Average Pollutant Rates.

12.4.1 Average Pollutant Rates from Hourly Values. When hourly average pollutant rates (E_h), inlet or outlet, are obtained (*e.g.*, CEMS values), compute the average pollutant rate (E_a) for the performance test period (*e.g.*, 30 days) specified in the applicable regulation using the following equation:

$$E_a = \frac{1}{H}\sum_{j=1}^{n} E_{hj} \qquad \text{Eq. 19-19}$$

12.4.2 Average Pollutant Rates from Other than Hourly Averages. When pollutant rates are determined from measured values representing longer than 1-hour periods (*e.g.*, daily fuel sampling and analyses or Method 6B values), or when pollutant rates are determined from combinations of 1-hour and longer than 1-hour periods (*e.g.*, CEMS and Method 6B values), compute the average pollutant rate (E_a) for the performance test period (*e.g.*, 30 days) specified in the applicable regulation using the following equation:

$$E_a = \frac{\sum_{j=1}^{D}\left(n_d E_d\right)_j}{\sum_{j=1}^{D} n_{dj}} \qquad \text{Eq. 19-20}$$

12.4.3 Daily Geometric Average Pollutant Rates from Hourly Values. The geometric average pollutant rate (E_{ga}) is computed using the following equation:

$$E_{ga} = \exp\left[\frac{1}{n_t}\sum_{j=1}^{n_t}\left[\ln\left(E_{hj}\right)\right]\right] \quad \text{Eq. 19-21}$$

12.5 Determination of Overall Reduction in Potential Sulfur Dioxide Emission.

12.5.1 Overall Percent Reduction. Compute the overall percent SO_2 reduction ($\%R_o$) using the following equation:

$$\%R_o = 100\left[1.0 - \left(1.0 - \frac{\%R_f}{100}\right)\left(1.0 - \frac{\%R_g}{100}\right)\right] \quad \text{Eq. 19-22}$$

12.5.2 Pretreatment Removal Efficiency (Optional). Compute the SO_2 removal efficiency from fuel pretreatment ($\%R_f$) for the averaging period (*e.g.*, 90 days) as specified in the applicable regulation using the following equation:

$$\%R_f = 100\left[1.0 - \frac{\sum_{j=1}^{N}\left(\frac{\%S_{pj}}{GCV_{pj}}\right)L_{pj}}{\sum_{j=1}^{N}\left(\frac{\%S_{rj}}{GCV_{rj}}\right)L_{rj}}\right] \quad \text{Eq. 19-23}$$

NOTE: In calculating $\%R_f$, include %S and GCV values for all fuel lots that are not pretreated and are used during the averaging period.

12.5.2.1 Solid Fossil (Including Waste) Fuel/Sampling and Analysis.

NOTE: For the purposes of this method, raw fuel (coal or oil) is the fuel delivered to the desulfurization (pretreatment) facility. For oil, the input oil to the oil desulfurization process (*e.g.*, hydrotreatment) is considered to be the raw fuel.

12.5.2.1.1 Sample Increment Collection. Use ASTM D 2234–76, 96, 97a, or 98 (incorporated by reference—see §60.17), Type I, Conditions A, B, or C, and systematic spacing. As used in this method, systematic spacing is intended to include evenly spaced increments in time or increments based on equal weights of coal passing the collection area. As a minimum, determine the number and weight of increments required per gross sample representing each coal lot according to Table 2 or Paragraph 7.1.5.2 of ASTM D 2234. Collect one gross sample for each lot of raw coal and one gross sample for each lot of product coal.

12.5.2.1.2 ASTM Lot Size. For the purpose of section 12.5.2 (fuel pretreatment), the lot size of product coal is the weight of product coal from one type of raw coal. The lot size of raw coal is the weight of raw coal used to produce one lot of product coal. Typically, the lot size is the weight of coal processed in a 1-day (24-hour) period. If more than one type of coal is treated and produced in 1 day, then gross samples must be collected and analyzed for each type of coal. A coal lot size equaling the 90-day quarterly fuel quantity for a steam generating unit may be used if representative sampling can be conducted for each raw coal and product coal.

NOTE: Alternative definitions of lot sizes may be used, subject to prior approval of the Administrator.

12.5.2.1.3 Gross Sample Analysis. Use ASTM D 2013–72 or 86 to prepare the sample, ASTM D 3177–75 or 89 or ASTM D 4239–85, 94, or 97 to determine sulfur content (%S), ASTM D 3173–73 or 87 to determine moisture content, and ASTM D 2015–77 (Reapproved 1978) or 96, D 3286–85 or 96, or D 5865–98 or 10 to determine gross calorific value (GCV) (all standards cited are incorporated by reference—see §60.17 for acceptable versions of the standards) on a dry basis for each gross sample.

12.5.2.2 Liquid Fossil Fuel-Sampling and Analysis. See Note under section 12.5.2.1.

12.5.2.2.1 Sample Collection. Follow the procedures for continuous sampling in ASTM D 270 or D 4177–95 (incorporated by reference—see §60.17) for each gross sample from each fuel lot.

12.5.2.2.2 Lot Size. For the purpose of section 12.5.2 (fuel pretreatment), the lot size of a product oil is the weight of product oil from one pretreatment facility and intended as one shipment (ship load, barge load, etc.). The lot size of raw oil is the weight of each crude liquid fuel type used to produce a lot of product oil.

NOTE: Alternative definitions of lot sizes may be used, subject to prior approval of the Administrator.

12.5.2.2.3 Sample Analysis. Use ASTM D 129–64, 78, or 95, ASTM D 1552–83 or 95, or ASTM D 4057–81 or 95 to determine the sulfur content (%S) and ASTM D 240–76 or 92 (all standards cited are incorporated by reference—see §60.17) to determine the GCV of each gross sample. These values may be assumed to be on a dry basis. The owner or operator of an affected facility may elect to determine the GCV by sampling the oil combusted on the first steam generating unit operating day of each calendar month and then using the lowest GCV value of the three GCV values per quarter for the GCV of all oil combusted in that calendar quarter.

12.5.2.3 Use appropriate procedures, subject to the approval of the Administrator, to determine the fraction of total mass input derived from each type of fuel.

12.5.3 Control Device Removal Efficiency. Compute the percent removal efficiency ($\%R_g$) of the control device using the following equation:

$$\%R_g = 100\left(1.0 - \frac{E_{ao}}{E_{ai}}\right) \qquad \text{Eq. 19-24}$$

12.5.3.1 Use continuous emission monitoring systems or test methods, as appropriate, to determine the outlet SO_2 rates and, if appropriate, the inlet SO_2 rates. The rates may be determined as hourly (E_h) or other sampling period averages (E_d). Then, compute the average pollutant rates for the performance test period (E_{ao} and E_{ai}) using the procedures in section 12.4.

12.5.3.2 As an alternative, as-fired fuel sampling and analysis may be used to determine inlet SO_2 rates as follows:

12.5.3.2.1 Compute the average inlet SO_2 rate (E_{di}) for each sampling period using the following equation:

$$E_{di} = K\frac{\%S}{GCV} \qquad \text{Eq. 19-25}$$

Where:

$$K = 2\times10^7\left(\frac{\text{ng SO}_2}{\%S}\right)\left(\frac{(\text{kJ})}{\text{J}}\right)\left(\frac{1}{\text{kg coal}}\right)\left[2\times10^4\left(\frac{\text{lb SO}_2}{\%S}\right)\left(\frac{\text{Btu}}{\text{million Btu}}\right)\left(\frac{1}{\text{lb coal}}\right)\right]$$

After calculating E_{di}, use the procedures in section 12.4 to determine the average inlet SO_2 rate for the performance test period (E_{ai}).

12.5.3.2.2 Collect the fuel samples from a location in the fuel handling system that provides a sample representative of the fuel bunkered or consumed during a steam generating unit operating day. For the purpose of as-fired fuel sampling under section 12.5.3.2 or section 12.6, the lot size for coal is the weight of coal bunkered or consumed during each steam generating unit operating day. The lot size for oil is the weight of oil supplied to the ''day'' tank or consumed during each steam generating unit operating day. For reporting and calculation purposes, the gross sample shall be identified with the calendar day on which sampling began. For steam generating unit operating days when a coal-fired steam generating unit is operated without coal being added to the bunkers, the coal analysis from the previous ''as bunkered'' coal sample shall be used until coal is bunkered again. For steam generating unit operating days when an oil-fired steam generating unit is operated without oil being added to the oil ''day'' tank, the oil analysis from the previous day shall be used until the ''day'' tank is filled again. Alternative definitions of fuel lot size may be used, subject to prior approval of the Administrator.

12.5.3.2.3 Use ASTM procedures specified in section 12.5.2.1 or 12.5.2.2 to determine %S and GCV.

12.5.4 Daily Geometric Average Percent Reduction from Hourly Values. The geometric average percent reduction ($\%R_{ga}$) is computed using the following equation:

$$\%R_{ga} = 100\left[1 - EXP\left(\frac{1}{n_t}\sum_{j=1}^{n_t} \ln\frac{E_{jo}}{E_{ji}}\right)\right] \qquad \text{Eq. 19-26}$$

NOTE: The calculation includes only paired data sets (hourly average) for the inlet and outlet pollutant measurements.

12.6 Sulfur Retention Credit for Compliance Fuel. If fuel sampling and analysis procedures in section 12.5.2.1 are being used to determine average SO_2 emission rates (E_{as}) to the atmosphere from a coal-fired steam generating unit when there is no SO_2 control device, the following equation may be used to adjust the emission rate for sulfur retention credits (no credits are allowed for oil-fired systems) (E_{di}) for each sampling period using the following equation:

$$E_{di} = 0.97K\ \frac{\%S}{GDV} \qquad \text{Eq. 19-27}$$

Where:

$$K = 2\times10^{7}\left(\frac{\text{ng } SO_2}{\%S}\right)\left(\frac{kJ}{J}\right)\left(\frac{1}{\text{kg coal}}\right)\left[2\times10^{4}\left(\frac{\text{lb } SO_2}{\%S}\right)\left(\frac{\text{Btu}}{\text{million Btu}}\right)\left(\frac{1}{\text{lb coal}}\right)\right]$$

After calculating E_{di}, use the procedures in section 12.4.2 to determine the average SO_2 emission rate to the atmosphere for the performance test period (E_{ao}).

12.7 Determination of Compliance When Minimum Data Requirement Is Not Met.

12.7.1 Adjusted Emission Rates and Control Device Removal Efficiency. When the minimum data requirement is not met, the Administrator may use the following adjusted emission rates or control device removal efficiencies to determine compliance with the applicable standards.

12.7.1.1 Emission Rate. Compliance with the emission rate standard may be determined by using the lower confidence limit of the emission rate (E_{ao}*) as follows:

$$E^{*}_{ao} = E_{ao} - t_{0.95}S_o \qquad \text{Eq. 19-28}$$

12.7.1.2 Control Device Removal Efficiency. Compliance with the overall emission reduction ($\%R_o$) may be determined by using the lower confidence limit of the emission rate (E_{ao}*) and the upper confidence limit of the inlet pollutant rate (E_{ai}*) in calculating the control device removal efficiency ($\%R_g$) as follows:

$$\%R_g = 100\left(1.0 - \frac{E^{*}_{ao}}{E^{*}_{ai}}\right) \qquad \text{Eq. 19-29}$$

$$E^{*}_{ai} = E_{ai} + t_{0.95}S_i \qquad \text{Eq. 19-30}$$

12.7.2 Standard Deviation of Hourly Average Pollutant Rates. Compute the standard deviation (S_e) of the hourly average pollutant rates using the following equation:

$$S_e = \sqrt{\frac{1}{H} - \frac{1}{H_r}}\ \sqrt{\frac{\sum_{j=1}^{H}\left(E_{hj} - E_a\right)^2}{H-1}} \qquad \text{Eq. 19-31}$$

Equation 19–19 through 19–31 may be used to compute the standard deviation for both the outlet (S_o) and, if applicable, inlet (S_i) pollutant rates.

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References [Reserved]

17.0 Tables, Diagrams, Flowcharts, and Validation Data

TABLE 19–1—CONVERSION FACTORS FOR CONCENTRATION

From	To	Multiply by
g/scm	ng/scm	10^9
mg/scm	ng/scm	10^6
lb/scf	ng/scm	1.602×10^{13}

TABLE 19–1—CONVERSION FACTORS FOR CONCENTRATION—Continued

From	To	Multiply by
ppm SO_2	ng/scm	2.66×10^6
ppm NO_X	ng/scm	1.912×10^6
ppm SO_2	lb/scf	1.660×10^{-7}
ppm NO_X	lb/scf	1.194×10^{-7}

TABLE 19–2—F FACTORS FOR VARIOUS FUELS[1]

Fuel Type	F_d		F_w		F_c	
	dscm/J	dscf/10^6 Btu	wscm/J	wscf/10^6 Btu	scm/J	scf/10^6 Btu
Coal:						
Anthracite[2]	2.71×10^{-7}	10,100	2.83×10^{-7}	10,540	0.530×10^{-7}	1,970
Bituminus[2]	2.63×10^{-7}	9,780	2.86×10^{-7}	10,640	0.484×10^{-7}	1,800
Lignite	2.65×10^{-7}	9,860	3.21×10^{-7}	11,950	0.513×10^{-7}	1,910
Oil[3]	2.47×10^{-7}	9,190	2.77×10^{-7}	10,320	0.383×10^{-7}	1,420
Gas:.						
Natural	2.34×10^{-7}	8,710	2.85×10^{-7}	10,610	0.287×10^{-7}	1,040
Propane	2.34×10^{-7}	8,710	2.74×10^{-7}	10,200	0.321×10^{-7}	1,190
Butane	2.34×10^{-7}	8,710	2.79×10^{-7}	10,390	0.337×10^{-7}	1,250
Wood	2.48×10^{-7}	9,240			0.492×10^{-7}	1,830
Wood Bark	2.58×10^{-7}	9,600			0.516×10^{-7}	1,920
Municipal	2.57×10^{-7}	9,570			0.488×10^{-7}	1,820
Solid Waste						

[1] Determined at standard conditions: 20 °C (68 °F) and 760 mm Hg (29.92 in Hg)
[2] As classified according to ASTM D 388.
[3] Crude, residual, or distillate.

TABLE 19–3—VALUES FOR $T_{0.95*}$

n[1]	$t_{0.95}$	n[1]	$t_{0.95}$	n[1]	$t_{0.95}$
2	6.31	8	1.89	22–26	1.71
3	2.42	9	1.86	27–31	1.70
4	2.35	10	1.83	32–51	1.68
5	2.13	11	1.81	52–91	1.67
6	2.02	12–16	1.77	92–151	1.66
7	1.94	17–21	1.73	152 or more	1.65

[1]The values of this table are corrected for n-1 degrees of freedom. Use n equal to the number (H) of hourly average data points.

METHOD 20—DETERMINATION OF NITROGEN OXIDES, SULFUR DIOXIDE, AND DILUENT EMISSIONS FROM STATIONARY GAS TURBINES

1.0 Scope and Application

What is Method 20?

Method 20 contains the details you must follow when using an instrumental analyzer to determine concentrations of nitrogen oxides, oxygen, carbon dioxide, and sulfur dioxide in the emissions from stationary gas turbines. This method follows the specific instructions for equipment and performance requirements, supplies, sample collection and analysis, calculations, and data analysis in the methods listed in section 2.0.

1.1 Analytes. What does this method determine?

Analyte	CAS No.	Sensitivity
Nitrogen oxides (NO_X) as nitrogen dioxide:	10102–43–9	Typically <2% of Calibration Span.
Nitric oxide (NO)	10102–44–0	
Nitrogen dioxide NO_2.		
Diluent oxygen (O_2) or carbon dioxide (CO_2)		Typically <2% of Calibration Span.
Sulfur dioxide (SO_X)	7446–09–5	Typically <2% of Calibration Span.

1.2 Applicability. When is this method required? The use of Method 20 may be required by specific New Source Performance Standards, Clean Air Marketing rules, and State Implementation Plans and permits where

measuring SO_2, NO_X, CO_2, and/or O_2 concentrations in stationary gas turbines emissions are required. Other regulations may also require its use.

1.3 Data Quality Objectives. How good must my collected data be? Refer to section 1.3 of Method 7E.

2.0 Summary of Method

In this method, NO_X, O_2 (or CO_2), and SO_X are measured using the following methods found in appendix A to this part:

(a) Method 1—Sample and Velocity Traverses for Stationary Sources.

(b) Method 3A—Determination of Oxygen and Carbon Dioxide Emissions From Stationary Sources (Instrumental Analyzer Procedure).

(c) Method 6C—Determination of Sulfur Dioxide Emissions From Stationary Sources (Instrumental Analyzer Procedure).

(d) Method 7E—Determination of Nitrogen Oxides Emissions From Stationary Sources (Instrumental Analyzer Procedure).

(e) Method 19—Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxide Emission Rates.

3.0 Definitions

Refer to section 3.0 of Method 7E for the applicable definitions.

4.0 Interferences

Refer to section 4.0 of Methods 3A, 6C, and 7E as applicable.

5.0 Safety

Refer to section 5.0 of Method 7E.

6.0 Equipment and Supplies

The measurement system design is shown in Figure 7E–1 of Method 7E. Refer to the appropriate methods listed in section 2.0 for equipment and supplies.

7.0 Reagents and Standards

Refer to the appropriate methods listed in section 2.0 for reagents and standards.

8.0 Sample Collection, Preservation, Storage, and Transport

8.1 Sampling Site and Sampling Points. Follow the procedures of section 8.1 of Method 7E. For the stratification test in section 8.1.2, determine the diluent-corrected pollutant concentration at each traverse point.

8.2 Initial Measurement System Performance Tests. You must refer to the appropriate methods listed in section 2.0 for the measurement system performance tests as applicable.

8.3 Interference Check. You must follow the procedures in section 8.3 of Method 3A or 6C, or section 8.2.7 of Method 7E (as appropriate).

8.4 Sample Collection. You must follow the procedures of section 8.4 of the appropriate methods listed in section 2.0. A test run must have a duration of at least 21 minutes.

8.5 Post-Run System Bias Check, Drift Assessment, and Alternative Dynamic Spike Procedure. You must follow the procedures of sections 8.5 and 8.6 of the appropriate methods listed in section 2.0. A test run must have a duration of at least 21 minutes.

9.0 Quality Control

Follow quality control procedures in section 9.0 of Method 7E.

10.0 Calibration and Standardization

Follow the procedures for calibration and standardization in section 10.0 of Method 7E.

11.0 Analytical Procedures

Because sample collection and analysis are performed together (see section 8), additional discussion of the analytical procedure is not necessary.

12.0 Calculations and Data Analysis

You must follow the procedures for calculations and data analysis in section 12.0 of the appropriate method listed in section 2.0. Follow the procedures in section 12.0 of Method 19 for calculating fuel-specific F factors, diluent-corrected pollutant concentrations, and emission rates.

13.0 Method Performance

The specifications for the applicable performance checks are the same as in section 13.0 of Method 7E.

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 Alternative Procedures

Refer to section 16.0 of the appropriate method listed in section 2.0 for alternative procedures.

17.0 References

Refer to section 17.0 of the appropriate method listed in section 2.0 for references.

18.0 Tables, Diagrams, Flowcharts, and Validation Data

Refer to section 18.0 of the appropriate method listed in section 2.0 for tables, diagrams, flowcharts, and validation data.

METHOD 21—DETERMINATION OF VOLATILE ORGANIC COMPOUND LEAKS

1.0 Scope and Application

1.1 Analytes.

Analyte	CAS No.
Volatile Organic Compounds (VOC).	No CAS number assigned.

1.2 Scope. This method is applicable for the determination of VOC leaks from process equipment. These sources include, but are not limited to, valves, flanges and other connections, pumps and compressors, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals.

1.3 Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.

2.0 Summary of Method

2.1 A portable instrument is used to detect VOC leaks from individual sources. The instrument detector type is not specified, but it must meet the specifications and performance criteria contained in section 6.0. A leak definition concentration based on a reference compound is specified in each applicable regulation. This method is intended to locate and classify leaks only, and is not to be used as a direct measure of mass emission rate from individual sources.

3.0 Definitions

3.1 *Calibration gas* means the VOC compound used to adjust the instrument meter reading to a known value. The calibration gas is usually the reference compound at a known concentration approximately equal to the leak definition concentration.

3.2 *Calibration precision* means the degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration to the known concentration.

3.3 *Leak definition concentration* means the local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is present. The leak definition is an instrument meter reading based on a reference compound.

3.4 *No detectable emission* means a local VOC concentration at the surface of a leak source, adjusted for local VOC ambient concentration, that is less than 2.5 percent of the specified leak definition concentration. that indicates that a VOC emission (leak) is not present.

3.5 *Reference compound* means the VOC species selected as the instrument calibration basis for specification of the leak definition concentration. (For example, if a leak definition concentration is 10,000 ppm as methane, then any source emission that results in a local concentration that yields a meter reading of 10,000 on an instrument meter calibrated with methane would be classified as a leak. In this example, the leak definition concentration is 10,000 ppm and the reference compound is methane.)

3.6 *Response factor* means the ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the applicable regulation.

3.7 *Response time* means the time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 percent of the corresponding final value is reached as displayed on the instrument readout meter.

4.0 Interferences [Reserved]

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to performing this test method.

5.2 Hazardous Pollutants. Several of the compounds, leaks of which may be determined by this method, may be irritating or corrosive to tissues (*e.g.*, heptane) or may be toxic (*e.g.*, benzene, methyl alcohol). Nearly all are fire hazards. Compounds in emissions should be determined through familiarity with the source. Appropriate precautions can be found in reference documents, such as reference No. 4 in section 16.0.

6.0 Equipment and Supplies

A VOC monitoring instrument meeting the following specifications is required:

6.1 The VOC instrument detector shall respond to the compounds being processed. Detector types that may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.

6.2 The instrument shall be capable of measuring the leak definition concentration specified in the regulation.

6.3 The scale of the instrument meter shall be readable to ±2.5 percent of the specified leak definition concentration.

6.4 The instrument shall be equipped with an electrically driven pump to ensure that a sample is provided to the detector at a constant flow rate. The nominal sample flow rate, as measured at the sample probe tip, shall be 0.10 to 3.0 l/min (0.004 to 0.1 ft^3/min) when the probe is fitted with a glass wool plug or filter that may be used to prevent plugging of the instrument.

6.5 The instrument shall be equipped with a probe or probe extension or sampling not to exceed 6.4 mm (¼ in) in outside diameter,

with a single end opening for admission of sample.

6.6 The instrument shall be intrinsically safe for operation in explosive atmospheres as defined by the National Electrical Code by the National Fire Prevention Association or other applicable regulatory code for operation in any explosive atmospheres that may be encountered in its use. The instrument shall, at a minimum, be intrinsically safe for Class 1, Division 1 conditions, and/or Class 2, Division 1 conditions, as appropriate, as defined by the example code. The instrument shall not be operated with any safety device, such as an exhaust flame arrestor, removed.

7.0 Reagents and Standards

7.1 Two gas mixtures are required for instrument calibration and performance evaluation:

7.1.1 Zero Gas. Air, less than 10 parts per million by volume (ppmv) VOC.

7.1.2 Calibration Gas. For each organic species that is to be measured during individual source surveys, obtain or prepare a known standard in air at a concentration approximately equal to the applicable leak definition specified in the regulation.

7.2 Cylinder Gases. If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manufacturer to be within 2 percent accuracy, and a shelf life must be specified. Cylinder standards must be either reanalyzed or replaced at the end of the specified shelf life.

7.3 Prepared Gases. Calibration gases may be prepared by the user according to any accepted gaseous preparation procedure that will yield a mixture accurate to within 2 percent. Prepared standards must be replaced each day of use unless it is demonstrated that degradation does not occur during storage.

7.4 Mixtures with non-Reference Compound Gases. Calibrations may be performed using a compound other than the reference compound. In this case, a conversion factor must be determined for the alternative compound such that the resulting meter readings during source surveys can be converted to reference compound results.

8.0 Sample Collection, Preservation, Storage, and Transport

8.1 Instrument Performance Evaluation. Assemble and start up the instrument according to the manufacturer's instructions for recommended warmup period and preliminary adjustments.

8.1.1 Response Factor. A response factor must be determined for each compound that is to be measured, either by testing or from reference sources. The response factor tests are required before placing the analyzer into service, but do not have to be repeated at subsequent intervals.

8.1.1.1 Calibrate the instrument with the reference compound as specified in the applicable regulation. Introduce the calibration gas mixture to the analyzer and record the observed meter reading. Introduce zero gas until a stable reading is obtained. Make a total of three measurements by alternating between the calibration gas and zero gas. Calculate the response factor for each repetition and the average response factor.

8.1.1.2 The instrument response factors for each of the individual VOC to be measured shall be less than 10 unless otherwise specified in the applicable regulation. When no instrument is available that meets this specification when calibrated with the reference VOC specified in the applicable regulation, the available instrument may be calibrated with one of the VOC to be measured, or any other VOC, so long as the instrument then has a response factor of less than 10 for each of the individual VOC to be measured.

8.1.1.3 Alternatively, if response factors have been published for the compounds of interest for the instrument or detector type, the response factor determination is not required, and existing results may be referenced. Examples of published response factors for flame ionization and catalytic oxidation detectors are included in References 1–3 of section 17.0.

8.1.2 Calibration Precision. The calibration precision test must be completed prior to placing the analyzer into service and at subsequent 3-month intervals or at the next use, whichever is later.

8.1.2.1 Make a total of three measurements by alternately using zero gas and the specified calibration gas. Record the meter readings. Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and multiply by 100 to express the resulting calibration precision as a percentage.

8.1.2.2 The calibration precision shall be equal to or less than 10 percent of the calibration gas value.

8.1.3 Response Time. The response time test is required before placing the instrument into service. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required before further use.

8.1.3.1 Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly to the specified calibration gas. After switching, measure the time required to attain 90 percent of the final stable reading. Perform this test sequence three times and record the results. Calculate the average response time.

8.1.3.2 The instrument response time shall be equal to or less than 30 seconds. The instrument pump, dilution probe (if any), sample probe, and probe filter that will be used

during testing shall all be in place during the response time determination.

8.2 Instrument Calibration. Calibrate the VOC monitoring instrument according to section 10.0.

8.3 Individual Source Surveys.

8.3.1 Type I—Leak Definition Based on Concentration. Place the probe inlet at the surface of the component interface where leakage could occur. Move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time. If the maximum observed meter reading is greater than the leak definition in the applicable regulation, record and report the results as specified in the regulation reporting requirements. Examples of the application of this general technique to specific equipment types are:

8.3.1.1 Valves. The most common source of leaks from valves is the seal between the stem and housing. Place the probe at the interface where the stem exits the packing gland and sample the stem circumference. Also, place the probe at the interface of the packing gland take-up flange seat and sample the periphery. In addition, survey valve housings of multipart assembly at the surface of all interfaces where a leak could occur.

8.3.1.2 Flanges and Other Connections. For welded flanges, place the probe at the outer edge of the flange-gasket interface and sample the circumference of the flange. Sample other types of nonpermanent joints (such as threaded connections) with a similar traverse.

8.3.1.3 Pumps and Compressors. Conduct a circumferential traverse at the outer surface of the pump or compressor shaft and seal interface. If the source is a rotating shaft, position the probe inlet within 1 cm of the shaft-seal interface for the survey. If the housing configuration prevents a complete traverse of the shaft periphery, sample all accessible portions. Sample all other joints on the pump or compressor housing where leakage could occur.

8.3.1.4 Pressure Relief Devices. The configuration of most pressure relief devices prevents sampling at the sealing seat interface. For those devices equipped with an enclosed extension, or horn, place the probe inlet at approximately the center of the exhaust area to the atmosphere.

8.3.1.5 Process Drains. For open drains, place the probe inlet at approximately the center of the area open to the atmosphere. For covered drains, place the probe at the surface of the cover interface and conduct a peripheral traverse.

8.3.1.6 Open-ended Lines or Valves. Place the probe inlet at approximately the center of the opening to the atmosphere.

8.3.1.7 Seal System Degassing Vents and Accumulator Vents. Place the probe inlet at approximately the center of the opening to the atmosphere.

8.3.1.8 Access door seals. Place the probe inlet at the surface of the door seal interface and conduct a peripheral traverse.

8.3.2 Type II—''No Detectable Emission''. Determine the local ambient VOC concentration around the source by moving the probe randomly upwind and downwind at a distance of one to two meters from the source. If an interference exists with this determination due to a nearby emission or leak, the local ambient concentration may be determined at distances closer to the source, but in no case shall the distance be less than 25 centimeters. Then move the probe inlet to the surface of the source and determine the concentration as outlined in section 8.3.1. The difference between these concentrations determines whether there are no detectable emissions. Record and report the results as specified by the regulation. For those cases where the regulation requires a specific device installation, or that specified vents be ducted or piped to a control device, the existence of these conditions shall be visually confirmed. When the regulation also requires that no detectable emissions exist, visual observations and sampling surveys are required. Examples of this technique are:

8.3.2.1 Pump or Compressor Seals. If applicable, determine the type of shaft seal. Perform a survey of the local area ambient VOC concentration and determine if detectable emissions exist as described in section 8.3.2.

8.3.2.2 Seal System Degassing Vents, Accumulator Vessel Vents, Pressure Relief Devices. If applicable, observe whether or not the applicable ducting or piping exists. Also, determine if any sources exist in the ducting or piping where emissions could occur upstream of the control device. If the required ducting or piping exists and there are no sources where the emissions could be vented to the atmosphere upstream of the control device, then it is presumed that no detectable emissions are present. If there are sources in the ducting or piping where emissions could be vented or sources where leaks could occur, the sampling surveys described in section 8.3.2 shall be used to determine if detectable emissions exist.

8.3.3 Alternative Screening Procedure.

8.3.3.1 A screening procedure based on the formation of bubbles in a soap solution that is sprayed on a potential leak source may be used for those sources that do not have continuously moving parts, that do not have surface temperatures greater than the boiling point or less than the freezing point of the soap solution, that do not have open

areas to the atmosphere that the soap solution cannot bridge, or that do not exhibit evidence of liquid leakage. Sources that have these conditions present must be surveyed using the instrument technique of section 8.3.1 or 8.3.2.

8.3.3.2 Spray a soap solution over all potential leak sources. The soap solution may be a commercially available leak detection solution or may be prepared using concentrated detergent and water. A pressure sprayer or squeeze bottle may be used to dispense the solution. Observe the potential leak sites to determine if any bubbles are formed. If no bubbles are observed, the source is presumed to have no detectable emissions or leaks as applicable. If any bubbles are observed, the instrument techniques of section 8.3.1 or 8.3.2 shall be used to determine if a leak exists, or if the source has detectable emissions, as applicable.

9.0 Quality Control

Section	Quality control measure	Effect
8.1.2	Instrument calibration precision check	Ensure precision and accuracy, respectively, of instrument response to standard.
10.0	Instrument calibration.	

10.0 Calibration and Standardization

10.1 Calibrate the VOC monitoring instrument as follows. After the appropriate warmup period and zero internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value.

NOTE: If the meter readout cannot be adjusted to the proper value, a malfunction of the analyzer is indicated and corrective actions are necessary before use.

11.0 Analytical Procedures [Reserved]

12.0 Data Analyses and Calculations [Reserved]

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. Dubose, D.A., and G.E. Harris. Response Factors of VOC Analyzers at a Meter Reading of 10,000 ppmv for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2–81051. September 1981.

2. Brown, G.E., *et al.* Response Factors of VOC Analyzers Calibrated with Methane for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2–81–022. May 1981.

3. DuBose, D.A. *et al.* Response of Portable VOC Analyzers to Chemical Mixtures. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2–81–110. September 1981.

4. Handbook of Hazardous Materials: Fire, Safety, Health. Alliance of American Insurers. Schaumberg, IL. 1983.

17.0 Tables, Diagrams, Flowcharts, and Validation Data [Reserved]

METHOD 22—VISUAL DETERMINATION OF FUGITIVE EMISSIONS FROM MATERIAL SOURCES AND SMOKE EMISSIONS FROM FLARES

NOTE: This method is not inclusive with respect to observer certification. Some material is incorporated by reference from Method 9.

1.0 Scope and Application

This method is applicable for the determination of the frequency of fugitive emissions from stationary sources, only as specified in an applicable subpart of the regulations. This method also is applicable for the determination of the frequency of visible smoke emissions from flares.

2.0 Summary of Method

2.1 Fugitive emissions produced during material processing, handling, and transfer operations or smoke emissions from flares are visually determined by an observer without the aid of instruments.

2.2 This method is used also to determine visible smoke emissions from flares used for combustion of waste process materials.

2.3 This method determines the amount of time that visible emissions occur during the observation period (*i.e.*, the accumulated emission time). This method does not require that the opacity of emissions be determined. Since this procedure requires only the determination of whether visible emissions occur and does not require the determination of opacity levels, observer certification according to the procedures of Method 9 is not required. However, it is necessary that the observer is knowledgeable with respect to the general procedures for determining the presence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative

to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. This training is to be obtained from written materials found in References 1 and 2 or from the lecture portion of the Method 9 certification course.

3.0 Definitions

3.1 *Emission frequency* means the percentage of time that emissions are visible during the observation period.

3.2 *Emission time* means the accumulated amount of time that emissions are visible during the observation period.

3.3 *Fugitive emissions* means emissions generated by an affected facility which is not collected by a capture system and is released to the atmosphere. This includes emissions that (1) escape capture by process equipment exhaust hoods; (2) are emitted during material transfer; (3) are emitted from buildings housing material processing or handling equipment; or (4) are emitted directly from process equipment.

3.4 *Observation period* means the accumulated time period during which observations are conducted, not to be less than the period specified in the applicable regulation.

3.5 *Smoke emissions* means a pollutant generated by combustion in a flare and occurring immediately downstream of the flame. Smoke occurring within the flame, but not downstream of the flame, is not considered a smoke emission.

4.0 Interferences

4.1 Occasionally, fugitive emissions from sources other than the affected facility (*e.g.*, road dust) may prevent a clear view of the affected facility. This may particularly be a problem during periods of high wind. If the view of the potential emission points is obscured to such a degree that the observer questions the validity of continuing observations, then the observations shall be terminated, and the observer shall clearly note this fact on the data form.

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to performing this test method.

6.0 Equipment

6.1 Stopwatches (two). Accumulative type with unit divisions of at least 0.5 seconds.

6.2 Light Meter. Light meter capable of measuring illuminance in the 50 to 200 lux range, required for indoor observations only.

7.0 Reagents and Supplies [Reserved]

8.0 Sample Collection, Preservation, Storage, and Transfer [Reserved]

9.0 Quality Control [Reserved]

10.0 Calibration and Standardization [Reserved]

11.0 Analytical Procedure

11.1 Selection of Observation Location. Survey the affected facility, or the building or structure housing the process to be observed, and determine the locations of potential emissions. If the affected facility is located inside a building, determine an observation location that is consistent with the requirements of the applicable regulation (*i.e.*, outside observation of emissions escaping the building/structure or inside observation of emissions directly emitted from the affected facility process unit). Then select a position that enables a clear view of the potential emission point(s) of the affected facility or of the building or structure housing the affected facility, as appropriate for the applicable subpart. A position at least 4.6 m (15 feet), but not more than 400 m (0.25 miles), from the emission source is recommended. For outdoor locations, select a position where the sunlight is not shining directly in the observer's eyes.

11.2 Field Records.

11.2.1 Outdoor Location. Record the following information on the field data sheet (Figure 22–1): Company name, industry, process unit, observer's name, observer's affiliation, and date. Record also the estimated wind speed, wind direction, and sky condition. Sketch the process unit being observed, and note the observer location relative to the source and the sun. Indicate the potential and actual emission points on the sketch.

11.2.2 Indoor Location. Record the following information on the field data sheet (Figure 22–2): Company name, industry, process unit, observer's name, observer's affiliation, and date. Record as appropriate the type, location, and intensity of lighting on the data sheet. Sketch the process unit being observed, and note the observer location relative to the source. Indicate the potential and actual fugitive emission points on the sketch.

11.3 Indoor Lighting Requirements. For indoor locations, use a light meter to measure the level of illumination at a location as close to the emission source(s) as is feasible. An illumination of greater than 100 lux (10 foot candles) is considered necessary for proper application of this method.

11.4 Observations.

11.4.1 Procedure. Record the clock time when observations begin. Use one stopwatch to monitor the duration of the observation

period. Start this stopwatch when the observation period begins. If the observation period is divided into two or more segments by process shutdowns or observer rest breaks (see section 11.4.3), stop the stopwatch when a break begins and restart the stopwatch without resetting it when the break ends. Stop the stopwatch at the end of the observation period. The accumulated time indicated by this stopwatch is the duration of observation period. When the observation period is completed, record the clock time. During the observation period, continuously watch the emission source. Upon observing an emission (condensed water vapor is not considered an emission), start the second accumulative stopwatch; stop the watch when the emission stops. Continue this procedure for the entire observation period. The accumulated elapsed time on this stopwatch is the total time emissions were visible during the observation period (*i.e.*, the emission time.)

11.4.2 Observation Period. Choose an observation period of sufficient length to meet the requirements for determining compliance with the emission standard in the applicable subpart of the regulations. When the length of the observation period is specifically stated in the applicable subpart, it may not be necessary to observe the source for this entire period if the emission time required to indicate noncompliance (based on the specified observation period) is observed in a shorter time period. In other words, if the regulation prohibits emissions for more than 6 minutes in any hour, then observations may (optional) be stopped after an emission time of 6 minutes is exceeded. Similarly, when the regulation is expressed as an emission frequency and the regulation prohibits emissions for greater than 10 percent of the time in any hour, then observations may (optional) be terminated after 6 minutes of emission are observed since 6 minutes is 10 percent of an hour. In any case, the observation period shall not be less than 6 minutes in duration. In some cases, the process operation may be intermittent or cyclic. In such cases, it may be convenient for the observation period to coincide with the length of the process cycle.

11.4.3 Observer Rest Breaks. Do not observe emissions continuously for a period of more than 15 to 20 minutes without taking a rest break. For sources requiring observation periods of greater than 20 minutes, the observer shall take a break of not less than 5 minutes and not more than 10 minutes after every 15 to 20 minutes of observation. If continuous observations are desired for extended time periods, two observers can alternate between making observations and taking breaks.

11.5 Recording Observations. Record the accumulated time of the observation period on the data sheet as the observation period duration. Record the accumulated time emissions were observed on the data sheet as the emission time. Record the clock time the observation period began and ended, as well as the clock time any observer breaks began and ended.

12.0 Data Analysis and Calculations

If the applicable subpart requires that the emission rate be expressed as an emission frequency (in percent), determine this value as follows: Divide the accumulated emission time (in seconds) by the duration of the observation period (in seconds) or by any minimum observation period required in the applicable subpart, if the actual observation period is less than the required period, and multiply this quotient by 100.

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. Missan, R., and A. Stein. Guidelines for Evaluation of Visible Emissions Certification, Field Procedures, Legal Aspects, and Background Material. EPA Publication No. EPA–340/1–75–007. April 1975.

2. Wohlschlegel, P., and D.E. Wagoner. Guideline for Development of a Quality Assurance Program: Volume IX—Visual Determination of Opacity Emissions from Stationary Sources. EPA Publication No. EPA–650/4–74–005i. November 1975.

17.0 Tables, Diagrams, Flowcharts, and Validation Data

FUGITIVE OR SMOKE EMISSION INSPECTION
OUTDOOR LOCATION

Company Location Company Rep.	Observer Affiliation Date
Sky Conditions Precipitation	Wind Direction Wind Speed
Industry	Process Unit

Sketch process unit: indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS	Clock Time	Observation period duration, min:sec	Accumulated emission time, min:sec
Begin Observation			
End Observation			

Figure 22-1

FUGITIVE OR SMOKE EMISSION INSPECTION
INDOOR LOCATION

Company Location Company Rep.	Observer Affiliation Date
Industry	Process Unit

Light type (fluorescent, incandescent, natural)
Light location (overhead, behind observer, etc.)
Illuminance (lux or footcandles)
Sketch process unit: indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS	Clock Time	Observation period duration, min:sec	Accumulated emission time, min:sec
Begin			
End Observation			

Figure 22-2

METHOD 23—DETERMINATION OF POLYCHLORINATED DIBENZO-P-DIOXINS AND POLYCHLORINATED DIBENZOFURANS FROM STATIONARY SOURCES

1. Applicability and Principle

1.1 Applicability. This method is applicable to the determination of polychlorinated dibenzo-p-dioxins (PCDD's) and polychlorinated dibenzofurans (PCDF's) from stationary sources.

1.2 Principle. A sample is withdrawn from the gas stream isokinetically and collected in the sample probe, on a glass fiber filter, and on a packed column of adsorbent material. The sample cannot be separated into a particle vapor fraction. The PCDD's and

PCDF's are extracted from the sample, separated by high resolution gas chromatography, and measured by high resolution mass spectrometry.

2. Apparatus

2.1 Sampling. A schematic of the sampling train used in this method is shown in Figure 23–1. Sealing greases may not be used in assembling the train. The train is identical to that described in section 2.1 of Method 5 of this appendix with the following additions:

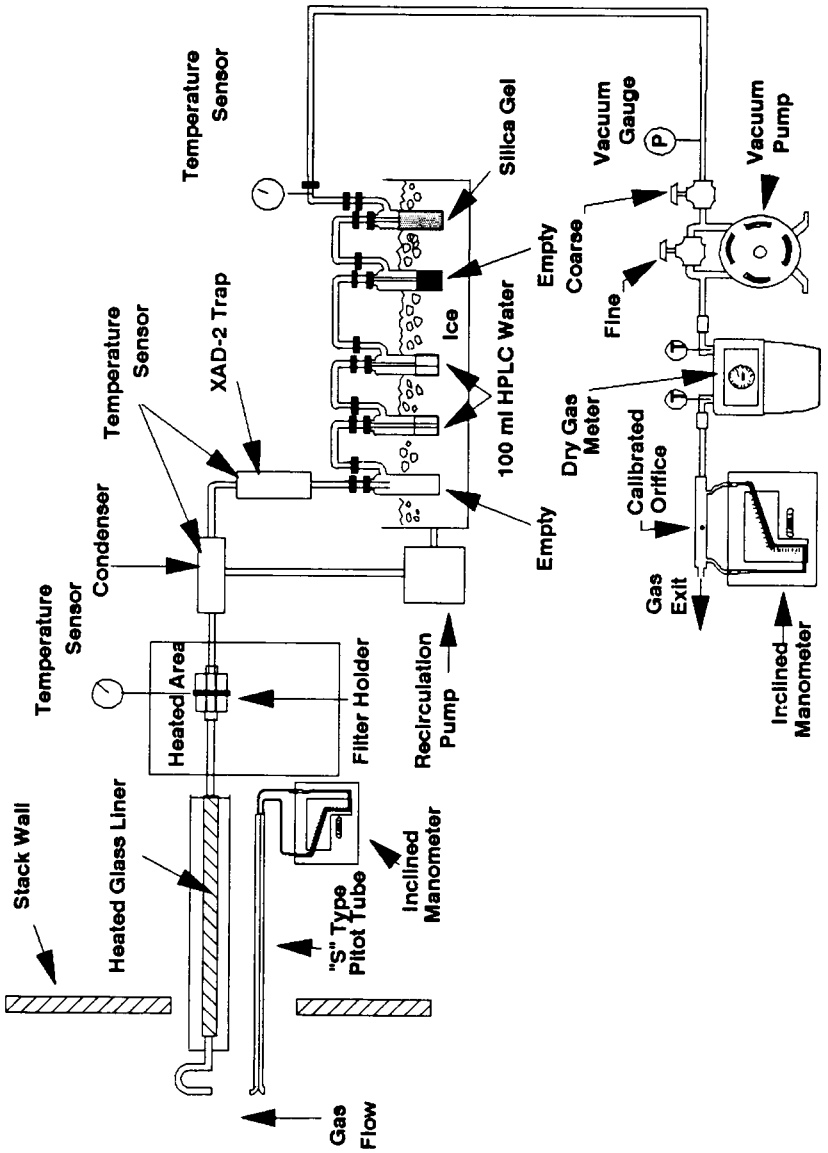

Figure 23.1 Sampling train

2.1.1 Nozzle. The nozzle shall be made of nickel, nickel-plated stainless steel, quartz, or borosilicate glass.

2.1.2 Sample Transfer Lines. The sample transfer lines, if needed, shall be heat traced, heavy walled TFE (½ in. OD with ⅛ in. wall) with connecting fittings that are capable of forming leak-free, vacuum-tight connections without using sealing greases. The line shall be as short as possible and must be maintained at 120 °C.

2.1.1 Filter Support. Teflon or Teflon-coated wire.

2.1.2 Condenser. Glass, coil type with compatible fittings. A schematic diagram is shown in Figure 23–2.

2.1.3 Water Bath. Thermostatically controlled to maintain the gas temperature exiting the condenser at <20 °C (68 °F).

2.1.4 Adsorbent Module. Glass container to hold the solid adsorbent. A shematic diagram is shown in Figure 23–2. Other physical configurations of the resin trap/condenser assembly are acceptable. The connecting fittings shall form leak-free, vacuum tight seals. No sealant greases shall be used in the sampling train. A coarse glass frit is included to retain the adsorbent.

2.2 Sample Recovery.

2.2.1 Fitting Caps. Ground glass, Teflon tape, or aluminum foil (Section 2.2.6) to cap off the sample exposed sections of the train.

2.2.2 Wash Bottles. Teflon, 500-ml.

2.2.3 Probe-Liner Probe-Nozzle, and Filter-Holder Brushes. Inert bristle brushes with precleaned stainless steel or Teflon handles. The probe brush shall have extensions of stainless steel or Teflon, at least as long as the probe. The brushes shall be properly sized and shaped to brush out the nozzle, probe liner, and transfer line, if used.

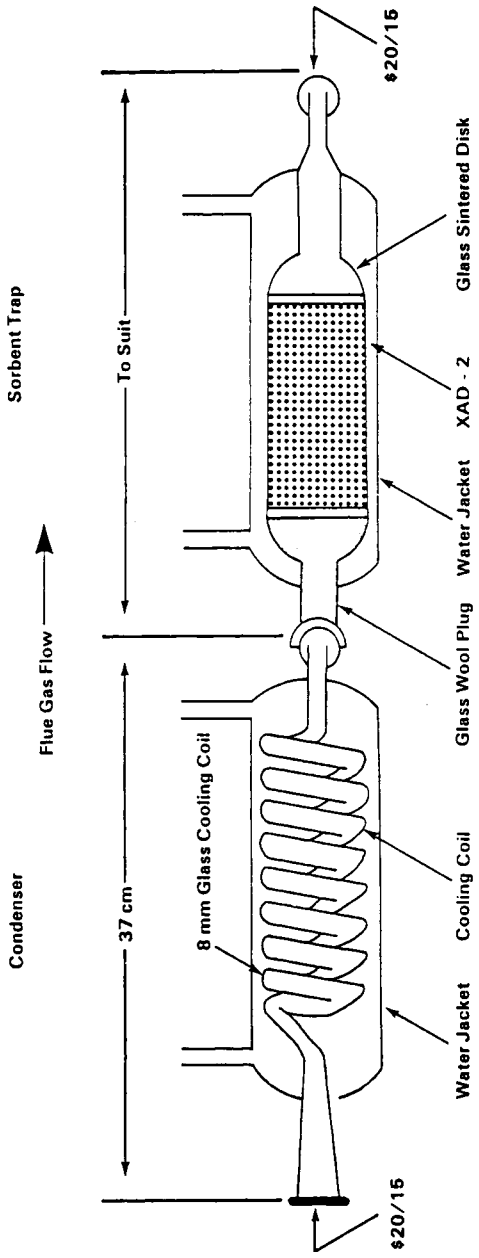

Figure 23.2. Condenser and adsorbent trap

2.2.4 Filter Storage Container. Sealed filter holder, wide-mouth amber glass jar with Teflon-lined cap, or glass petri dish.

2.2.5 Balance. Triple beam.

2.2.6 Aluminum Foil. Heavy duty, hexane-rinsed.

2.2.7 Storage Container. Air-tight container to store silica gel.

2.2.8 Graduated Cylinder. Glass, 250-ml with 2-ml graduation.

2.2.9 Glass Sample Storage Container. Amber glass bottle for sample glassware washes, 500- or 1000-ml, with leak free Teflon-lined caps.

2.3 Analysis.

2.3.1 Sample Container. 125- and 250-ml flint glass bottles with Teflon-lined caps.

2.3.2 Test Tube. Glass.

2.3.3 Soxhlet Extraction Apparatus. Capable of holding 43 × 123 mm extraction thimbles.

2.3.4 Extraction Thimble. Glass, precleaned cellulosic, or glass fiber.

2.3.5 Pasteur Pipettes. For preparing liquid chromatographic columns.

2.3.6 Reacti-vials. Amber glass, 2-ml, silanized prior to use.

2.3.7 Rotary Evaporator. Buchi/Brinkman RF–121 or equivalent.

2.3.8 Nitrogen Evaporative Concentrator. N-Evap Analytical Evaporator Model III or equivalent.

2.3.9 Separatory Funnels. Glass, 2-liter.

2.3.10 Gas Chromatograph. Consisting of the following components:

2.3.10.1 Oven. Capable of maintaining the separation column at the proper operating temperature ±°C and performing programmed increases in temperature at rates of at least 40 °C/min.

2.3.10.2 Temperature Gauge. To monitor column oven, detector, and exhaust temperatures ±1 °C.

2.3.10.3 Flow System. Gas metering system to measure sample, fuel, combustion gas, and carrier gas flows.

2.3.10.4 Capillary Columns. A fused silica column, 60 × 0.25 mm inside diameter (ID), coated with DB–5 and a fused silica column, 30 m × 0.25 mm ID coated with DB–225. Other column systems may be used provided that the user is able to demonstrate using calibration and performance checks that the column system is able to meet the specifications of section 6.1.2.2.

2.3.11 Mass Spectrometer. Capable of routine operation at a resolution of 1:10000 with a stability of ±5 ppm.

2.3.12 Data System. Compatible with the mass spectrometer and capable of monitoring at least five groups of 25 ions.

2.3.13 Analytical Balance. To measure within 0.1 mg.

3. Reagents

3.1 Sampling.

3.1.1 Filters. Glass fiber filters, without organic binder, exhibiting at least 99.95 percent efficiency (<0.05 percent penetration) on 0.3-micron dioctyl phthalate smoke particles. The filter efficiency test shall be conducted in accordance with ASTM Standard Method D 2986–71 (Reapproved 1978) (incorporated by reference—see §60.17).

3.1.1.1 Precleaning. All filters shall be cleaned before their initial use. Place a glass extraction thimble and 1 g of silica gel and a plug of glass wool into a Soxhlet apparatus, charge the apparatus with toluene, and reflux for a minimum of 3 hours. Remove the toluene and discard it, but retain the silica gel. Place no more than 50 filters in the thimble onto the silica gel bed and top with the cleaned glass wool. Charge the Soxhlet with toluene and reflux for 16 hours. After extraction, allow the Soxhlet to cool, remove the filters, and dry them under a clean N_2 stream. Store the filters in a glass petri dish sealed with Teflon tape.

3.1.2 Adsorbent Resin. Amberlite XAD–2 resin. Thoroughly cleaned before initial use.

3.1.2.1 Cleaning Procedure. This procedure may be carried out in a giant Soxhlet extractor. An all-glass filter thimble containing an extra-course frit is used for extraction of XAD–2. The frit is recessed 10–15 mm above a crenelated ring at the bottom of the thimble to facilitate drainage. The resin must be carefully retained in the extractor cup with a glass wool plug and a stainless steel ring because it floats on methylene chloride. This process involves sequential extraction in the following order.

Solvent	Procedure
Water	Initial rinse: Place resin in a beaker, rinse once with water, and discard. Fill with water a second time, let stand overnight, and discard.
Water	Extract with water for 8 hours.
Methanol	Extract for 22 hours.
Methylene Chloride	Extract for 22 hours.
Toluene	Extract for 22 hours.

3.1.2.2 Drying.

3.1.2.2.1 Drying Column. Pyrex pipe, 10.2 cm ID by 0.6 m long, with suitable retainers.

3.1.2.2.2 Procedure. The adsorbent must be dried with clean inert gas. Liquid nitrogen from a standard commercial liquid nitrogen cylinder has proven to be a reliable source of large volumes of gas free from organic contaminants. Connect the liquid nitrogen cylinder to the column by a length of cleaned copper tubing, 0.95 cm ID, coiled to pass through a heat source. A convenient heat source is a water-bath heated from a steam line. The final nitrogen temperature should only be warm to the touch and not over 40 °C. Continue flowing nitrogen through the adsorbent until all the residual solvent is removed. The flow rate should be sufficient to gently agitate the particles but not so excessive as the cause the particles to fracture.

3.1.2.3 Quality Control Check. The adsorbent must be checked for residual toluene.

3.1.2.3.1 Extraction. Weigh 1.0 g sample of dried resin into a small vial, add 3 ml of toluene, cap the vial, and shake it well.

3.1.2.3.2 Analysis. Inject a 2 µl sample of the extract into a gas chromatograph operated under the following conditions:

Column: 6 ft × ⅛ in stainless steel containing 10 percent OV–101 on 100/120 Supelcoport.
Carrier Gas: Helium at a rate of 30 ml/min.
Detector: Flame ionization detector operated at a sensitivity of 4×10^{-11} A/mV.
Injection Port Temperature: 250 °C.
Detector Temperature: 305 °C.
Oven Temperature: 30 °C for 4 min; programmed to rise at 40 °C/min until it reaches 250 °C; return to 30 °C after 17 minutes.

Compare the results of the analysis to the results from the reference solution. Prepare the reference solution by injection 2.5 µl of methylene chloride into 100 ml of toluene. This corresponds to 100 µg of methylene chloride per g of adsorbent. The maximum acceptable concentration is 1000 µg/g of adsorbent. If the adsorbent exceeds this level, drying must be continued until the excess methylene chloride is removed.

3.1.2.4 Storage. The adsorbent must be used within 4 weeks of cleaning. After cleaning, it may be stored in a wide mouth amber glass container with a Teflon-lined cap or placed in one of the glass adsorbent modules tightly sealed with glass stoppers. If precleaned adsorbent is purchased in sealed containers, it must be used within 4 weeks after the seal is broken.

3.1.3 Glass Wool. Cleaned by sequential immersion in three aliquots of methylene chloride, dried in a 110 °C oven, and stored in a methylene chloride-washed glass jar with a Teflon-lined screw cap.

3.1.4 Water. Deionized distilled and stored in a methylene chloride-rinsed glass container with a Teflon-lined screw cap.

3.1.5 Silica Gel. Indicating type, 6 to 16 mesh. If previously used, dry at 175 °C (350 °F) for two hours. New silica gel may be used as received. Alternately other types of desiccants (equivalent or better) may be used, subject to the approval of the Administrator.

3.1.6 Chromic Acid Cleaning Solution. Dissolve 20 g of sodium dichromate in 15 ml of water, and then carefully add 400 ml of concentrated sulfuric acid.

3.2 Sample Recovery.

3.2.2 Acetone. Pesticide quality.

3.2.2 Methylene Chloride. Pesticide qualtity.

3.2.3 Toluene. Pesticide quality.

3.3 Analysis.

3.3.1 Potassium Hydroxide. ACS grade, 2-percent (weight/volume) in water.

3.3.2 Sodium Sulfate. Granulated, reagent grade. Purify prior to use by rinsing with methylene chloride and oven drying. Store the cleaned material in a glass container with a Teflon-lined screw cap.

3.3.3 Sulfuric Acid. Reagent grade.

3.3.4 Sodium Hydroxide. 1.0 N. Weigh 40 g of sodium hydroxide into a 1-liter volumetric flask. Dilute to 1 liter with water.

3.3.5 Hexane. Pesticide grade.

3.3.6 Methylene Chloride. Pesticide grade.

3.3.7 Benzene. Pesticide Grade.

3.3.8 Ethyl Acetate.

3.3.9 Methanol. Pesticide Grade.

3.3.10 Toluene. Pesticide Grade.

3.3.11 Nonane. Pesticide Grade.

3.3.12 Cyclohexane. Pesticide Grade.

3.3.13 Basic Alumina. Activity grade 1, 100–200 mesh. Prior to use, activate the alumina by heating for 16 hours at 130 °C before use. Store in a desiccator. Pre-activated alumina may be purchased from a supplier and may be used as received.

3.3.14 Silica Gel. Bio-Sil A, 100–200 mesh. Prior to use, activate the silica gel by heating for at least 30 minutes at 180 °C. After cooling, rinse the silica gel sequentially with methanol and methylene chloride. Heat the rinsed silica gel at 50 °C for 10 minutes, then increase the temperature gradually to 180 °C over 25 minutes and maintain it at this temperature for 90 minutes. Cool at room temperature and store in a glass container with a Teflon-lined screw cap.

3.3.15 Silica Gel Impregnated with Sulfuric Acid. Combine 100 g of silica gel with 44 g of concentrated sulfuric acid in a screw capped glass bottle and agitate thoroughly. Disperse the solids with a stirring rod until a uniform mixture is obtained. Store the mixture in a glass container with a Teflon-lined screw cap.

3.3.16 Silica Gel Impregnated with Sodium Hydroxide. Combine 39 g of 1 N sodium hydroxide with 100 g of silica gel in a screw capped glass bottle and agitate thoroughly. Disperse solids with a stirring rod until a uniform mixture is obtained. Store the mixture in glass container with a Teflon-lined screw cap.

3.3.17 Carbon/Celite. Combine 10.7 g of AX–21 carbon with 124 g of Celite 545 in a 250-ml glass bottle with a Teflon-lined screw cap. Agitate the mixture thoroughly until a uniform mixture is obtained. Store in the glass container.

3.3.18 Nitrogen. Ultra high purity.

3.3.19 Hydrogen. Ultra high purity.

3.3.20 Internal Standard Solution. Prepare a stock standard solution containing the isotopically labelled PCDD's and PCDF's at the concentrations shown in Table 1 under the heading ''Internal Standards'' in 10 ml of nonane.

3.3.21 Surrogate Standard Solution. Prepare a stock standard solution containing the isotopically labelled PCDD's and PCDF's at the concentrations shown in Table 1 under the heading ''Surrogate Standards'' in 10 ml of nonane.

3.3.22 Recovery Standard Solution. Prepare a stock standard solution containing the

isotopically labelled PCDD's and PCDF's at the concentrations shown in Table 1 under the heading ''Recovery Standards'' in 10 ml of nonane.

4. Procedure

4.1 Sampling. The complexity of this method is such that, in order to obtain reliable results, testers should be trained and experienced with the test procedures.

4.1.1 Pretest Preparation.

4.1.1.1 Cleaning Glassware. All glass components of the train upstream of and including the adsorbent module, shall be cleaned as described in section 3A of the ''Manual of Analytical Methods for the Analysis of Pesticides in Human and Environmental Samples.'' Special care shall be devoted to the removal of residual silicone grease sealants on ground glass connections of used glassware. Any residue shall be removed by soaking the glassware for several hours in a chromic acid cleaning solution prior to cleaning as described above.

4.1.1.2 Adsorbent Trap. The traps must be loaded in a clean area to avoid contamination. They may not be loaded in the field. Fill a trap with 20 to 40 g of XAD–2. Follow the XAD–2 with glass wool and tightly cap both ends of the trap. Add 100 μl of the surrogate standard solution (section 3.3.21) to each trap.

4.1.1.3 Sample Train. It is suggested that all components be maintained according to the procedure described in APTD–0576. Alternative mercury-free thermometers may be used if the thermometers are, at a minimum, equivalent in terms of performance or suitably effective for the specific temperature measurement application.

4.1.1.4 Silica Gel. Weigh several 200 to 300 g portions of silica gel in an air tight container to the nearest 0.5 g. Record the total weight of the silica gel plus container, on each container. As an alternative, the silica gel may be weighed directly in its impinger or sampling holder just prior to sampling.

4.1.1.5 Filter. Check each filter against light for irregularities and flaws or pinhole leaks. Pack the filters flat in a clean glass container.

4.1.2 Preliminary Determinations. Same as section 4.1.2 of Method 5.

4.1.3 Preparation of Collection Train.

4.1.3.1 During preparation and assembly of the sampling train, keep all train openings where contamination can enter, sealed until just prior to assembly or until sampling is about to begin.

NOTE: Do not use sealant grease in assembling the train.

4.1.3.2 Place approximately 100 ml of water in the second and third impingers, leave the first and fourth impingers empty, and transfer approximately 200 to 300 g of preweighed silica gel from its container to the fifth impinger.

4.1.3.3 Place the silica gel container in a clean place for later use in the sample recovery. Alternatively, the weight of the silica gel plus impinger may be determined to the nearest 0.5 g and recorded.

4.1.3.4 Assemble the train as shown in Figure 23–1.

4.1.3.5 Turn on the adsorbent module and condenser coil recirculating pump and begin monitoring the adsorbent module gas entry temperature. Ensure proper sorbent temperature gas entry temperature before proceeding and before sampling is initiated. It is extremely important that the XAD–2 adsorbent resin temperature never exceed 50 °C because thermal decomposition will occur. During testing, the XAD–2 temperature must not exceed 20 °C for efficient capture of the PCDD's and PCDF's.

4.1.4 Leak-Check Procedure. Same as Method 5, section 4.1.4.

4.1.5 Sample Train Operation. Same as Method 5, section 4.1.5.

4.2 Sample Recovery. Proper cleanup procedure begins as soon as the probe is removed from the stack at the end of the sampling period. Seal the nozzle end of the sampling probe with Teflon tape or aluminum foil.

When the probe can be safely handled, wipe off all external particulate matter near the tip of the probe. Remove the probe from the train and close off both ends with aluminum foil. Seal off the inlet to the train with Teflon tape, a ground glass cap, or aluminum foil.

Transfer the probe and impinger assembly to the cleanup area. This area shall be clean and enclosed so that the chances of losing or contaminating the sample are minimized. Smoking, which could contaminate the sample, shall not be allowed in the cleanup area.

Inspect the train prior to and during disassembly and note any abnormal conditions, e.g., broken filters, colored impinger liquid, etc. Treat the samples as follows:

4.2.1 Container No. 1. Either seal the filter holder or carefully remove the filter from the filter holder and place it in its identified container. Use a pair of cleaned tweezers to handle the filter. If it is necessary to fold the filter, do so such that the particulate cake is inside the fold. Carefully transfer to the container any particulate matter and filter fibers which adhere to the filter holder gasket, by using a dry inert bristle brush and a sharp-edged blade. Seal the container.

4.2.2 Adsorbent Module. Remove the module from the train, tightly cap both ends, label it, cover with aluminum foil, and store it on ice for transport to the laboratory.

4.2.3 Container No. 2. Quantitatively recover material deposited in the nozzle, probe transfer lines, the front half of the filter holder, and the cyclone, if used, first, by

brushing while rinsing three times each with acetone and then, by rinsing the probe three times with methylene chloride. Collect all the rinses in Container No. 2.

Rinse the back half of the filter holder three times with acetone. Rinse the connecting line between the filter and the condenser three times with acetone. Soak the connecting line with three separate portions of methylene chloride for 5 minutes each. If using a separate condenser and adsorbent trap, rinse the condenser in the same manner as the connecting line. Collect all the rinses in Container No. 2 and mark the level of the liquid on the container.

4.2.4 Container No. 3. Repeat the methylene chloride-rinsing described in section 4.2.3 using toluene as the rinse solvent. Collect the rinses in Container No. 3 and mark the level of the liquid on the container.

4.2.5 Impinger Water. Measure the liquid in the first three impingers to within ±1 ml by using a graduated cylinder or by weighing it to within ±0.5 g by using a balance. Record the volume or weight of liquid present. This information is required to calculate the moisture content of the effluent gas.

Discard the liquid after measuring and recording the volume or weight.

4.2.7 Silica Gel. Note the color of the indicating silica gel to determine if it has been completely spent and make a mention of its condition. Transfer the silica gel from the fifth impinger to its original container and seal. If a moisture determination is made, follow the applicable procedures in sections 8.7.6.3 and 11.2.3 of Method 5 to handle and weigh the silica gel. If moisture is not measured, the silica gel may be disposed.

5. Analysis

All glassware shall be cleaned as described in section 3A of the ''Manual of Analytical Methods for the Analysis of Pesticides in Human and Environmental Samples.'' All samples must be extracted within 30 days of collection and analyzed within 45 days of extraction.

5.1 Sample Extraction.

5.1.1 Extraction System. Place an extraction thimble (section 2.3.4), 1 g of silica gel, and a plug of glass wool into the Soxhlet apparatus, charge the apparatus with toluene, and reflux for a minimum of 3 hours. Remove the toluene and discard it, but retain the silica gel. Remove the extraction thimble from the extraction system and place it in a glass beaker to catch the solvent rinses.

5.1.2 Container No. 1 (Filter). Transfer the contents directly to the glass thimble of the extraction system and extract them simultaneously with the XAD–2 resin.

5.1.3 Adsorbent Cartridge. Suspend the adsorbent module directly over the extraction thimble in the beaker (See section 5.1.1). The glass frit of the module should be in the up position. Using a Teflon squeeze bottle containing toluene, flush the XAD–2 into the thimble onto the bed of cleaned silica gel. Thoroughly rinse the glass module catching the rinsings in the beaker containing the thimble. If the resin is wet, effective extraction can be accomplished by loosely packing the resin in the thimble. Add the XAD–2 glass wool plug into the thimble.

5.1.4 Container No. 2 (Acetone and Methylene Chloride). Concentrate the sample to a volume of about 1–5 ml using the rotary evaporator apparatus, at a temperature of less than 37 °C. Rinse the sample container three times with small portions of methylene chloride and add these to the concentrated solution and concentrate further to near dryness. This residue contains particulate matter removed in the rinse of the train probe and nozzle. Add the concentrate to the filter and the XAD–2 resin in the Soxhlet apparatus described in section 5.1.1.

5.1.5 Extraction. Add 100 µl of the internal standard solution (Section 3.3.20) to the extraction thimble containing the contents of the adsorbent cartridge, the contents of Container No. 1, and the concentrate from section 5.1.4. Cover the contents of the extraction thimble with the cleaned glass wool plug to prevent the XAD–2 resin from floating into the solvent reservoir of the extractor. Place the thimble in the extractor, and add the toluene contained in the beaker to the solvent reservoir. Pour additional toluene to fill the reservoir approximately ⅔ full. Add Teflon boiling chips and assemble the apparatus. Adjust the heat source to cause the extractor to cycle three times per hour. Extract the sample for 16 hours. After extraction, allow the Soxhlet to cool. Transfer the toluene extract and three 10-ml rinses to the rotary evaporator. Concentrate the extract to approximately 10 ml. At this point the analyst may choose to split the sample in half. If so, split the sample, store one half for future use, and analyze the other according to the procedures in sections 5.2 and 5.3. In either case, use a nitrogen evaporative concentrator to reduce the volume of the sample being analyzed to near dryness. Dissolve the residue in 5 ml of hexane.

5.1.6 Container No. 3 (Toluene Rinse). Add 100 µl of the Internal Standard solution (section 3.3.2) to the contents of the container. Concentrate the sample to a volume of about 1–5 ml using the rotary evaporator apparatus at a temperature of less than 37 °C. Rinse the sample container apparatus at a temperature of less than 37 °C. Rinse the sample container three times with small portions of toluene and add these to the concentrated solution and concentrate further to near dryness. Analyze the extract separately according to the procedures in sections 5.2 and 5.3, but concentrate the solution in a rotary evaporator apparatus rather than a nitrogen evaporative concentrator.

5.2 Sample Cleanup and Fractionation.

5.2.1 Silica Gel Column. Pack one end of a glass column, 20 mm × 230 mm, with glass wool. Add in sequence, 1 g silica gel, 2 g of sodium hydroxide impregnated silica gel, 1 g silica gel, 4 g of acid-modified silica gel, and 1 g of silica gel. Wash the column with 30 ml of hexane and discard it. Add the sample extract, dissolved in 5 ml of hexane to the column with two additional 5-ml rinses. Elute the column with an additional 90 ml of hexane and retain the entire eluate. Concentrate this solution to a volume of about 1 ml using the nitrogen evaporative concentrator (section 2.3.7).

5.2.2 Basic Alumina Column. Shorten a 25-ml disposable Pasteur pipette to about 16 ml. Pack the lower section with glass wool and 12 g of basic alumina. Transfer the concentrated extract from the silica gel column to the top of the basic alumina column and elute the column sequentially with 120 ml of 0.5 percent methylene chloride in hexane followed by 120 ml of 35 percent methylene chloride in hexane. Discard the first 120 ml of eluate. Collect the second 120 ml of eluate and concentrate it to about 0.5 ml using the nitrogen evaporative concentrator.

5.2.3 AX–21 Carbon/Celite 545 Column. Remove the botton 0.5 in. from the tip of a 9-ml disposable Pasteur pipette. Insert a glass fiber filter disk in the top of the pipette 2.5 cm from the constriction. Add sufficient carbon/celite mixture to form a 2 cm column. Top with a glass wool plug. In some cases AX–21 carbon fines may wash through the glass wool plug and enter the sample. This may be prevented by adding a celite plug to the exit end of the column. Rinse the column in sequence with 2 ml of 50 percent benzene in ethyl acetate, 1 ml of 50 percent methylene chloride in cyclohexane, and 2 ml of hexane. Discard these rinses. Transfer the concentrate in 1 ml of hexane from the basic alumina column to the carbon/celite column along with 1 ml of hexane rinse. Elute the column sequentially with 2 ml of 50 percent methylene chloride in hexane and 2 ml of 50 percent benzene in ethyl acetate and discard these eluates. Invert the column and elute in the reverse direction with 13 ml of toluene. Collect this eluate. Concentrate the eluate in a rotary evaporator at 50 °C to about 1 ml. Transfer the concentrate to a Reacti-vial using a toluene rinse and concentrate to a volume of 200 µl using a stream of N_2. Store extracts at room temperature, shielded from light, until the analysis is performed.

5.3 Analysis. Analyze the sample with a gas chromatograph coupled to a mass spectrometer (GC/MS) using the instrumental parameters in sections 5.3.1 and 5.3.2. Immediately prior to analysis, add a 20 µl aliquot of the Recovery Standard solution from Table 1 to each sample. A 2 µl aliquot of the extract is injected into the GC. Sample extracts are first analyzed using the DB–5 capillary column to determine the concentration of each isomer of PCDD's and PCDF's (tetra-through octa-). If tetra-chlorinated dibenzofurans are detected in this analysis, then analyze another aliquot of the sample in a separate run, using the DB–225 column to measure the 2,3,7,8 tetra-chloro dibenzofuran isomer. Other column systems may be used, provided that the user is able to demonstrate using calibration and performance checks that the column system is able to meet the specifications of section 6.1.2.2.

5.3.1 Gas Chromatograph Operating Conditions.

5.3.1.1 Injector. Configured for capillary column, splitless, 250 °C.

5.3.1.2 Carrier Gas. Helium, 1–2 ml/min.

5.3.1.3 Oven. Initially at 150 °C. Raise by at least 40 °C/min to 190 °C and then at 3 °C/min up to 300 °C.

5.3.2 High Resolution Mass Spectrometer.

5.3.2.1 Resolution. 10000 m/e.

5.3.2.2 Ionization Mode. Electron impact.

5.3.2.3 Source Temperature 250 °C.

5.3.2.4 Monitoring Mode. Selected ion monitoring. A list of the various ions to be monitored is summarized in Table 3.

5.3.2.5 Identification Criteria. The following identification criteria shall be used for the characterization of polychlorinated dibenzodioxins and dibenzofurans.

1. The integrated ion-abundance ratio (M/M + 2 or M + 2/M + 4) shall be within 15 percent of the theoretical value. The acceptable ion-abundance ratio ranges for the identification of chlorine-containing compounds are given in Table 4.

2. The retention time for the analytes must be within 3 seconds of the corresponding ^{13}C-labeled internal standard, surrogate or alternate standard.

3. The monitored ions, shown in Table 3 for a given analyte, shall reach their maximum within 2 seconds of each other.

4. The identification of specific isomers that do not have corresponding ^{13}C-labeled standards is done by comparison of the relative retention time (RRT) of the analyte to the nearest internal standard retention time with reference (i.e., within 0.005 RRT units) to the comparable RRT's found in the continuing calibration.

5. The signal to noise ratio for all monitored ions must be greater than 2.5.

6. The confirmation of 2, 3, 7, 8–TCDD and 2, 3, 7, 8–TCDF shall satisfy all of the above identification criteria.

7. For the identification of PCDF's, no signal may be found in the corresponding PCDPE channels.

5.3.2.6 Quantification. The peak areas for the two ions monitored for each analyte are summed to yield the total response for each analyte. Each internal standard is used to quantify the indigenous PCDD's or PCDF's in its homologous series. For example, the $^{13}C_{12}$–2,3,7,8-tetra chlorinated dibenzodioxin is used to calculate the concentrations of all

other tetra chlorinated isomers. Recoveries of the tetra- and penta- internal standards are calculated using the $^{13}C_{12}$–1,2,3,4–TCDD. Recoveries of the hexa- through octa- internal standards are calculated using $^{13}C_{12}$–1,2,3,7,8,9–HxCDD. Recoveries of the surrogate standards are calculated using the corresponding homolog from the internal standard.

6. Calibration

Same as Method 5 with the following additions.

6.1 GC/MS System.

6.1.1 Initial Calibration. Calibrate the GC/MS system using the set of five standards shown in Table 2. The relative standard deviation for the mean response factor from each of the unlabeled analytes (Table 2) and of the internal, surrogate, and alternate standards shall be less than or equal to the values in Table 5. The signal to noise ratio for the GC signal present in every selected ion current profile shall be greater than or equal to 2.5. The ion abundance ratios shall be within the control limits in Table 4.

6.1.2 Daily Performance Check.

6.1.2.1 Calibration Check. Inject on µl of solution Number 3 from Table 2. Calculate the relative response factor (RRF) for each compound and compare each RRF to the corresponding mean RRF obtained during the initial calibration. The analyzer performance is acceptable if the measured RRF's for the labeled and unlabeled compounds for the daily run are within the limits of the mean values shown in Table 5. In addition, the ion-abundance ratios shall be within the allowable control limits shown in Table 4.

6.1.2.2 Column Separation Check. Inject a solution of a mixture of PCDD's and PCDF's that documents resolution between 2,3,7,8–TCDD and other TCDD isomers. Resolution is defined as a valley between peaks that is less than 25 percent of the lower of the two peaks. Identify and record the retention time windows for each homologous series.

Perform a similar resolution check on the confirmation column to document the resolution between 2,3,7,8 TCDF and other TCDF isomers.

6.2 Lock Channels. Set mass spectrometer lock channels as specified in Table 3. Monitor the quality control check channels specified in Table 3 to verify instrument stability during the analysis.

7. Quality Control

7.1 Sampling Train Collection Efficiency Check. Add 100 µl of the surrogate standards in Table 1 to the absorbent cartridge of each train before collecting the field samples.

7.2 Internal Standard Percent Recoveries. A group of nine carbon labeled PCDD's and PCDF's representing, the tetra-through octachlorinated homologues, is added to every sample prior to extraction. The role of the internal standards is to quantify the native PCDD's and PCDF's present in the sample as well as to determine the overall method efficiency. Recoveries of the internal standards must be between 40 to 130 percent for the tetra-through hexachlorinated compounds while the range is 25 to 130 percent for the higher hepta- and octachlorinated homologues.

7.3 Surrogate Recoveries. The five surrogate compounds in Table 2 are added to the resin in the adsorbent sampling cartridge before the sample is collected. The surrogate recoveries are measured relative to the internal standards and are a measure of collection efficiency. They are not used to measure native PCDD's and PCDF's. All recoveries shall be between 70 and 130 percent. Poor recoveries for all the surrogates may be an indication of breakthrough in the sampling train. If the recovery of all standards is below 70 percent, the sampling runs must be repeated. As an alternative, the sampling runs do not have to be repeated if the final results are divided by the fraction of surrogate recovery. Poor recoveries of isolated surrogate compounds should not be grounds for rejecting an entire set of the samples.

7.4 Toluene QA Rinse. Report the results of the toluene QA rinse separately from the total sample catch. Do not add it to the total sample.

8.0 [Reserved]

9. Calculations

Same as Method 5, section 6 with the following additions.

9.1 Nomenclature.

A_{ai} = Integrated ion current of the noise at the retention time of the analyte.

A^*_{ci} = Integrated ion current of the two ions characteristic of the internal standard i in the calibration standard.

A_{cij} = Integrated ion current of the two ions characteristic of compound i in the jth calibration standard.

A^*_{cij} = Integrated ion current of the two ions characteristic of the internal standard i in the jth calibration standard.

A_{csi} = Integrated ion current of the two ions characteristic of surrogate compound i in the calibration standard.

A_i = Integrated ion current of the two ions characteristic of compound i in the sample.

A^*_i = Integrated ion current of the two ions characteristic of internal standard i in the sample.

A_{rs} = Integrated ion current of the two ions characteristic of the recovery standard.

A_{si} = Integrated ion current of the two ions characteristic of surrogate compound i in the sample.

C_i = Concentration of PCDD or PCDF i in the sample, pg/M^3.

C_T = Total concentration of PCDD's or PCDF's in the sample, pg/M^3.
m_{ci} = Mass of compound i in the calibration standard injected into the analyzer, pg.
m_{rs} = Mass of recovery standard in the calibration standard injected into the analyzer, pg.
m_{si} = Mass of surrogate compound in the calibration standard, pg.
RRF_i = Relative response factor.
RRF_{rs} = Recovery standard response factor.
RRF_s = Surrogate compound response factor.

9.2 Average Relative Response Factor.

$$RRF_i = \frac{1}{n}\sum_{j=1}^{n}\frac{A_{cij}\, m^*_{ci}}{A^*_{cij}\, m_{ci}} \qquad \text{Eq. 23-1}$$

9.3 Concentration of the PCDD's and PCDF's.

$$C_i = \frac{m_i^* A_i}{A_i^* RRF_i V_{mstd}} \qquad \text{Eq. 23-2}$$

9.4 Recovery Standard Response Factor.

$$RRF_{rs} = \frac{A_{ci}^* m_{rs}}{A_{rs} m_{ci}^*} \qquad \text{Eq. 23-3}$$

9.5 Recovery of Internal Standards (R*).

$$R^* = \frac{A_i^* m_{rs}}{A_{rs} RF_{rs} m_i^*} \times 100\% \qquad \text{Eq. 23-4}$$

9.6 Surrogate Compound Response Factor.

$$RRF_s = \frac{A_{ci}^* m_s}{A_{cis} m_{ci}^*} \qquad \text{Eq. 23-5}$$

9.7 Recovery of Surrogate Compounds (R_s).

$$R_s = \frac{A_s m_i^*}{A_i^* RRF_s m_s} \times 100\% \qquad \text{Eq. 23-6}$$

9.8 Minimum Detectable Limit (MDL).

$$MDL = \frac{2.5\, A_{ai} m_i^*}{A_{ci}^* RRF_i} \qquad \text{Eq. 23-7}$$

9.9 Total Concentration of PCDD's and PCDF's in the Sample.

$$C_{Tr} = \sum_{i=1}^{n} C_i \qquad \text{Eq. 23-8}$$

Any PCDD's or PCDF's that are reported as nondetected (below the MDL) shall be counted as zero for the purpose of calculating the total concentration of PCDD's and PCDF's in the sample.

10. Bibliography

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TABLE 1—COMPOSITION OF THE SAMPLE FORTIFICATION AND RECOVERY STANDARDS SOLUTIONS

Analyte	Concentration (pg/μl)
Internal Standards:	
$^{13}C_{12}$-2,3,7,8-TCDD	100
$^{13}C_{12}$-1,2,3,7,8-PeCDD	100
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	100
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	100
$^{13}C_{12}$-OCDD	100
$^{13}C_{12}$-2,3,7,8-TCDF	100
$^{13}C_{12}$-1,2,3,7,8-PeCDF	100
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	100
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	100
Surrogate Standards:	
$^{37}Cl_4$-2,3,7,8-TCDD	100
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	100
$^{13}C_{12}$-2,3,4,7,8-PeCDF	100
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	100
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	100
Recovery Standards:	
$^{13}C_{12}$-1,2,3,4-TCDD	500
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	500

TABLE 2—COMPOSITION OF THE INITIAL CALIBRATION SOLUTIONS

Compound	Concentrations (pg/μL)				
	Solution No.				
	1	2	3	4	5
Alternate Standard:					
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	2.5	5	25	250	500

TABLE 2—COMPOSITION OF THE INITIAL CALIBRATION SOLUTIONS—Continued

Compound	Concentrations (pg/μL)				
	Solution No.				
	1	2	3	4	5
Recovery Standards:					
$^{13}C_{12}$-1,2,3,4-TCDD ..	100	100	100	100	100

TABLE 2—COMPOSITION OF THE INITIAL CALIBRATION SOLUTIONS—Continued

Compound	Concentrations (pg/μL)				
	Solution No.				
	1	2	3	4	5
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	100	100	100	100	100

TABLE 3—ELEMENTAL COMPOSITIONS AND EXACT MASSES OF THE IONS MONITORED BY HIGH RESOLUTION MASS SPECTROMETRY FOR PCDD'S AND PCDF'S

Descriptor No.	Accurate mass	Ion type	Elemental composition	Analyte
2	292.9825	LOCK	C_7F_{11}	PFK
	303.9016	M	$C_{12}H_4{}^{35}Cl_4O$	TCDF
	305.8987	M + 2	$C_{12}H_4{}^{35}Cl^{37}O$	TCDF
	315.9419	M	$^{13}C_{12}H_4{}^{35}Cl_4O$	TCDF (S)
	317.9389	M + 2	$^{13}C_{12}H_4{}^{35}Cl_3{}^{37}ClO$	TCDF (S)
	319.8965	M	$C_{12}H_4{}^{35}ClO_2$	TCDD
	321.8936	M + 2	$C_{12}H_4{}^{35}Cl_3{}^{37}ClO_2$	TCDD
	327.8847	M	$C_{12}H_4{}^{37}Cl_4O_2$	TCDD (S)
	330.9792	QC	C_7F_{13}	PFK
	331.9368	M	$^{13}C_{12}H_4{}^{35}Cl_4O_2$	TCDD (S)
	333.9339	M + 2	$^{13}C_{12}H_4{}^{35}Cl^{37}ClO_2$	TCDD (S)
	339.8597	M + 2	$C_{12}H_3{}^{35}Cl_4{}^{37}ClO$	PECDF
	341.8567	M + 4	$C_{12}H_3{}^{35}Cl_3{}^{37}Cl_2O$	PeCDF
	351.9000	M + 2	$^{13}C_{12}H_3{}^{35}Cl_4{}^{37}ClO$	PeCDF (S)
	353.8970	M + 4	$^{13}C_{12}H_3{}^{35}Cl^{3537}Cl_2O$	PeCDF (S)
	355.8546	M + 2	$C_{12}H_3{}^{35}Cl_3{}^{37}ClO_2$	PeCDD
	357.8516	M + 4	$C_{12}H_3{}^{35}Cl_3{}^{37}Cl_2O_2$	PeCDD
	367.8949	M + 2	$^{13}C_{12}H_3{}^{35}Cl_4{}^{37}ClO_2$	PeCDD (S)
	369.8919	M + 4	$^{13}C_{12}H_3{}^{35}Cl_3{}^{37}\ Cl_2O_2$	PeCDD (S)
	375.8364	M + 2	$C_{12}H_4{}^{35}Cl_5{}^{37}ClO$	HxCDPE
	409.7974	M + 2	$C_{12}H_3{}^{35}Cl_6{}^{37}ClO$	HpCPDE
3	373.8208	M + 2	$C_{12}H_2{}^{35}35Cl_5{}^{37}ClO$	HxCDF
	375.8178	M + 4	$C_{12}H_2{}^{35}Cl_4{}^{37}Cl_2O$	HxCDF
	383.8639	M	$^{13}C_{12}H_2{}^{35}Cl_6O$	HxCDF (S)
	385.8610	M + 2	$^{13}C_{12}H_2{}^{35}Cl_5{}^{37}ClO$	HxCDF (S)
	389.8157	M + 2	$C_{12}H_2{}^{35}Cl_5{}^{37}ClO_2$	HxCDD
	391.8127	M + 4	$C_{12}H_2{}^{35}Cl_4{}^{37}Cl_2O_2$	HxCDD
	392.9760	LOCK	C_9F_{15}	PFK
	401.8559	M + 2	$^{13}C_{12}H_2{}^{35}Cl_5{}^{37}ClO_2$	HxCDD (S)
	403.8529	M + 4	$^{13}C_{12}H_2{}^{35}Cl_4{}^{37}Cl_2O$	HxCDD (S)
	445.7555	M + 4	$C_{12}H_2{}^{35}Cl_6{}^{37}Cl_2O$	OCDPE
	430.9729	QC	C_9F_{17}	PFK
4	407.7818	M + 2	$C_{12}H^{35}Cl_6{}^{37}ClO$	HpCDF
	409.7789	M + 4	$C_{12}H^{35}Cl_5{}^{37}Cl_2O$	HpCDF
	417.8253	M	$^{13}C_{12}H^{35}Cl_7O$	HpCDF (S)
	419.8220	M + 2	$^{13}C_{12}H^{35}Cl_6{}^{37}ClO$	HpCDF (S)
	423.7766	M + 2	$C_{12}H^{35}Cl_6{}^{37}ClO_2$	HpCDD
	425.7737	M + 4	$C_{12}H^{35}Cl_5{}^{37}Cl_2O_2$	HpCDD
	435.8169	M + 2	$^{13}C_{12}H^{35}Cl_6{}^{37}ClO_2$	HpCDD (S)
	437.8140	M + 4	$^{13}C_{12}H^{35}Cl_5{}^{37}Cl_2O_2$	HpCDD (S)
	479.7165	M + 4	$C_{12}H^{35}Cl_7{}^{37}Cl_2O$	NCPDE
	430.9729	LOCK	C_9F_{17}	PFK
	441.7428	M + 2	$C_{12}{}^{35}Cl_7{}^{37}ClO$	OCDF
	443.7399	M + 4	$C_{12}{}^{35}Cl_6{}^{37}Cl_2O$	OCDF
	457.7377	M + 2	$C_{12}{}^{35}Cl_7{}^{37}ClO_2$	OCDD
	459.7348	M + 4	$C_{12}{}^{35}Cl_6{}^{37}Cl_2O_2$	OCDD
	469.7779	M + 2	$^{13}C_{12}{}^{35}Cl_7{}^{37}ClO_2$	OCDD (S)
	471.7750	M + 4	$^{13}C_{12}{}^{35}Cl_6{}^{37}Cl_2O_2$	OCDD (S)
	513.6775	M + 4	$C_{12}{}^{35}Cl_8{}^{37}Cl_2O_2$	DCDPE
	442.9728	QC	$C_{10}F_{17}$	PFK

(a) The following nuclidic masses were used:
H = 1.007825
C = 12.000000
^{13}C = 13.003355
F = 18.9984
O = 15.994915
^{35}Cl = 34.968853
^{37}Cl = 36.965903

S = Labeled Standard
QC = Ion selected for monitoring instrument stability during the GC/MS analysis.

TABLE 4—ACCEPTABLE RANGES FOR ION-ABUNDANCE RATIOS OF PCDD'S AND PCDF'S

No. of chlorine atoms	Ion type	Theoretical ratio	Control limits	
			Lower	Upper
4	M/M + 2	0.77	0.65	0.89
5	M + 2/M + 4	1.55	1.32	1.78
6	M + 2/M + 4	1.24	1.05	1.43
6[a]	M/M + 2	0.51	0.43	0.59
7[b]	M/M + 2	0.44	0.37	0.51
7	M + 2/M + 4	1.04	0.88	1.20
8	M + 2/M + 4	0.89	0.76	1.02

[a] Used only for ^{13}C-HxCDF.
[b] Used only for ^{13}C-HpCDF.

TABLE 5—MINIMUM REQUIREMENTS FOR INITIAL AND DAILY CALIBRATION RESPONSE FACTORS

Compound	Relative response factors	
	Initial calibration RSD	Daily calibration % difference
Unlabeled Analytes:		
2,3,7,8-TCDD	25	25
2,3,7,8-TCDF	25	25
1,2,3,7,8-PeCDD	25	25
1,2,3,7,8-PeCDF	25	25
2,3,4,7,8-PeCDF	25	25
1,2,4,5,7,8-HxCDD	25	25
1,2,3,6,7,8-HxCDD	25	25
1,2,3,7,8,9-HxCDD	25	25
1,2,3,4,7,8-HxCDF	25	25
1,2,3,6,7,8-HxCDF	25	25
1,2,3,7,8,9-HxCDF	25	25
2,3,4,6,7,8-HxCDF	25	25
1,2,3,4,6,7,8-HpCDD	25	25
1,2,3,4,6,7,8-HpCDF	25	25
OCDD	25	25
OCDF	30	30
Internal Standards:		
$^{13}C_{12}$-2,3,7,8-TCDD	25	25
$^{13}C_{12}$-1,2,3,7,8-PeCDD	30	30
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	25	25
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	30	30
$^{13}C_{12}$-OCDD	30	30
$^{13}C_{12}$-2,3,7,8-TCDF	30	30
$^{13}C_{12}$-1,2,3,7,8-PeCDF	30	30
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	30	30
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	30	30
Surrogate Standards:		
$^{37}Cl_4$-2,3,7,8-TCDD	25	25
$^{13}C_{12}$-2,3,4,7,8-PeCDF	25	25
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	25	25
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	25	25
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	25	25
Alternate Standard:		
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	25	25

METHOD 24—DETERMINATION OF VOLATILE MATTER CONTENT, WATER CONTENT, DENSITY, VOLUME SOLIDS, AND WEIGHT SOLIDS OF SURFACE COATINGS

1.0 Scope and Application

1.1 Analytes.

Analyte	CAS No.
Volatile organic compounds	No CAS Number assigned
Water.	7732–18–5

1.2 Applicability. This method is applicable for the determination of volatile matter content, water content, density, volume solids, and weight solids of paint, varnish, lacquer, or other related surface coatings.

1.3 Precision and Bias. Intra-and inter-laboratory analytical precision statements are presented in section 13.1. No bias has been identified.

2.0 Summary of Method

2.1 Standard methods are used to determine the volatile matter content, water content, density, volume solids, and weight solids of paint, varnish, lacquer, or other related surface coatings.

3.0 Definitions

3.1 *Waterborne coating* means any coating which contains more than 5 percent water by weight in its volatile fraction.

3.2 *Multicomponent coatings* are coatings that are packaged in two or more parts, which are combined before application. Upon combination a coreactant from one part of the coating chemically reacts, at ambient conditions, with a coreactant from another part of the coating.

3.3 *Ultraviolet (UV) radiation-cured coatings* are coatings which contain unreacted monomers that are polymerized by exposure to ultraviolet light.

4.0 Interferences [Reserved]

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to performing this test method.

5.2 Hazardous Components. Several of the compounds that may be contained in the coatings analyzed by this method may be irritating or corrosive to tissues (e.g., heptane) or may be toxic (e.g., benzene, methyl alcohol). Nearly all are fire hazards.

Appropriate precautions can be found in reference documents, such as Reference 3 of section 16.0.

6.0 Equipment and Supplies

The equipment and supplies specified in the ASTM methods listed in sections 6.1 through 6.6 (incorporated by reference—see §60.17 for acceptable versions of the methods) are required:

6.1 ASTM D 1475–60, 80, or 90, Standard Test Method for Density of Paint, Varnish, Lacquer, and Related Products.

6.2 ASTM D 2369–81, 87, 90, 92, 93, or 95, Standard Test Method for Volatile Content of Coatings.

6.3 ASTM D 3792–79 or 91, Standard Test Method for Water Content of Water Reducible Paints by Direct Injection into a Gas Chromatograph.

6.4 ASTM D 4017–81, 90, or 96a, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method.

6.5 ASTM 4457–85 91, Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph.

6.6 ASTM D 5403–93, Standard Test Methods for Volatile Content of Radiation Curable Materials.

6.7 ASTM D 6419–00, Test Method for Volatile Content of Sheet-Fed and Coldset Web Offset Printing Inks.

7.0 Reagents and Standards

7.1 The reagents and standards specified in the ASTM methods listed in sections 6.1 through 6.6 are required.

8.0 Sample Collection, Preservation, Storage, and Transport

8.1 Follow the sample collection, preservation, storage, and transport procedures described in Reference 1 of section 16.0.

9.0 Quality Control

9.1 Reproducibility

NOTE: Not applicable to UV radiation-cured coatings). The variety of coatings that may be subject to analysis makes it necessary to verify the ability of the analyst and the analytical procedures to obtain reproducible results for the coatings tested. Verification is accomplished by running duplicate analyses on each sample tested (Sections 11.2 through 11.4) and comparing the results with the intra-laboratory precision statements (Section 13.1) for each parameter.

9.2 Confidence Limits for Waterborne Coatings. Because of the inherent increased imprecision in the determination of the VOC content of waterborne coatings as the weight percent of water increases, measured parameters for waterborne coatings are replaced with appropriate confidence limits (Section 12.6). These confidence limits are based on measured parameters and inter-laboratory precision statements.

10.0 Calibration and Standardization

10.1 Perform the calibration and standardization procedures specified in the ASTM methods listed in sections 6.1 through 6.6.

11.0 Analytical Procedure

Additional guidance can be found in Reference 2 of section 16.0.

11.1 Non Thin-film Ultraviolet Radiation-cured (UV radiation-cured) Coatings.

11.1.1 Volatile Content. Use the procedure in ASTM D 5403 to determine the volatile matter content of the coating except the curing test described in NOTE 2 of ASTM D 5403 is required.

11.1.2 Water Content. To determine water content, follow section 11.3.2.

11.1.3 Coating Density. To determine coating density, follow section 11.3.3.

11.1.4 Solids Content. To determine solids content, follow section 11.3.4.

11.1.5 To determine if a coating or ink can be classified as a thin-film UV cured coating or ink, use the equation in section 12.2. If C is less than 0.2 g and A is greater than or equal to 225 cm^2 (35 in^2) then the coating or ink is considered a thin-film UV radiation-cured coating and ASTM D 5403 is not applicable.

NOTE: As noted in section 1.4 of ASTM D 5403, this method may not be applicable to radiation curable materials wherein the volatile material is water.

11.2 Multi-component Coatings.

11.2.1 Sample Preparation.

11.2.1.1 Prepare about 100 ml of sample by mixing the components in a storage container, such as a glass jar with a screw top or a metal can with a cap. The storage container should be just large enough to hold the mixture. Combine the components (by weight or volume) in the ratio recommended by the manufacturer. Tightly close the container between additions and during mixing to prevent loss of volatile materials. However, most manufacturers mixing instructions are by volume. Because of possible error caused by expansion of the liquid when measuring the volume, it is recommended that the components be combined by weight. When weight is used to combine the components and the manufacturer's recommended ratio is by volume, the density must be determined by section 11.3.3.

11.2.1.2 Immediately after mixing, take aliquots from this 100 ml sample for determination of the total volatile content, water content, and density.

11.2.2 Volatile Content. To determine total volatile content, use the apparatus and

reagents described in ASTM D2369 (incorporated by reference; see §60.17 for the approved versions of the standard), respectively, and use the following procedures:

11.2.2.1 Weigh and record the weight of an aluminum foil weighing dish. Add 3 ±1 ml of suitable solvent as specified in ASTM D2369 to the weighing dish. Using a syringe as specified in ASTM D2369, weigh to 1 mg, by difference, a sample of coating into the weighing dish. For coatings believed to have a volatile content less than 40 weight percent, a suitable size is 0.3 + 0.10 g, but for coatings believed to have a volatile content greater than 40 weight percent, a suitable size is 0.5 ±0.1 g.

NOTE: If the volatile content determined pursuant to section 12.4 is not in the range corresponding to the sample size chosen repeat the test with the appropriate sample size. Add the specimen dropwise, shaking (swirling) the dish to disperse the specimen completely in the solvent. If the material forms a lump that cannot be dispersed, discard the specimen and prepare a new one. Similarly, prepare a duplicate. The sample shall stand for a minimum of 1 hour, but no more than 24 hours prior to being oven cured at 110 ±5 °C (230 ±9 °F) for 1 hour.

11.2.2.2 Heat the aluminum foil dishes containing the dispersed specimens in the forced draft oven for 60 min at 110 ±5 °C (230 ±9 °F). Caution—provide adequate ventilation, consistent with accepted laboratory practice, to prevent solvent vapors from accumulating to a dangerous level.

11.2.2.3 Remove the dishes from the oven, place immediately in a desiccator, cool to ambient temperature, and weigh to within 1 mg.

11.2.2.4 Run analyses in pairs (duplicate sets) for each coating mixture until the criterion in section 11.4 is met. Calculate W_v following Equation 24–2 and record the arithmetic average.

11.2.3 Water Content. To determine water content, follow section 11.3.2.

11.2.4 Coating Density. To determine coating density, follow section 11.3.3.

11.2.5 Solids Content. To determine solids content, follow section 11.3.4.

11.2.6 Exempt Solvent Content. To determine the exempt solvent content, follow section 11.3.5.

NOTE: For all other coatings (*i.e.*, water-or solvent-borne coatings) not covered by multicomponent or UV radiation-cured coatings, analyze as shown below:

11.3 Water-or Solvent-borne coatings.

11.3.1 Volatile Content. Use the procedure in ASTM D 2369 to determine the volatile matter content (may include water) of the coating.

11.3.1.1 Record the following information:

W_1 = weight of dish and sample before heating, g

W_2 = weight of dish and sample after heating, g

W_3 = sample weight, g.

11.3.1.2 Calculate the weight fraction of the volatile matter (W_v) for each analysis as shown in section 12.3.

11.3.1.3 Run duplicate analyses until the difference between the two values in a set is less than or equal to the intra-laboratory precision statement in section 13.1.

11.3.1.4 Record the arithmetic average (W_v).

11.3.2 Water Content. For waterborne coatings only, determine the weight fraction of water (W_w) using either ASTM D 3792 or ASTM D 4017.

11.3.2.1 Run duplicate analyses until the difference between the two values in a set is less than or equal to the intra-laboratory precision statement in section 13.1.

11.3.2.2 Record the arithmetic average (w_w).

11.3.3 Coating Density. Determine the density (Dc, kg/l) of the surface coating using the procedure in ASTM D 1475.

11.3.3.1 Run duplicate analyses until each value in a set deviates from the mean of the set by no more than the intra-laboratory precision statement in section 13.1.

11.3.3.2 Record the arithmetic average (D_c).

11.3.4 Solids Content. Determine the volume fraction (V_s) solids of the coating by calculation using the manufacturer's formulation.

11.3.5 Exempt Solvent Content. Determine the weight fraction of exempt solvents (W_E) by using ASTM Method D4457. Run a duplicate set of determinations and record the arithmetic average (W_E).

11.4 Sample Analysis Criteria. For W_v and W_w, run duplicate analyses until the difference between the two values in a set is less than or equal to the intra-laboratory precision statement for that parameter. For D_c, run duplicate analyses until each value in a set deviates from the mean of the set by no more than the intra-laboratory precision statement. If, after several attempts, it is concluded that the ASTM procedures cannot be used for the specific coating with the established intra-laboratory precision (excluding UV radiation-cured coatings), the U.S. Environmental Protection Agency (EPA) will assume responsibility for providing the necessary procedures for revising the method or precision statements upon written request to: Director, Emissions, Monitoring, and Analysis Division, MD–14, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

12.0 Calculations and Data Analysis

12.1 Nomenclature.

A = Area of substrate, cm^2, (in^2).

C = Amount of coating or ink added to the substrate, g.

D_c = Density of coating or ink, g/cm^3 (g/in^3).

F = Manufacturer's recommended film thickness, cm (in).
W_o = Weight fraction of nonaqueous volatile matter, g/g.
W_s = Weight fraction of solids, g/g.
W_v = Weight fraction of the volatile matter, g/g.
W_w = Weight fraction of the water, g/g.

12.2 To determine if a coating or ink can be classified as a thin-film UV cured coating or ink, use the following equation:

$$C = F A D_c \qquad \text{Eq. 24-1}$$

12.3 Calculate W_v for each analysis as shown below:

$$W_v = \frac{W_1 - W_2}{W_3} \qquad \text{Eq. 24-2}$$

12.4 Nonaqueous Volatile Matter.
12.4.1 Solvent-borne Coatings.

$$W_o = W_v \qquad \text{Eq. 24-3}$$

12.4.2 Waterborne Coatings.

$$W_o = W_v - W_w \qquad \text{Eq. 24-4}$$

12.4.3 Coatings Containing Exempt Solvents.

$$W_o = W_v - W_E - W_w \qquad \text{Eq. 24-5}$$

12.5 Weight Fraction Solids.

$$W_s = 1 - W_v \qquad \text{Eq. 24-6}$$

12.6 Confidence Limit Calculations for Waterborne Coatings. To calculate the lower confidence limit, subtract the appropriate inter-laboratory precision value from the measured mean value for that parameter. To calculate the upper confidence limit, add the appropriate inter-laboratory precision value to the measured mean value for that parameter. For W_v and D_c, use the lower confidence limits; for W_w, use the upper confidence limit. Because W_s is calculated, there is no adjustment for this parameter.

13.0 Method Performance

13.1 Analytical Precision Statements. The intra-and inter-laboratory precision statements are given in Table 24–1 in section 17.0.

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

Same as specified in section 6.0, with the addition of the following:

1. Standard Procedure for Collection of Coating and Ink Samples for Analysis by Reference Methods 24 and 24A. EPA–340/1–91–010. U.S. Environmental Protection Agency, Stationary Source Compliance Division, Washington, D.C. September 1991.

2. Standard Operating Procedure for Analysis of Coating and Ink Samples by Reference Methods 24 and 24A.

EPA–340/1–91–011. U.S. Environmental Protection Agency, Stationary Source Compliance Division, Washington, D.C. September 1991.

3. Handbook of Hazardous Materials: Fire, Safety, Health. Alliance of American Insurers. Schaumberg, IL. 1983.

17.0 Tables, Diagrams, Flowcharts, and Validation Data

TABLE 24–1—ANALYTICAL PRECISION STATEMENTS

	Intra-laboratory	Inter-laboratory
Volatile matter content, W_v	±0.015 $\overline{W}_v$	±0.047 $\overline{W}_v$
Water content, W_w	±0.029 $\overline{W}_w$	±0.075 $\overline{W}_w$
Density, D_c	±0.001 kg/l	±0.002 kg/l

METHOD 24A—DETERMINATION OF VOLATILE MATTER CONTENT AND DENSITY OF PUBLICATION ROTOGRAVURE INKS AND RELATED PUBLICATION ROTOGRAVURE COATINGS

1.0 Scope and Application

1.1 Analytes.

Analyte	CAS No.
Volatile organic compounds (VOC).	No CAS number assigned.

1.2 Applicability. This method is applicable for the determination of the VOC content and density of solvent-borne (solvent-reducible) publication rotogravure inks and related publication rotogravure coatings.

2.0 Summary of Method

2.1 Separate procedures are used to determine the VOC weight fraction and density of the ink or related coating and the density of the solvent in the ink or related coating. The VOC weight fraction is determined by measuring the weight loss of a known sample quantity which has been heated for a specified length of time at a specified temperature. The density of both the ink or related coating and solvent are measured by a standard procedure. From this information, the VOC volume fraction is calculated.

3.0 Definitions [Reserved]

4.0 Interferences [Reserved]

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to performing this test method.

5.2 Hazardous Components. Some of the compounds that may be contained in the inks or related coatings analyzed by this method may be irritating or corrosive to tissues or may be toxic. Nearly all are fire hazards. Appropriate precautions can be found in reference documents, such as Reference 6 of section 16.0.

6.0 Equipment and Supplies

The following equipment and supplies are required for sample analysis:

6.1 Weighing Dishes. Aluminum foil, 58 mm (2.3 in.) in diameter by 18 mm (0.7 in.) high, with a flat bottom. There must be at least three weighing dishes per sample.

6.2 Disposable Syringe. 5 ml.

6.3 Analytical Balance. To measure to within 0.1 mg.

6.4 Oven. Vacuum oven capable of maintaining a temperature of 120 ±2 °C (248 ±4 °F) and an absolute pressure of 510 ±51 mm Hg (20 ±2 in. Hg) for 4 hours. Alternatively, a forced draft oven capable of maintaining a temperature of 120 ±2 °C (248 ±4 °F) for 24 hours.

6.5 The equipment and supplies specified in ASTM D 1475–60, 80, or 90 (incorporated by reference—see §60.17).

7.0 Reagents and Standards

7.1 The reagents and standards specified in ASTM D 1475–60, 80, or 90 are required.

8.0 Sample Collection, Preservation, Storage, and Transport

8.1 Follow the sample collection, preservation, storage, and transport procedures described in Reference 4 of section 16.0.

9.0 Quality Control [Reserved]

10.0 Calibration and Standardization [Reserved]

11.0 Analytical Procedure

Additional guidance can be found in Reference 5 of section 16.0.

11.1 VOC Weight Fraction. Shake or mix the ink or related coating sample thoroughly to assure that all the solids are completely suspended. Label and weigh to the nearest 0.1 mg a weighing dish and record this weight (M_{x1}). Using a 5 ml syringe, without a needle, extract an aliquot from the ink or related coating sample. Weigh the syringe and aliquot to the nearest 0.1 mg and record this weight (M_{cy1}). Transfer 1 to 3 g of the aliquot to the tared weighing dish. Reweigh the syringe and remaining aliquot to the nearest 0.1 mg and record this weight (M_{cy2}). Heat the weighing dish with the transferred aliquot in a vacuum oven at an absolute pressure of 510 ±51 mm Hg (20 ±2 in. Hg) and a temperature of 120 ±2 °C (248 ±4 °F) for 4 hours. Alternatively, heat the weighing dish with the transferred aliquot in a forced draft oven at a temperature of 120 ±2 °C for 24 hours. After the weighing dish has cooled, reweigh it to the nearest 0.1 mg and record the weight (M_{x2}). Repeat this procedure two times for each ink or related coating sample, for a total of three samples.

11.2 Ink or Related Coating Density. Determine the density of the ink or related coating (D_c) according to the procedure outlined in ASTM D 1475. Make a total of three determinations for each ink or related coating sample. Report the ink or related coating density as the arithmetic average (D_c) of the three determinations.

11.3 Solvent Density. Determine the density of the solvent (D_o) according to the procedure outlined in ASTM D 1475. Make a total of three determinations for each ink or related coating sample. Report the solvent density as the arithmetic average (D_o) of the three determinations.

12.0 Calculations and Data Analysis

12.1 VOC Weight Fraction. For each determination, calculate the volatile organic content weight fraction (W_o) using the following equation:

$$W_o = \frac{M_{x1} + M_{cy1} - M_{cy2} - M_{x2}}{M_{cy1} - M_{cy2}} \qquad \text{Eq. 24A-1}$$

Make a total of three determinations. Report the VOC weight fraction as the arithmetic average ($\bar{W}_o$) of the three determinations.

12.2 VOC Volume Fraction. Calculate the volume fraction volatile organic content (V_o) using the following equation:

$$V_o = \frac{\overline{W}_o \overline{D}_c}{\overline{D}_o} \qquad \text{Eq. 24A-2}$$

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. Standard Test Method for Density of Paint, Varnish, Lacquer, and Related Products. ASTM Designation D 1475.

2. Teleconversation. Wright, Chuck, Inmont Corporation with Reich, R., A., Radian Corporation. September 25, 1979, Gravure Ink Analysis.

3. Teleconversation. Oppenheimer, Robert, Gravure Research Institute with Burt, Rick, Radian Corporation, November 5, 1979, Gravure Ink Analysis.

4. Standard Procedure for Collection of Coating and Ink Samples for Analysis by Reference Methods 24 and 24A. EPA–340/1–91–010. U.S. Environmental Protection Agency, Stationary Source Compliance Division, Washington, D.C. September 1991.

5. Standard Operating Procedure for Analysis of Coating and Ink Samples by Reference Methods 24 and 24A. EPA–340/1–91–011. U.S. Environmental Protection Agency, Stationary Source Compliance Division, Washington, D.C. September 1991.

6. Handbook of Hazardous Materials: Fire, Safety, Health. Alliance of American Insurers. Schaumberg, IL. 1983.

17.0 Tables, Diagrams, Flowcharts, and Validation Data [Reserved]

Method 25—Determination of Total Gaseous Nonmethane Organic Emissions as Carbon

1.0 Scope and Application

1.1 Analytes.

Analyte	CAS No.	Sensitivity
Total gaseous nonmethane organic compounds (TGNMO)	N/A	Dependent upon analytical equipment.

1.2 Applicability.

1.2.1 This method is applicable for the determination of volatile organic compounds (VOC) (measured as total gaseous nonmethane organics (TGNMO) and reported as carbon) in stationary source emissions. This method is not applicable for the determination of organic particulate matter.

1.2.2 This method is not the only method that applies to the measurement of VOC. Costs, logistics, and other practicalities of source testing may make other test methods more desirable for measuring VOC contents of certain effluent streams. Proper judgment is required in determining the most applicable VOC test method. For example, depending upon the molecular composition of the organics in the effluent stream, a totally automated semicontinuous nonmethane organics (NMO) analyzer interfaced directly to the source may yield accurate results. This approach has the advantage of providing emission data semicontinuously over an extended time period.

1.2.3 Direct measurement of an effluent with a flame ionization detector (FID) analyzer may be appropriate with prior characterization of the gas stream and knowledge that the detector responds predictably to the organic compounds in the stream. If present, methane (CH_4) will, of course, also be measured. The FID can be used under any of the following limited conditions: (1) Where only one compound is known to exist; (2) when the organic compounds consist of only hydrogen and carbon; (3) where the relative percentages of the compounds are known or can be determined, and the FID responses to the compounds are known; (4) where a consistent mixture of the compounds exists before and after emission control and only the relative concentrations are to be assessed; or (5) where the FID can be calibrated against mass standards of the compounds emitted (solvent emissions, for example).

1.2.4 Another example of the use of a direct FID is as a screening method. If there is enough information available to provide a rough estimate of the analyzer accuracy, the FID analyzer can be used to determine the VOC content of an uncharacterized gas stream. With a sufficient buffer to account for possible inaccuracies, the direct FID can be a useful tool to obtain the desired results without costly exact determination.

1.2.5 In situations where a qualitative/quantitative analysis of an effluent stream is desired or required, a gas chromatographic FID system may apply. However, for sources emitting numerous organics, the time and expense of this approach will be formidable.

2.0 Summary of Method

2.1 An emission sample is withdrawn from the stack at a constant rate through a heated filter and a chilled condensate trap by means of an evacuated sample tank. After sampling is completed, the TGNMO are determined by independently analyzing the condensate trap and sample tank fractions and combining the analytical results. The organic content of the condensate trap fraction is determined by oxidizing the NMO to carbon dioxide (CO_2) and quantitatively collecting in the effluent in an evacuated vessel; then a portion of the CO_2 is reduced to CH_4 and measured by an FID. The organic content of the sample tank fraction is measured by injecting a portion of the sample into a gas chromatographic column to separate the NMO from carbon monoxide (CO), CO_2, and CH_4; the NMO are oxidized to CO_2, reduced to CH_4, and measured by an FID. In this manner, the variable response of the FID associated with different types of organics is eliminated.

3.0 Definitions [Reserved]

4.0 Interferences

4.1 Carbon Dioxide and Water Vapor. When carbon dioxide (CO_2) and water vapor are present together in the stack, they can produce a positive bias in the sample. The magnitude of the bias depends on the concentrations of CO_2 and water vapor. As a guideline, multiply the CO_2 concentration, expressed as volume percent, times the water vapor concentration. If this product does not exceed 100, the bias can be considered insignificant. For example, the bias is not significant for a source having 10 percent CO_2 and 10 percent water vapor, but it might be significant for a source having 10 percent CO_2 and 20 percent water vapor.

4.2. Particulate Matter. Collection of organic particulate matter in the condensate trap would produce a positive bias. A filter is included in the sampling equipment to minimize this bias.

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to performing this test method.

6.0 Equipment and Supplies

6.1 Sample Collection. The sampling system consists of a heated probe, heated filter, condensate trap, flow control system, and sample tank (see Figure 25–1). The TGNMO sampling equipment can be constructed from commercially available components and components fabricated in a machine shop. The following equipment is required:

6.1.1 Heated Probe. 6.4-mm (¼-in.) OD stainless steel tubing with a heating system capable of maintaining a gas temperature at the exit end of at least 129 °C (265 °F). The probe shall be equipped with a temperature sensor at the exit end to monitor the gas temperature. A suitable probe is shown in Figure 25–1. The nozzle is an elbow fitting attached to the front end of the probe while the temperature sensor is inserted in the side arm of a tee fitting attached to the rear of the probe. The probe is wrapped with a suitable length of high temperature heating tape, and then covered with two layers of glass cloth insulation and one layer of aluminum foil or an equivalent wrapping.

NOTE: If it is not possible to use a heating system for safety reasons, an unheated system with an in-stack filter is a suitable alternative.

6.1.2 Filter Holder. 25-mm (15/16-in.) ID Gelman filter holder with 303 stainless steel body and 316 stainless steel support screen with the Viton O-ring replaced by a Teflon O-ring.

6.1.3 Filter Heating System.

6.1.3.1 A metal box consisting of an inner and an outer shell separated by insulating material with a heating element in the inner shell capable of maintaining a gas temperature at the filter of 121 ±3 °C (250 ±5 °F). The heating box shall include temperature sensors to monitor the gas temperature immediately upstream and immediately downstream of the filter.

6.1.3.2 A suitable heating box is shown in Figure 25–2. The outer shell is a metal box that measures 102 mm × 280 mm × 292 mm (4 in. × 11 in. × 11½ in.), while the inner shell is a metal box measuring 76 mm × 229 mm × 241 mm (3 in. × 9 in. × 9½ in.). The inner box is supported by 13-mm (½-in.) phenolic rods. The void space between the boxes is filled with ceramic fiber insulation which is sealed in place by means of a silicon rubber bead around the upper sides of the box. A removable lid made in a similar manner, with a 25-mm (1-in.) gap between the parts is used to cover the heating chamber. The inner box is heated with a 250-watt cartridge heater, shielded by a stainless steel shroud. The heater is regulated by a thermostatic temperature controller which is set to maintain a gas temperature of 121 °C (250 °F) as measured by the temperature sensor upstream of the filter.

NOTE: If it is not possible to use a heating system for safety reasons, an unheated system with an in-stack filter is a suitable alternative.

6.1.4 Condensate Trap. 9.5-mm (⅜-in.) OD 316 stainless steel tubing bent into a U-shape. Exact dimensions are shown in Figure

25–3. The tubing shall be packed with coarse quartz wool, to a density of approximately 0.11 g/cm^3 before bending. While the condensate trap is packed with dry ice in the Dewar, an ice bridge may form between the arms of the condensate trap making it difficult to remove the condensate trap. This problem can be prevented by attaching a steel plate between the arms of the condensate trap in the same plane as the arms to completely fill the intervening space.

6.1.5 Valve. Stainless steel control valve for starting and stopping sample flow.

6.1.6 Metering Valve. Stainless steel valve for regulating the sample flow rate through the sample train.

6.1.7 Rate Meter. Rotameter, or equivalent, capable of measuring sample flow in the range of 60 to 100 cm^3/min (0.13 to 0.21 ft^3/hr).

6.1.8 Sample Tank. Stainless steel or aluminum tank with a minimum volume of 4 liters (0.14 ft^3).

NOTE: Sample volumes greater than 4 liters may be required for sources with low organic concentrations.

6.1.9 Mercury Manometer. U-tube manometer or absolute pressure gauge capable of measuring pressure to within 1 mm Hg in the range of 0 to 900 mm.

6.1.10 Vacuum Pump. Capable of evacuating to an absolute pressure of 10 mm Hg.

6.2 Condensate Recovery. The system for the recovery of the organics captured in the condensate trap consists of a heat source, an oxidation catalyst, a nondispersive infrared (NDIR) analyzer, and an intermediate collection vessel (ICV). Figure 25–4 is a schematic of a typical system. The system shall be capable of proper oxidation and recovery, as specified in section 10.1.1. The following major components are required:

6.2.1 Heat Source. Sufficient to heat the condensate trap (including probe) to a temperature of 200 °C (390 °F). A system using both a heat gun and an electric tube furnace is recommended.

6.2.2 Heat Tape. Sufficient to heat the connecting tubing between the water trap and the oxidation catalyst to 100 °C (212 °F).

6.2.3 Oxidation Catalyst. A suitable length of 9.5 mm (3/8-in.) OD Inconel 600 tubing packed with 15 cm (6 in.) of 3.2 mm (3/8-in.) diameter 19 percent chromia on alumina pellets. The catalyst material is packed in the center of the catalyst tube with quartz wool packed on either end to hold it in place.

6.2.4 Water Trap. Leak-proof, capable of removing moisture from the gas stream.

6.2.5 Syringe Port. A 6.4-mm (1/4-in.) OD stainless steel tee fitting with a rubber septum placed in the side arm.

6.2.6 NDIR Detector. Capable of indicating CO_2 concentration in the range of zero to 5 percent, to monitor the progress of combustion of the organic compounds from the condensate trap.

6.2.7 Flow-Control Valve. Stainless steel, to maintain the trap conditioning system near atmospheric pressure.

6.2.8 Intermediate Collection Vessel. Stainless steel or aluminum, equipped with a female quick connect. Tanks with nominal volumes of at least 6 liters (0.2 ft^3) are recommended.

6.2.9 Mercury Manometer. Same as described in section 6.1.9.

6.2.10 Syringe. 10-ml gas-tight glass syringe equipped with an appropriate needle.

6.2.11 Syringes. 10-µl and 50-µl liquid injection syringes.

6.2.12 Liquid Sample Injection Unit. 316 Stainless steel U-tube fitted with an injection septum (see Figure 25–7).

6.3 Analysis.

6.3.1 NMO Analyzer. The NMO analyzer is a gas chromatograph (GC) with backflush capability for NMO analysis and is equipped with an oxidation catalyst, reduction catalyst, and FID. Figures 25–5 and 25–6 are schematics of a typical NMO analyzer. This semicontinuous GC/FID analyzer shall be capable of: (1) Separating CO, CO_2, and CH_4 from NMO, (2) reducing the CO_2 to CH_4 and quantifying as CH_4, and (3) oxidizing the NMO to CO_2, reducing the CO_2 to CH_4 and quantifying as CH_4, according to section 10.1.2. The analyzer consists of the following major components:

6.3.1.1 Oxidation Catalyst. A suitable length of 9.5-mm (3/8-in.) OD Inconel 600 tubing packed with 5.1 cm (2 in.) of 19 percent chromia on 3.2-mm (1/8-in.) alumina pellets. The catalyst material is packed in the center of the tube supported on either side by quartz wool. The catalyst tube must be mounted vertically in a 650 °C (1200 °F) furnace. Longer catalysts mounted horizontally may be used, provided they can meet the specifications of section 10.1.2.1.

6.3.1.2 Reduction Catalyst. A 7.6-cm (3-in.) length of 6.4-mm (1/4-in.) OD Inconel tubing fully packed with 100-mesh pure nickel powder. The catalyst tube must be mounted vertically in a 400 °C (750 °F) furnace.

6.3.1.3 Separation Column(s). A 30-cm (1-ft) length of 3.2-mm (1/8-in.) OD stainless steel tubing packed with 60/80 mesh Unibeads 1S followed by a 61-cm (2-ft) length of 3.2-mm (1/8-in.) OD stainless steel tubing packed with 60/80 mesh Carbosieve G. The Carbosieve and Unibeads columns must be baked separately at 200 °C (390 °F) with carrier gas flowing through them for 24 hours before initial use.

6.3.1.4 Sample Injection System. A single 10-port GC sample injection valve or a group of valves with sufficient ports fitted with a sample loop properly sized to interface with the NMO analyzer (1-cc loop recommended).

6.3.1.5 FID. An FID meeting the following specifications is required:

6.3.1.5.1 Linearity. A linear response (±5 percent) over the operating range as demonstrated by the procedures established in section 10.1.2.3.

6.3.1.5.2 Range. A full scale range of 10 to 50,000 ppm CH_4. Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale.

6.3.1.6 Data Recording System. Analog strip chart recorder or digital integration system compatible with the FID for permanently recording the analytical results.

6.3.2 Barometer. Mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 1 mm Hg.

6.3.3 Temperature Sensor. Capable of measuring the laboratory temperature within 1 °C (2 °F).

6.3.4 Vacuum Pump. Capable of evacuating to an absolute pressure of 10 mm Hg.

7.0 Reagents and Standards

7.1 Sample Collection. The following reagents are required for sample collection:

7.1.1 Dry Ice. Solid CO2, crushed.

7.1.2 Coarse Quartz Wool. 8 to 15 um.

7.1.3 Filters. Glass fiber filters, without organic binder, exhibiting at least 99.95 percent efficiency (<0.05 percent penetration) on 0.3 micron dioctyl phthalate smoke particles. The filter efficiency test shall be conducted in accordance with ASTM Method D2986–71, 78, or 95a (incorporated by reference—see §60.17). Test data from the supplier's quality control program are sufficient for this purpose.

7.2 NMO Analysis. The following gases are required for NMO analysis:

7.2.1 Carrier Gases. Helium (He) and oxygen (O_2) containing less than 1 ppm CO_2 and less than 0.1 ppm hydrocarbon.

7.2.2 Fuel Gas. Hydrogen (H_2), at least 99.999 percent pure.

7.2.3 Combustion Gas. Either air (less than 0.1 ppm total hydrocarbon content) or O_2 (purity 99.99 percent or greater), as required by the detector.

7.3 Condensate Analysis. The following are required for condensate analysis:

7.3.1 Gases. Containing less than 1 ppm carbon.

7.3.1.1 Air.

7.3.1.2 Oxygen.

7.3.2 Liquids. To conform to the specifications established by the Committee on Analytical Reagents of the American Chemical Society.

7.3.2.1 Hexane.

7.3.2.2 Decane.

7.4 Calibration. For all calibration gases, the manufacturer must recommend a maximum shelf life for each cylinder (i.e., the length of time the gas concentration is not expected to change more than ±5 percent from its certified value). The date of gas cylinder preparation, certified organic concentration, and recommended maximum shelf life must be affixed to each cylinder before shipment from the gas manufacturer to the buyer. The following calibration gases are required:

7.4.1 Oxidation Catalyst Efficiency Check Calibration Gas. Gas mixture standard with nominal concentration of 1 percent methane in air.

7.4.2 FID Linearity and NMO Calibration Gases. Three gas mixture standards with nominal propane concentrations of 20 ppm, 200 ppm, and 3000 ppm, in air.

7.4.3 CO_2 Calibration Gases. Three gas mixture standards with nominal CO_2 concentrations of 50 ppm, 500 ppm, and 1 percent, in air.

NOTE: Total NMO less than 1 ppm required for 1 percent mixture.

7.4.4 NMO Analyzer System Check Calibration Gases. Four calibration gases are needed as follows:

7.4.4.1 Propane Mixture. Gas mixture standard containing (nominal) 50 ppm CO, 50 ppm CH_4, 1 percent CO_2, and 20 ppm C_3H_8, prepared in air.

7.4.4.2 Hexane. Gas mixture standard containing (nominal) 50 ppm hexane in air.

7.4.4.3 Toluene. Gas mixture standard containing (nominal) 20 ppm toluene in air.

7.4.4.4 Methanol. Gas mixture standard containing (nominal) 100 ppm methanol in air.

8.0 Sample Collection, Preservation, Transport, and Storage

8.1 Sampling Equipment Preparation.

8.1.1 Condensate Trap Cleaning. Before its initial use and after each use, a condensate trap should be thoroughly cleaned and checked to ensure that it is not contaminated. Both cleaning and checking can be accomplished by installing the trap in the condensate recovery system and treating it as if it were a sample. The trap should be heated as described in section 11.1.3. A trap may be considered clean when the CO_2 concentration in its effluent gas drops below 10 ppm. This check is optional for traps that most recently have been used to collect samples which were then recovered according to the procedure in section 11.1.3.

8.1.2 Sample Tank Evacuation and Leak-Check. Evacuate the sample tank to 10 mm Hg absolute pressure or less. Then close the sample tank valve, and allow the tank to sit for 60 minutes. The tank is acceptable if a change in tank vacuum of less than 1 mm Hg is noted. The evacuation and leak-check may be conducted either in the laboratory or the field.

8.1.3 Sampling Train Assembly. Just before assembly, measure the tank vacuum using a mercury manometer. Record this vacuum, the ambient temperature, and the barometric pressure at this time. Close the sample tank valve and assemble the sampling

system as shown in Figure 25–1. Immerse the condensate trap body in dry ice at least 30 minutes before commencing sampling to improve collection efficiency. The point where the inlet tube joins the trap body should be 2.5 to 5 cm (1 to 2 in.) above the top of the dry ice.

8.1.4 Pretest Leak-Check. A pretest leak-check is required. Calculate or measure the approximate volume of the sampling train from the probe tip to the sample tank valve. After assembling the sampling train, plug the probe tip, and make certain that the sample tank valve is closed. Turn on the vacuum pump, and evacuate the sampling system from the probe tip to the sample tank valve to an absolute pressure of 10 mm Hg or less. Close the purge valve, turn off the pump, wait a minimum period of 10 minutes, and recheck the indicated vacuum. Calculate the maximum allowable pressure change based on a leak rate of 1 percent of the sampling rate using Equation 25–1, section 12.2. If the measured pressure change exceeds the allowable, correct the problem and repeat the leak-check before beginning sampling.

8.2 Sample Collection.

8.2.1 Unplug the probe tip, and place the probe into the stack such that the probe is perpendicular to the duct or stack axis; locate the probe tip at a single preselected point of average velocity facing away from the direction of gas flow. For stacks having a negative static pressure, seal the sample port sufficiently to prevent air in-leakage around the probe. Set the probe temperature controller to 129 °C (265 °F) and the filter temperature controller to 121 °C (250 °F). Allow the probe and filter to heat for about 30 minutes before purging the sample train.

8.2.2 Close the sample valve, open the purge valve, and start the vacuum pump. Set the flow rate between 60 and 100 cm^3/min (0.13 and 0.21 ft^3/hr), and purge the train with stack gas for at least 10 minutes.

8.2.3 When the temperatures at the exit ends of the probe and filter are within the corresponding specified ranges, check the dry ice level around the condensate trap, and add dry ice if necessary. Record the clock time. To begin sampling, close the purge valve and stop the pump. Open the sample valve and the sample tank valve. Using the flow control valve, set the flow through the sample train to the proper rate. Adjust the flow rate as necessary to maintain a constant rate (±10 percent) throughout the duration of the sampling period. Record the sample tank vacuum and flowmeter setting at 5-minute intervals. (See Figure 25–8.) Select a total sample time greater than or equal to the minimum sampling time specified in the applicable subpart of the regulations; end the sampling when this time period is reached or when a constant flow rate can no longer be maintained because of reduced sample tank vacuum.

NOTE: If sampling had to be stopped before obtaining the minimum sampling time (specified in the applicable subpart) because a constant flow rate could not be maintained, proceed as follows: After closing the sample tank valve, remove the used sample tank from the sampling train (without disconnecting other portions of the sampling train). Take another evacuated and leak-checked sample tank, measure and record the tank vacuum, and attach the new tank to the sampling train. After the new tank is attached to the sample train, proceed with the sampling until the required minimum sampling time has been exceeded.

8.3 Sample Recovery. After sampling is completed, close the flow control valve, and record the final tank vacuum; then record the tank temperature and barometric pressure. Close the sample tank valve, and disconnect the sample tank from the sample system. Disconnect the condensate trap at the inlet to the rate meter, and tightly seal both ends of the condensate trap. Do not include the probe from the stack to the filter as part of the condensate sample.

8.4 Sample Storage and Transport. Keep the trap packed in dry ice until the samples are returned to the laboratory for analysis. Ensure that run numbers are identified on the condensate trap and the sample tank(s).

9.0 Quality Control

Section	Quality control measure	Effect
10.1.1	Initial performance check of condensate recovery apparatus.	Ensure acceptable condensate recovery efficiency.
10.1.2, 10.2	NMO analyzer initial and daily performance checks.	Ensure precision of analytical results.

10.0 Calibration and Standardization

NOTE: Maintain a record of performance of each item.

10.1 Initial Performance Checks.

10.1.1 Condensate Recovery Apparatus. Perform these tests before the system is first placed in operation, after any shutdown of 6 months or more, and after any major modification of the system, or at the frequency recommended by the manufacturer.

10.1.1.1 Carrier Gas and Auxiliary O_2 Blank Check. Analyze each new tank of carrier gas or auxiliary O_2 with the NMO analyzer to

check for contamination. Treat the gas cylinders as noncondensible gas samples, and analyze according to the procedure in section 11.2.3. Add together any measured CH_4, CO, CO_2, or NMO. The total concentration must be less than 5 ppm.

10.1.1.2 Oxidation Catalyst Efficiency Check.

10.1.1.2.1 With a clean condensate trap installed in the recovery system or a ⅛″ stainless steel connector tube, replace the carrier gas cylinder with the high level methane standard gas cylinder (Section 7.4.1). Set the four-port valve to the recovery position, and attach an ICV to the recovery system. With the sample recovery valve in vent position and the flow-control and ICV valves fully open, evacuate the manometer or gauge, the connecting tubing, and the ICV to 10 mm Hg absolute pressure. Close the flow-control and vacuum pump valves.

10.1.1.2.2 After the NDIR response has stabilized, switch the sample recovery valve from vent to collect. When the manometer or pressure gauge begins to register a slight positive pressure, open the flow-control valve. Keep the flow adjusted such that the pressure in the system is maintained within 10 percent of atmospheric pressure. Continue collecting the sample in a normal manner until the ICV is filled to a nominal gauge pressure of 300 mm Hg. Close the ICV valve, and remove the ICV from the system. Place the sample recovery valve in the vent position, and return the recovery system to its normal carrier gas and normal operating conditions. Analyze the ICV for CO_2 using the NMO analyzer; the catalyst efficiency is acceptable if the CO_2 concentration is within 2 percent of the methane standard concentration.

10.1.1.3 System Performance Check. Construct a liquid sample injection unit similar in design to the unit shown in Figure 25–7. Insert this unit into the condensate recovery and conditioning system in place of a condensate trap, and set the carrier gas and auxiliary O_2 flow rates to normal operating levels. Attach an evacuated ICV to the system, and switch from system vent to collect. With the carrier gas routed through the injection unit and the oxidation catalyst, inject a liquid sample (see sections 10.1.1.3.1 to 10.1.1.3.4) into the injection port. Operate the trap recovery system as described in section 11.1.3. Measure the final ICV pressure, and then analyze the vessel to determine the CO_2 concentration. For each injection, calculate the percent recovery according to section 12.7. Calculate the relative standard deviation for each set of triplicate injections according to section 12.8. The performance test is acceptable if the average percent recovery is 100 ±5 percent and the relative standard deviation is less than 2 percent for each set of triplicate injections.

10.1.1.3.1 50 µl hexane.

10.1.1.3.2 10 µl hexane.

10.1.1.3.3 50 µl decane.

10.1.1.3.4 10 µl decane.

10.1.2 NMO Analyzer. Perform these tests before the system is first placed in operation, after any shutdown longer than 6 months, and after any major modification of the system.

10.1.2.1 Oxidation Catalyst Efficiency Check. Turn off or bypass the NMO analyzer reduction catalyst. Make triplicate injections of the high level methane standard (Section 7.4.1). The oxidation catalyst operation is acceptable if the FID response is less than 1 percent of the injected methane concentration.

10.1.2.2 Reduction Catalyst Efficiency Check. With the oxidation catalyst unheated or bypassed and the heated reduction catalyst bypassed, make triplicate injections of the high level methane standard (Section 7.4.1). Repeat this procedure with both catalysts operative. The reduction catalyst operation is acceptable if the responses under both conditions agree within 5 percent of their average.

10.1.2.3 NMO Analyzer Linearity Check Calibration. While operating both the oxidation and reduction catalysts, conduct a linearity check of the analyzer using the propane standards specified in section 7.4.2. Make triplicate injections of each calibration gas. For each gas (*i.e.*, each set of triplicate injections), calculate the average response factor (area/ppm C) for each gas, as well as and the relative standard deviation (according to section 12.8). Then calculate the overall mean of the response factor values. The instrument linearity is acceptable if the average response factor of each calibration gas is within 2.5 percent of the overall mean value and if the relative standard deviation gas is less than 2 percent of the overall mean value. Record the overall mean of the propane response factor values as the NMO calibration response factor (RF_{NMO}). Repeat the linearity check using the CO_2 standards specified in section 7.4.3. Make triplicate injections of each gas, and then calculate the average response factor (area/ppm C) for each gas, as well as the overall mean of the response factor values. Record the overall mean of the response factor values as the CO_2 calibration response factor (RF_{CO2}). The RF_{CO2} must be within 10 percent of the RF_{NMO}.

10.1.2.4 System Performance Check. Check the column separation and overall performance of the analyzer by making triplicate injections of the calibration gases listed in section 7.4.4. The analyzer performance is acceptable if the measured NMO value for each gas (average of triplicate injections) is within 5 percent of the expected value.

10.2 NMO Analyzer Daily Calibration. The following calibration procedures shall be performed before and immediately after the

analysis of each set of samples, or on a daily basis, whichever is more stringent:

10.2.1 CO_2 Response Factor. Inject triplicate samples of the high level CO_2 calibration gas (Section 7.4.3), and calculate the average response factor. The system operation is adequate if the calculated response factor is within 5 percent of the RF_{CO2} calculated during the initial performance test (Section 10.1.2.3). Use the daily response factor (DRF_{CO2}) for analyzer calibration and the calculation of measured CO_2 concentrations in the ICV samples.

10.2.2 NMO Response Factors. Inject triplicate samples of the mixed propane calibration cylinder gas (Section 7.4.4.1), and calculate the average NMO response factor. The system operation is adequate if the calculated response factor is within 10 percent of the RF_{NMO} calculated during the initial performance test (Section 10.1.2.4). Use the daily response factor (DRF_{NMO}) for analyzer calibration and calculation of NMO concentrations in the sample tanks.

10.3 Sample Tank and ICV Volume. The volume of the gas sampling tanks used must be determined. Determine the tank and ICV volumes by weighing them empty and then filled with deionized distilled water; weigh to the nearest 5 g, and record the results. Alternatively, measure the volume of water used to fill them to the nearest 5 ml.

11.0 Analytical Procedure

11.1 Condensate Recovery. See Figure 25–9. Set the carrier gas flow rate, and heat the catalyst to its operating temperature to condition the apparatus.

11.1.1 Daily Performance Checks. Each day before analyzing any samples, perform the following tests:

11.1.1.1 Leak-Check. With the carrier gas inlets and the sample recovery valve closed, install a clean condensate trap in the system, and evacuate the system to 10 mm Hg absolute pressure or less. Monitor the system pressure for 10 minutes. The system is acceptable if the pressure change is less than 2 mm Hg.

11.1.1.2 System Background Test. Adjust the carrier gas and auxiliary oxygen flow rate to their normal values of 100 cc/min and 150 cc/min, respectively, with the sample recovery valve in vent position. Using a 10-ml syringe, withdraw a sample from the system effluent through the syringe port. Inject this sample into the NMO analyzer, and measure the CO_2 content. The system background is acceptable if the CO_2 concentration is less than 10 ppm.

11.1.1.3 Oxidation Catalyst Efficiency Check. Conduct a catalyst efficiency test as specified in section 10.1.1.2. If the criterion of this test cannot be met, make the necessary repairs to the system before proceeding.

11.1.2 Condensate Trap CO_2 Purge and Sample Tank Pressurization.

11.1.2.1 After sampling is completed, the condensate trap will contain condensed water and organics and a small volume of sampled gas. This gas from the stack may contain a significant amount of CO_2 which must be removed from the condensate trap before the sample is recovered. This is accomplished by purging the condensate trap with zero air and collecting the purged gas in the original sample tank.

11.1.2.2 Begin with the sample tank and condensate trap from the test run to be analyzed. Set the four-port valve of the condensate recovery system in the CO_2 purge position as shown in Figure 25–9. With the sample tank valve closed, attach the sample tank to the sample recovery system. With the sample recovery valve in the vent position and the flow control valve fully open, evacuate the manometer or pressure gauge to the vacuum of the sample tank. Next, close the vacuum pump valve, open the sample tank valve, and record the tank pressure.

11.1.2.3 Attach the dry ice-cooled condensate trap to the recovery system, and initiate the purge by switching the sample recovery valve from vent to collect position. Adjust the flow control valve to maintain atmospheric pressure in the recovery system. Continue the purge until the CO_2 concentration of the trap effluent is less than 5 ppm. CO_2 concentration in the trap effluent should be measured by extracting syringe samples from the recovery system and analyzing the samples with the NMO analyzer. This procedure should be used only after the NDIR response has reached a minimum level. Using a 10-ml syringe, extract a sample from the syringe port prior to the NDIR, and inject this sample into the NMO analyzer.

11.1.2.4 After the completion of the CO_2 purge, use the carrier gas bypass valve to pressurize the sample tank to approximately 1,060 mm Hg absolute pressure with zero air.

11.1.3 Recovery of the Condensate Trap Sample (See Figure 25–10).

11.1.3.1 Attach the ICV to the sample recovery system. With the sample recovery valve in a closed position, between vent and collect, and the flow control and ICV valves fully open, evacuate the manometer or gauge, the connecting tubing, and the ICV to 10 mm Hg absolute pressure. Close the flow-control and vacuum pump valves.

11.1.3.2 Begin auxiliary oxygen flow to the oxidation catalyst at a rate of 150 cc/min, then switch the four-way valve to the trap recovery position and the sample recovery valve to collect position. The system should now be set up to operate as indicated in Figure 25–10. After the manometer or pressure gauge begins to register a slight positive pressure, open the flow control valve. Adjust the flow-control valve to maintain atmospheric pressure in the system within 10 percent.

11.1.3.3 Remove the condensate trap from the dry ice, and allow it to warm to ambient temperature while monitoring the NDIR response. If, after 5 minutes, the CO_2 concentration of the catalyst effluent is below 10,000 ppm, discontinue the auxiliary oxygen flow to the oxidation catalyst. Begin heating the trap by placing it in a furnace preheated to 200 °C (390 °F). Once heating has begun, carefully monitor the NDIR response to ensure that the catalyst effluent concentration does not exceed 50,000 ppm. Whenever the CO_2 concentration exceeds 50,000 ppm, supply auxiliary oxygen to the catalyst at the rate of 150 cc/min. Begin heating the tubing that connected the heated sample box to the condensate trap only after the CO_2 concentration falls below 10,000 ppm. This tubing may be heated in the same oven as the condensate trap or with an auxiliary heat source such as a heat gun. Heating temperature must not exceed 200 °C (390 °F). If a heat gun is used, heat the tubing slowly along its entire length from the upstream end to the downstream end, and repeat the pattern for a total of three times. Continue the recovery until the CO_2 concentration drops to less than 10 ppm as determined by syringe injection as described under the condensate trap CO_2 purge procedure (Section 11.1.2).

11.1.3.4 After the sample recovery is completed, use the carrier gas bypass valve to pressurize the ICV to approximately 1060 mm Hg absolute pressure with zero air.

11.2 Analysis. Once the initial performance test of the NMO analyzer has been successfully completed (see section 10.1.2) and the daily CO_2 and NMO response factors have been determined (see section 10.2), proceed with sample analysis as follows:

11.2.1 Operating Conditions. The carrier gas flow rate is 29.5 cc/min He and 2.2 cc/min O_2. The column oven is heated to 85 °C (185 °F). The order of elution for the sample from the column is CO, CH_4, CO_2, and NMO.

11.2.2 Analysis of Recovered Condensate Sample. Purge the sample loop with sample, and then inject the sample. Under the specified operating conditions, the CO_2 in the sample will elute in approximately 100 seconds. As soon as the detector response returns to baseline following the CO_2 peak, switch the carrier gas flow to backflush, and raise the column oven temperature to 195 °C (380 °F) as rapidly as possible. A rate of 30 °C/min (90 °F) has been shown to be adequate. Record the value obtained for the condensible organic material (C_{cm}) measured as CO_2 and any measured NMO. Return the column oven temperature to 85 °C (185 °F) in preparation for the next analysis. Analyze each sample in triplicate, and report the average C_{cm}.

11.2.3 Analysis of Sample Tank. Perform the analysis as described in section 11.2.2, but record only the value measured for NMO (C_{tm}).

12.0 Data Analysis and Calculations

Carry out the calculations, retaining at least one extra significant figure beyond that of the acquired data. Round off figures after final calculations. All equations are written using absolute pressure; absolute pressures are determined by adding the measured barometric pressure to the measured gauge or manometer pressure.

12.1 Nomenclature.

C = TGNMO concentration of the effluent, ppm C equivalent.
C_c = Calculated condensible organic (condensate trap) concentration of the effluent, ppm C equivalent.
C_{cm} = Measured concentration (NMO analyzer) for the condensate trap ICV, ppm CO_2.
C_t = Calculated noncondensible organic concentration (sample tank) of the effluent, ppm C equivalent.
C_{tm} = Measured concentration (NMO analyzer) for the sample tank, ppm NMO.
F = Sampling flow rate, cc/min.
L = Volume of liquid injected, µl.
M = Molecular weight of the liquid injected, g/g-mole.
M_c = TGNMO mass concentration of the effluent, mg C/dsm³.
N = Carbon number of the liquid compound injected (N = 12 for decane, N = 6 for hexane).
n = Number of data points.
P_f = Final pressure of the intermediate collection vessel, mm Hg absolute.
P_b = Barometric pressure, cm Hg.
P_{ti} = Gas sample tank pressure before sampling, mm Hg absolute.
P_t = Gas sample tank pressure after sampling, but before pressurizing, mm Hg absolute.
P_{tf} = Final gas sample tank pressure after pressurizing, mm Hg absolute.
q = Total number of analyzer injections of intermediate collection vessel during analysis (where k = injection number, 1 * * * q).
r = Total number of analyzer injections of sample tank during analysis (where j = injection number, 1 * * * r).
r = Density of liquid injected, g/cc.
T_f = Final temperature of intermediate collection vessel, °K.
T_{ti} = Sample tank temperature before sampling, °K.
T_t = Sample tank temperature at completion of sampling, °K.
T_{tf} = Sample tank temperature after pressurizing, °K.
V = Sample tank volume, m³.
V_t = Sample train volume, cc.
V_v = Intermediate collection vessel volume, m³.
V_s = Gas volume sampled, dsm³.
x_i = Individual measurements.
$\bar{x}$ = Mean value.

ΔP = Allowable pressure change, cm Hg.
Θ = Leak-check period, min.

12.2 Allowable Pressure Change. For the pretest leak-check, calculate the allowable pressure change using Equation 25–1:

$$\Delta P = 0.01 \frac{F P_b \Theta}{V_t} \qquad \text{Eq. 25-1}$$

12.3 Sample Volume. For each test run, calculate the gas volume sampled using Equation 25–2:

$$V_s = 0.3857\ V\left(\frac{P_t}{T_t} - \frac{P_{ti}}{T_{ti}}\right) \qquad \text{Eq. 25-2}$$

12.4 Noncondensible Organics. For each sample tank, determine the concentration of nonmethane organics (ppm C) using Equation 25–3:

$$C_t = \left(\frac{\frac{P_{tf}}{T_{tf}}}{\frac{P_t}{T_t} - \frac{P_{ti}}{T_{ti}}}\right)\left(\frac{1}{r}\sum_{j=1}^{r} C_{tm_j}\right) \qquad \text{Eq. 25-3}$$

12.5 Condensible Organics. For each condensate trap determine the concentration of organics (ppm C) using Equation 25–4:

$$C_c = 0.3857 \frac{V_v P_f}{V_s T_f}\left(\frac{1}{q}\sum_{k=1}^{q} C_{cm_k}\right) \qquad \text{Eq. 25-4}$$

12.6 TGNMO Mass Concentration. Determine the TGNMO mass concentration as carbon for each test run, using Equation 25–5:

$$M_c = 0.4993\left(C_t + C_c\right) \qquad \text{Eq. 25-5}$$

12.7 Percent Recovery. Calculate the percent recovery for the liquid injections to the condensate recovery and conditioning system using Equation 25–6:

$$\text{Percent Recovery} = K \frac{M V_v P_t C_{cm}}{L P T_f N} \qquad \text{Eq. 25-6}$$

where K = 1.604 (°K)(g-mole)(%)/(mm Hg)(ml)(m^3)(ppm).

12.8 Relative Standard Deviation. Use Equation 25–7 to calculate the relative standard deviation (RSD) of percent recovery and analyzer linearity.

$$RSD = \frac{100}{\bar{x}}\left[\frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2}{n-1}\right]^{\frac{1}{2}} \qquad \text{Eq. 25-7}$$

13.0 Method Performance

13.1 Range. The minimum detectable limit of the method has been determined to be 50 parts per million by volume (ppm). No upper limit has been established.

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. Salo, A.E., S. Witz, and R.D. MacPhee. Determination of Solvent Vapor Concentrations by Total Combustion Analysis: A Comparison of Infrared with Flame Ionization Detectors. Paper No. 75–33.2. (Presented at the 68th Annual Meeting of the Air Pollution Control Association. Boston, MA. June 15–20, 1975.) 14 p.

2. Salo, A.E., W.L. Oaks, and R.D. MacPhee. Measuring the Organic Carbon Content of Source Emissions for Air Pollution Control. Paper No. 74–190. (Presented at the 67th Annual Meeting of the Air Pollution Control Association. Denver, CO. June 9–13, 1974.) 25 p.

17.0 Tables, Diagrams, Flowcharts, and Validation Data

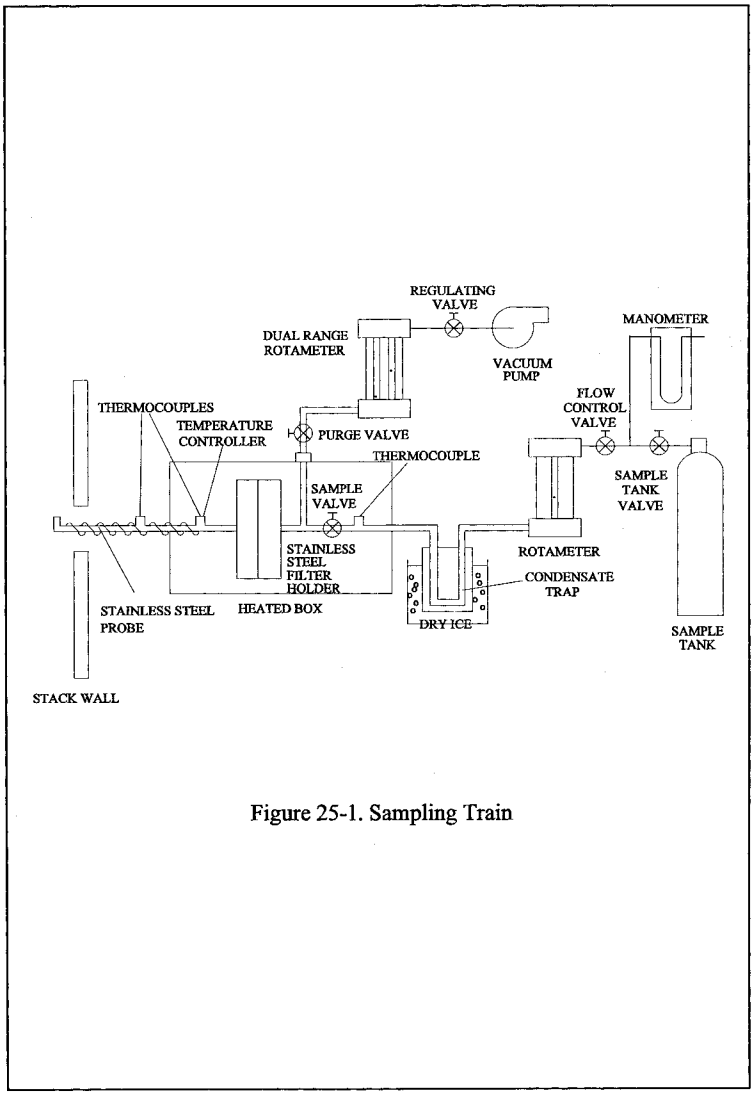


Figure 25-1. Sampling Train

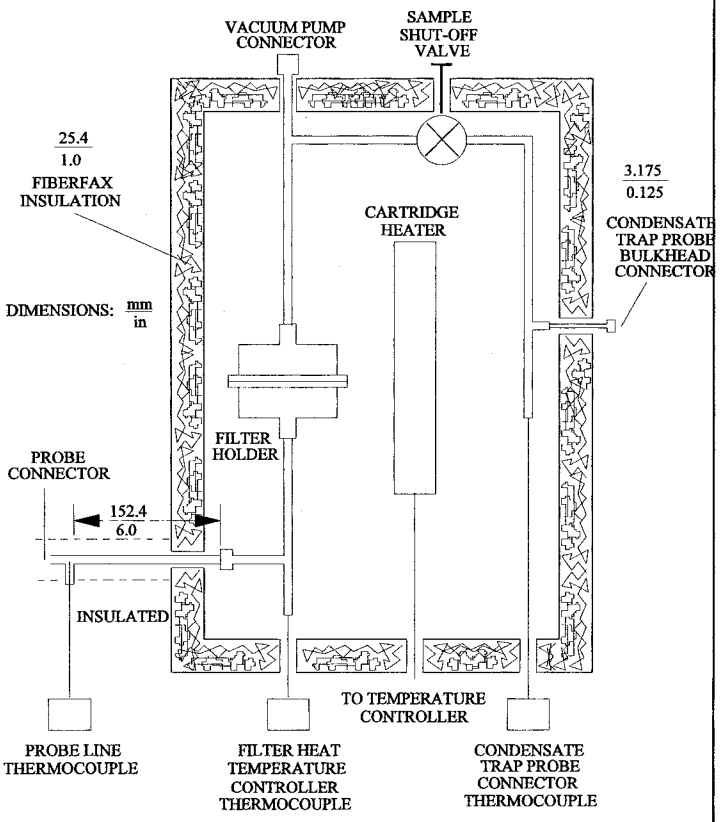


Figure 25-2. Out-of-stack Filter Box

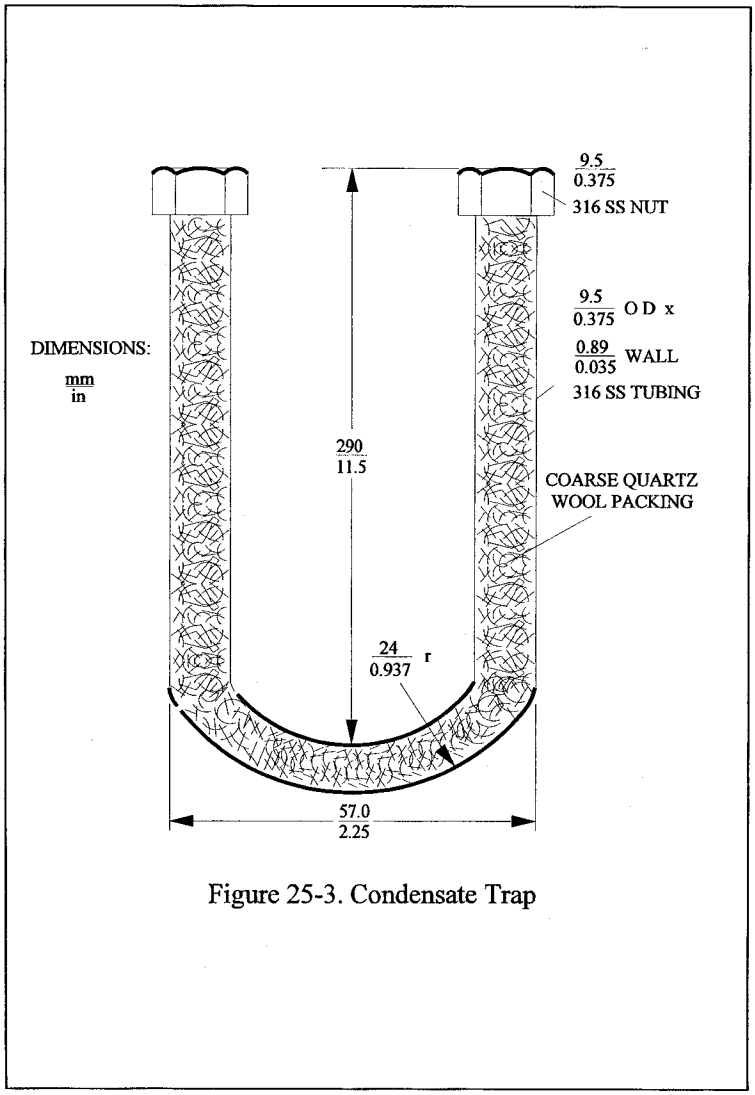


Figure 25-3. Condensate Trap

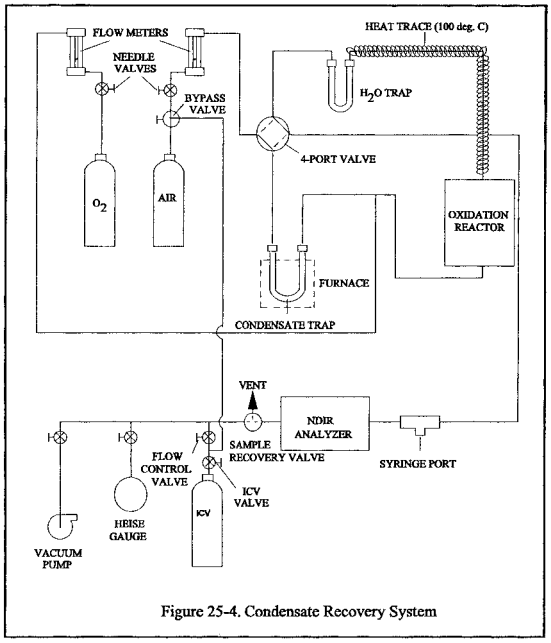


Figure 25-4. Condensate Recovery System

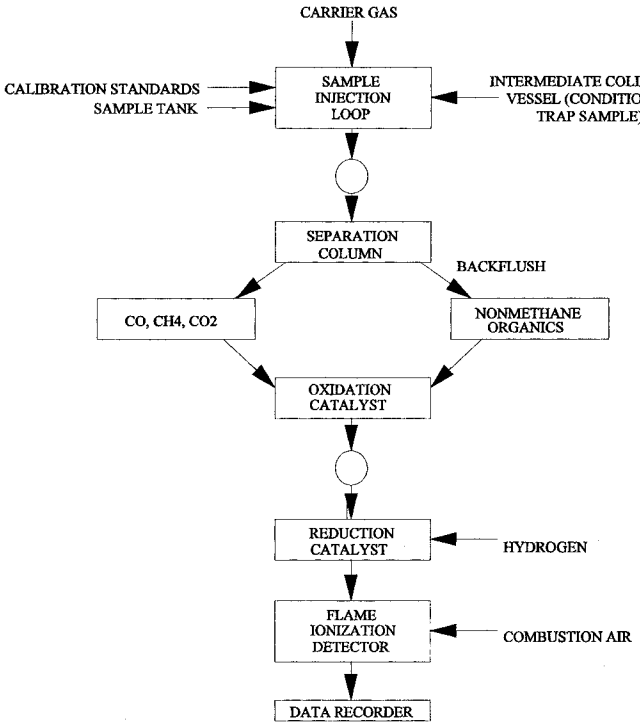


Figure 25-5. Simplified Schematic of Nonmethane Organic (NMO) Analyzer

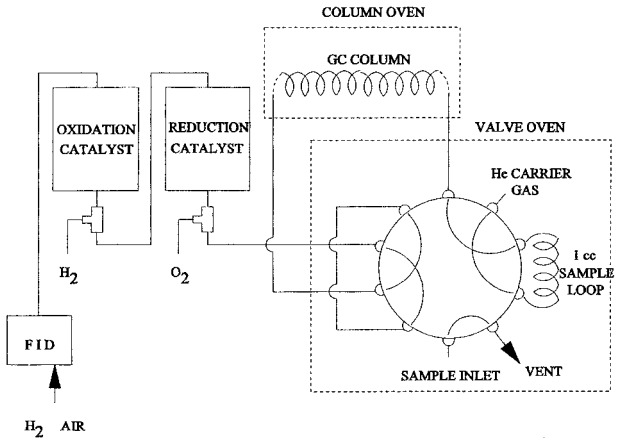


Figure 25-6. Nonmethane Organic Analyzer (NMO)

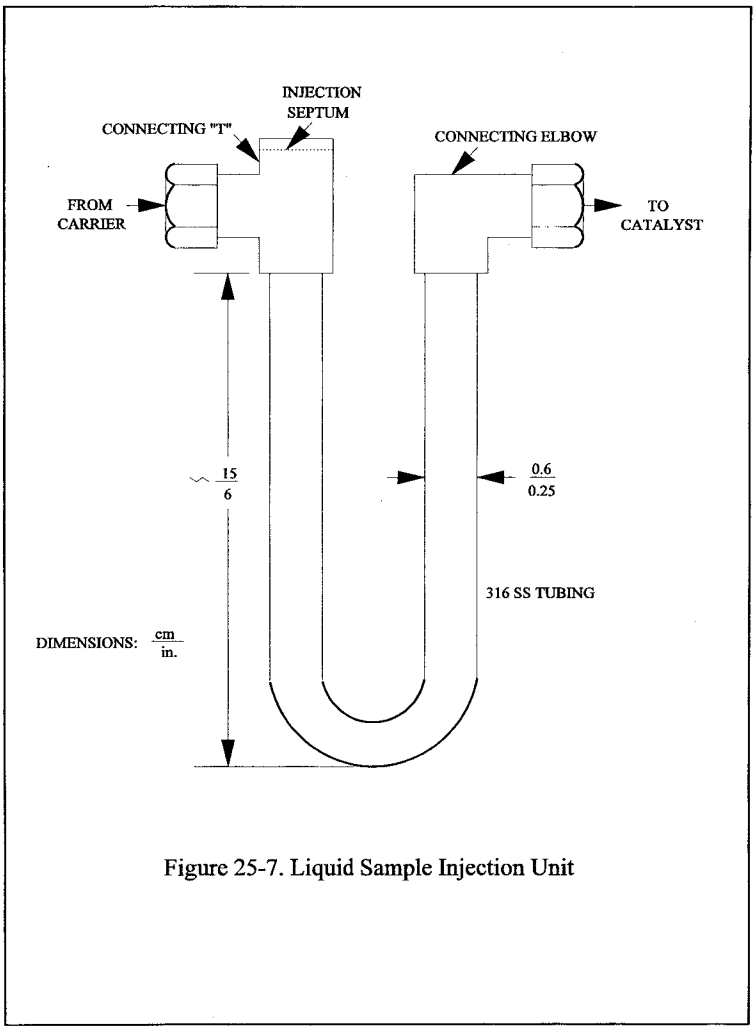


Figure 25-7. Liquid Sample Injection Unit

VOLATILE ORGANIC CARBON

FACILITY _____ SAMPLE LOCATION _____

LOCATION _____ OPERATOR _____

DATE _____ RUN NUMBER _____

TANK NUMBER _____ TRAP NUMBER _____ SAMPLE ID NUMBER _____

TANK VACUUM mm HG	TANK VACUUM cm Hg	BAROMETRIC PRESSURE mm Hg	AMBIENT TEMPERATURE ^{0}C
PRETEST (MANOMETER)	(GAUGE)		
POST-TEST (MANOMETER)	(GAUGE)		

LEAK RATE _____ cm Hg / 1.0 min

PRETEST _____

TIME CLOCK/SAMPLE	VACUUM cm Hg	FLOWMETER SETTINGS	COMMENTS

Figure 25-8. Example Field Data Form

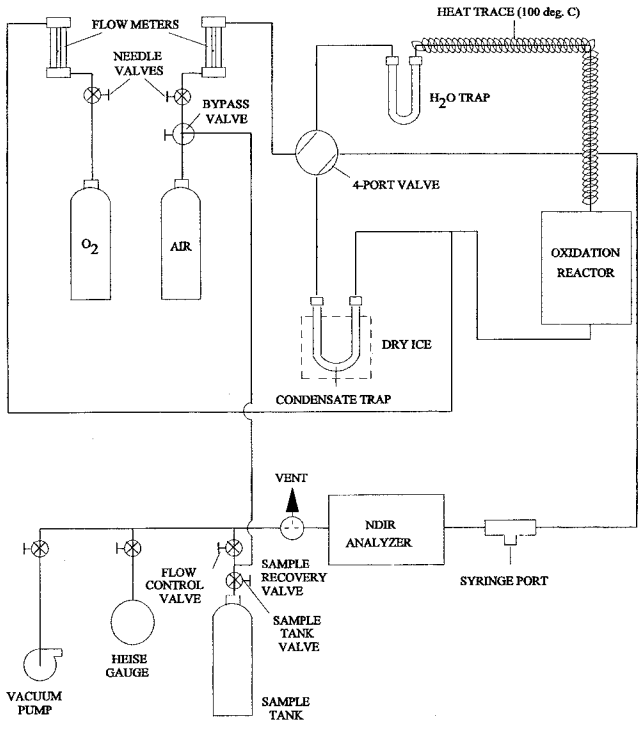


Figure 25-9. Condensate Recovery System, CO2 Purge

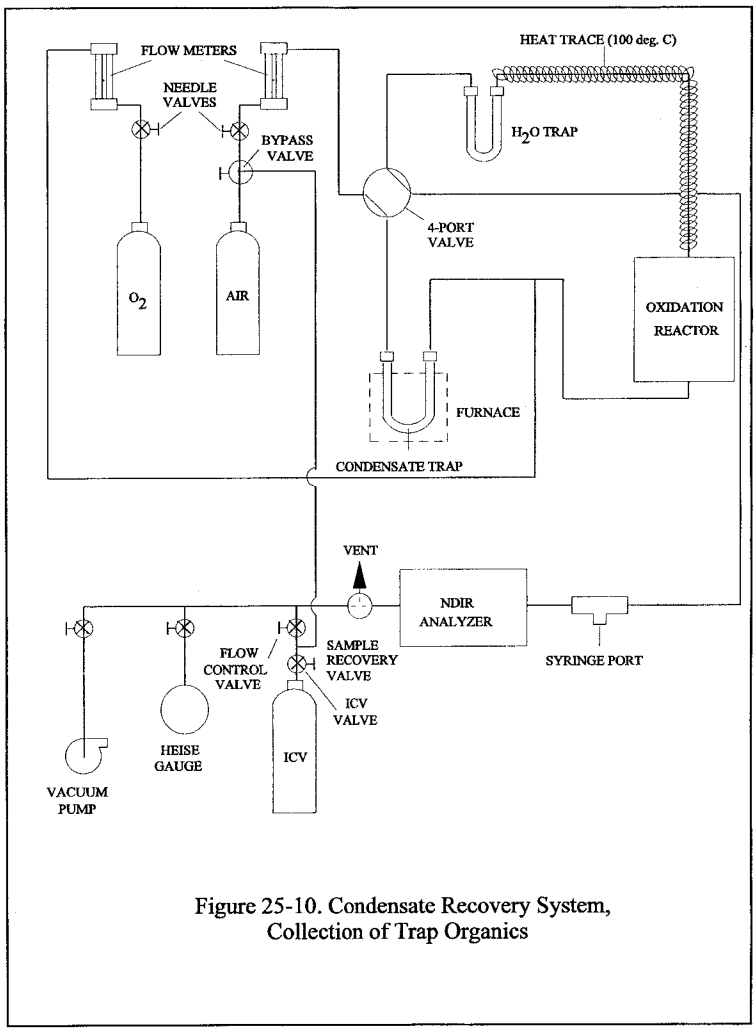


Figure 25-10. Condensate Recovery System, Collection of Trap Organics

METHOD 25A—DETERMINATION OF TOTAL GASEOUS ORGANIC CONCENTRATION USING A FLAME IONIZATION ANALYZER

1.0 Scope and Application

1.1 Analytes.

Analyte	CAS No.	Sensitivity
Total Organic Compounds	N/A	<2% of span.

1.2 Applicability. This method is applicable for the determination of total gaseous organic concentration of vapors consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of carbon.

1.3 Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.

2.0 Summary of Method

2.1 A gas sample is extracted from the source through a heated sample line and glass fiber filter to a flame ionization analyzer (FIA). Results are reported as volume concentration equivalents of the calibration gas or as carbon equivalents.

3.0 Definitions

3.1 *Calibration drift* means the difference in the measurement system response to a mid-level calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

3.2 *Calibration error* means the difference between the gas concentration indicated by the measurement system and the know concentration of the calibration gas.

3.3 *Calibration gas* means a known concentration of a gas in an appropriate diluent gas.

3.4 *Measurement system* means the total equipment required for the determination of the gas concentration. The system consists of the following major subsystems:

3.4.1 *Sample interface* means that portion of a system used for one or more of the following: sample acquisition, sample transportation, sample conditioning, or protection of the analyzer(s) from the effects of the stack effluent.

3.4.2 *Organic analyzer* means that portion of the measurement system that senses the gas to be measured and generates an output proportional to its concentration.

3.5 *Response time* means the time interval from a step change in pollutant concentration at the inlet to the emission measurement system to the time at which 95 percent of the corresponding final value is reached as displayed on the recorder.

3.6 *Span Value* means the upper limit of a gas concentration measurement range that is specified for affected source categories in the applicable part of the regulations. The span value is established in the applicable regulation and is usually 1.5 to 2.5 times the applicable emission limit. If no span value is provided, use a span value equivalent to 1.5 to 2.5 times the expected concentration. For convenience, the span value should correspond to 100 percent of the recorder scale.

3.7 *Zero drift* means the difference in the measurement system response to a zero level calibration gas before or after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

4.0 Interferences [Reserved]

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to performing this test method. The analyzer users manual should be consulted for specific precautions to be taken with regard to the analytical procedure.

5.2 Explosive Atmosphere. This method is often applied in highly explosive areas. Caution and care should be exercised in choice of equipment and installation.

6.0 Equipment and Supplies

6.1 Measurement System. Any measurement system for total organic concentration that meets the specifications of this method. A schematic of an acceptable measurement system is shown in Figure 25A–1. All sampling components leading to the analyzer shall be heated ≥110 °C (220 °F) throughout the sampling period, unless safety reasons are cited (Section 5.2) The essential components of the measurement system are described below:

6.1.1 Organic Concentration Analyzer. A flame ionization analyzer (FIA) capable of meeting or exceeding the specifications of this method. The flame ionization detector block shall be heated >120 °C (250 °F).

6.1.2 Sample Probe. Stainless steel, or equivalent, three-hole rake type. Sample holes shall be 4 mm (0.16-in.) in diameter or smaller and located at 16.7, 50, and 83.3 percent of the equivalent stack diameter. Alternatively, a single opening probe may be used so that a gas sample is collected from the centrally located 10 percent area of the stack cross-section.

6.1.3 Heated Sample Line. Stainless steel or Teflon'' tubing to transport the sample gas

to the analyzer. The sample line should be heated (≥110 °C) to prevent any condensation.

6.1.4 Calibration Valve Assembly. A three-way valve assembly to direct the zero and calibration gases to the analyzers is recommended. Other methods, such as quick-connect lines, to route calibration gas to the analyzers are applicable.

6.1.5 Particulate Filter. An in-stack or an out-of-stack glass fiber filter is recommended if exhaust gas particulate loading is significant. An out-of-stack filter should be heated to prevent any condensation.

6.1.6 Recorder. A strip-chart recorder, analog computer, or digital recorder for recording measurement data. The minimum data recording requirement is one measurement value per minute.

7.0 Reagents and Standards

7.1 Calibration Gases. The calibration gases for the gas analyzer shall be propane in air or propane in nitrogen. Alternatively, organic compounds other than propane can be used; the appropriate corrections for response factor must be made. Calibration gases shall be prepared in accordance with the procedure listed in Citation 2 of section 16. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than ±2 percent from the certified value. For calibration gas values not generally available (*i.e.*, organics between 1 and 10 percent by volume), alternative methods for preparing calibration gas mixtures, such as dilution systems (Test Method 205, 40 CFR Part 51, Appendix M), may be used with prior approval of the Administrator.

7.1.1 Fuel. A 40 percent H_2/60 percent N_2 gas mixture is recommended to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

7.1.2 Zero Gas. High purity air with less than 0.1 part per million by volume (ppmv) of organic material (propane or carbon equivalent) or less than 0.1 percent of the span value, whichever is greater.

7.1.3 Low-level Calibration Gas. An organic calibration gas with a concentration equivalent to 25 to 35 percent of the applicable span value.

7.1.4 Mid-level Calibration Gas. An organic calibration gas with a concentration equivalent to 45 to 55 percent of the applicable span value.

7.1.5 High-level Calibration Gas. An organic calibration gas with a concentration equivalent to 80 to 90 percent of the applicable span value.

8.0 Sample Collection, Preservation, Storage, and Transport

8.1 Selection of Sampling Site. The location of the sampling site is generally specified by the applicable regulation or purpose of the test (*i.e.*, exhaust stack, inlet line, etc.). The sample port shall be located to meet the testing requirements of Method 1.

8.2 Location of Sample Probe. Install the sample probe so that the probe is centrally located in the stack, pipe, or duct and is sealed tightly at the stack port connection.

8.3 Measurement System Preparation. Prior to the emission test, assemble the measurement system by following the manufacturer's written instructions for preparing sample interface and the organic analyzer. Make the system operable (Section 10.1).

8.4 Calibration Error Test. Immediately prior to the test series (within 2 hours of the start of the test), introduce zero gas and high-level calibration gas at the calibration valve assembly. Adjust the analyzer output to the appropriate levels, if necessary. Calculate the predicted response for the low-level and mid-level gases based on a linear response line between the zero and high-level response. Then introduce low-level and mid-level calibration gases successively to the measurement system. Record the analyzer responses for low-level and mid-level calibration gases and determine the differences between the measurement system responses and the predicted responses. These differences must be less than 5 percent of the respective calibration gas value. If not, the measurement system is not acceptable and must be replaced or repaired prior to testing. No adjustments to the measurement system shall be conducted after the calibration and before the drift check (Section 8.6.2). If adjustments are necessary before the completion of the test series, perform the drift checks prior to the required adjustments and repeat the calibration following the adjustments. If multiple electronic ranges are to be used, each additional range must be checked with a mid-level calibration gas to verify the multiplication factor.

8.5 Response Time Test. Introduce zero gas into the measurement system at the calibration valve assembly. When the system output has stabilized, switch quickly to the high-level calibration gas. Record the time from the concentration change to the measurement system response equivalent to 95 percent of the step change. Repeat the test three times and average the results.

8.6 Emission Measurement Test Procedure.

8.6.1 Organic Measurement. Begin sampling at the start of the test period, recording time and any required process information as appropriate. In particulate, note on the recording chart, periods of process interruption or cyclic operation.

8.6.2 Drift Determination. Immediately following the completion of the test period and hourly during the test period, reintroduce the zero and mid-level calibration gases, one at a time, to the measurement system at the calibration valve assembly. (Make no adjustments to the measurement system until both the zero and calibration drift checks are made.) Record the analyzer response. If the drift values exceed the specified limits, invalidate the test results preceding the check and repeat the test following corrections to the measurement system. Alternatively, recalibrate the test measurement system as in section 8.4 and report the results using both sets of calibration data (i.e., data determined prior to the test period and data determined following the test period).

NOTE: Note on the recording chart periods of process interruption or cyclic operation.

9.0 Quality Control

Method section	Quality control measure	Effect
8.4	Zero and calibration drift tests	Ensures that bias introduced by drift in the measurement system output during the run is no greater than 3 percent of span.

10.0 Calibration and Standardization

10.1 FIA equipment can be calibrated for almost any range of total organic concentrations. For high concentrations of organics (>1.0 percent by volume as propane), modifications to most commonly available analyzers are necessary. One accepted method of equipment modification is to decrease the size of the sample to the analyzer through the use of a smaller diameter sample capillary. Direct and continuous measurement of organic concentration is a necessary consideration when determining any modification design.

11.0 Analytical Procedure

The sample collection and analysis are concurrent for this method (see section 8.0).

12.0 Calculations and Data Analysis

12.1 Determine the average organic concentration in terms of ppmv as propane or other calibration gas. The average shall be determined by integration of the output recording over the period specified in the applicable regulation. If results are required in terms of ppmv as carbon, adjust measured concentrations using Equation 25A–1.

$$C_c = K C_{meas} \qquad \text{Eq. 25A-1}$$

Where:

C_c = Organic concentration as carbon, ppmv.
C_{meas} = Organic concentration as measured, ppmv.
K = Carbon equivalent correction factor.
= 2 for ethane.
= 3 for propane.
= 4 for butane.
= Appropriate response factor for other organic calibration gases.

13.0 Method Performance

13.1 Measurement System Performance Specifications.

13.1.1 Zero Drift. Less than ±3 percent of the span value.

13.1.2 Calibration Drift. Less than ±3 percent of span value.

13.1.3 Calibration Error. Less than ±5 percent of the calibration gas value.

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. Measurement of Volatile Organic Compounds—Guideline Series. U.S. Environmental Protection Agency. Research Triangle Park, NC. Publication No. EPA–450/2–78–041. June 1978. p. 46–54.

2. EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards. U.S. Environmental Protection Agency, Quality Assurance and Technical Support Division. Research Triangle Park, N.C. September 1993.

3. Gasoline Vapor Emission Laboratory Evaluation—Part 2. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, NC. EMB Report No. 75–GAS–6. August 1975.

17.0 Tables, Diagrams, Flowcharts, and Validation Data

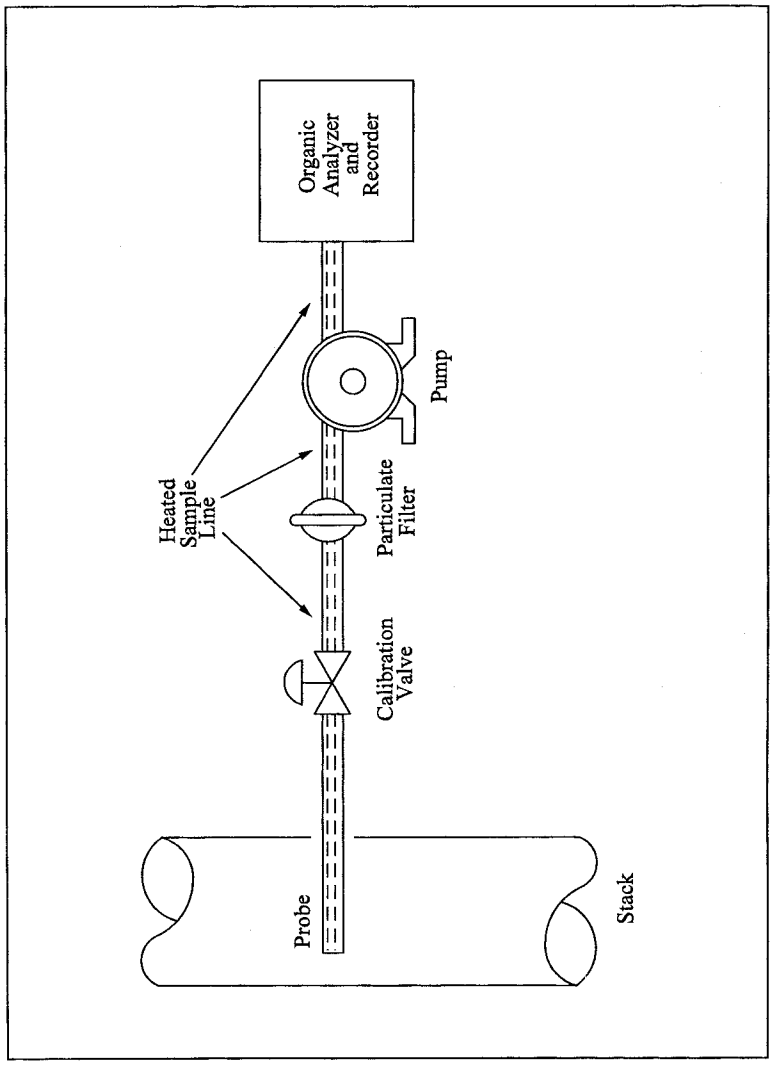


Figure 25A-1. Organic Concentration Measurement System.

METHOD 25B—DETERMINATION OF TOTAL GASEOUS ORGANIC CONCENTRATION USING A NONDISPERSIVE INFRARED ANALYZER

NOTE: This method does not include all of the specifications (*e.g.*, equipment and supplies) and procedures (*e.g.*, sampling) essential to its performance. Some material is incorporated by reference from other methods in this part. Therefore, to obtain reliable results, persons using this method should have a thorough knowledge of at least the following additional test methods: Method 1, Method 6C, and Method 25A.

1.0 Scope and Application

1.1 Analytes.

Analyte	CAS No.	Sensitivity
Total Organic Compounds	N/A	<2% of span.

1.2 Applicability. This method is applicable for the determination of total gaseous organic concentration of vapors consisting primarily of alkanes. Other organic materials may be measured using the general procedure in this method, the appropriate calibration gas, and an analyzer set to the appropriate absorption band.

1.3 Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.

2.0 Summary of Method

A gas sample is extracted from the source through a heated sample line, if necessary, and glass fiber filter to a nondispersive infrared analyzer (NDIR). Results are reported as volume concentration equivalents of the calibration gas or as carbon equivalents.

3.0 Definitions

Same as Method 25A, section 3.0.

4.0 Interferences [Reserved]

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to performing this test method. The analyzer users manual should be consulted for specific precautions to be taken with regard to the analytical procedure.

5.2 Explosive Atmosphere. This method is often applied in highly explosive areas. Caution and care should be exercised in choice of equipment and installation.

6.0 Equipment and Supplies

Same as Method 25A, section 6.0, with the exception of the following:

6.1 Organic Concentration Analyzer. A nondispersive infrared analyzer designed to measure alkane organics and capable of meeting or exceeding the specifications in this method.

7.0 Reagents and Standards

Same as Method 25A, section 7.1. No fuel gas is required for an NDIR.

8.0 Sample Collection, Preservation, Storage, and Transport

Same as Method 25A, section 8.0.

9.0 Quality Control

Same as Method 25A, section 9.0.

10.0 Calibration and Standardization

Same as Method 25A, section 10.0.

11.0 Analytical Procedure

The sample collection and analysis are concurrent for this method (see section 8.0).

12.0 Calculations and Data Analysis

Same as Method 25A, section 12.0.

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

Same as Method 25A, section 16.0.

17.0 Tables, Diagrams, Flowcharts, and Validation Data [Reserved]

METHOD 25C—DETERMINATION OF NONMETHANE ORGANIC COMPOUNDS (NMOC) IN LANDFILL GASES

NOTE: This method does not include all of the specifications (*e.g.*, equipment and supplies) and procedures (*e.g.*, sampling and analytical) essential to its performance. Some material is incorporated by reference from other methods in this part. Therefore, to obtain reliable results, persons using this method should also have a thorough knowledge of EPA Method 25.

1.0 Scope and Application

1.1 Analytes.

Analyte	CAS No.
Nonmethane organic compounds (NMOC).	No CAS number assigned.

1.2 Applicability. This method is applicable to the sampling and measurement of NMOC as carbon in landfill gases (LFG).

1.3 Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.

2.0 Summary of Method

2.1 A sample probe that has been perforated at one end is driven or augured to a depth of 0.9 m (3 ft) below the bottom of the landfill cover. A sample of the landfill gas is extracted with an evacuated cylinder. The NMOC content of the gas is determined by

injecting a portion of the gas into a gas chromatographic column to separate the NMOC from carbon monoxide (CO), carbon dioxide (CO_2), and methane (CH_4); the NMOC are oxidized to CO_2, reduced to CH_4, and measured by a flame ionization detector (FID). In this manner, the variable response of the FID associated with different types of organics is eliminated.

3.0 Definitions [Reserved]

4.0 Interferences [Reserved]

5.0 Safety

5.1 Since this method is complex, only experienced personnel should perform this test. LFG contains methane, therefore explosive mixtures may exist on or near the landfill. It is advisable to take appropriate safety precautions when testing landfills, such as refraining from smoking and installing explosion-proof equipment.

6.0 Equipment and Supplies

6.1 Sample Probe. Stainless steel, with the bottom third perforated. Teflon probe liners and sampling lines are also allowed. Non-perforated probes are allowed as long as they are withdrawn to create a gap equivalent to having the bottom third perforated. The sample probe must be capped at the bottom and must have a threaded cap with a sampling attachment at the top. The sample probe must be long enough to go through and extend no less than 0.9 m (3 ft) below the landfill cover. If the sample probe is to be driven into the landfill, the bottom cap should be designed to facilitate driving the probe into the landfill.

6.2 Sampling Train.

6.2.1 Rotameter with Flow Control Valve. Capable of measuring a sample flow rate of 100 ±10 ml/min. The control valve must be made of stainless steel.

6.2.2 Sampling Valve. Stainless steel.

6.2.3 Pressure Gauge. U-tube mercury manometer, or equivalent, capable of measuring pressure to within 1 mm Hg (0.5 in H_2O) in the range of 0 to 1,100 mm Hg (0 to 590 in H_2O).

6.2.4 Sample Tank. Stainless steel or aluminum cylinder, equipped with a stainless steel sample tank valve.

6.3 Vacuum Pump. Capable of evacuating to an absolute pressure of 10 mm Hg (5.4 in H_2O).

6.4 Purging Pump. Portable, explosion proof, and suitable for sampling NMOC.

6.5 Pilot Probe Procedure. The following are needed only if the tester chooses to use the procedure described in section 8.2.1.

6.5.1 Pilot Probe. Tubing of sufficient strength to withstand being driven into the landfill by a post driver and an outside diameter of at least 6 mm (0.25 in.) smaller than the sample probe. The pilot probe shall be capped on both ends and long enough to go through the landfill cover and extend no less than 0.9 m (3 ft) into the landfill.

6.5.2 Post Driver and Compressor. Capable of driving the pilot probe and the sampling probe into the landfill. The Kitty Hawk portable post driver has been found to be acceptable.

6.6 Auger Procedure. The following are needed only if the tester chooses to use the procedure described in section 8.2.2.

6.6.1 Auger. Capable of drilling through the landfill cover and to a depth of no less than 0.9 m (3 ft) into the landfill.

6.6.2 Pea Gravel.

6.6.3 Bentonite.

6.7 NMOC Analyzer, Barometer, Thermometer, and Syringes. Same as in sections 6.3.1, 6.3.2, 6.33, and 6.2.10, respectively, of Method 25.

7.0 Reagents and Standards

7.1 NMOC Analysis. Same as in Method 25, section 7.2.

7.2 Calibration. Same as in Method 25, section 7.4, except omit section 7.4.3.

8.0 Sample Collection, Preservation, Storage, and Transport

8.1 Sample Tank Evacuation and Leak-Check. Conduct the sample tank evacuation and leak-check either in the laboratory or the field. Connect the pressure gauge and sampling valve to the sample tank. Evacuate the sample tank to 10 mm Hg (5.4 in H_2O) absolute pressure or less. Close the sampling valve, and allow the tank to sit for 30 minutes. The tank is acceptable if no change more than ±2 mm is noted. Include the results of the leak-check in the test report.

8.2 Sample Probe Installation. The tester may use the procedure in section 8.2.1 or 8.2.2.

8.2.1 Pilot Probe Procedure. Use the post driver to drive the pilot probe at least 0.9 m (3 ft) below the landfill cover. Alternative procedures to drive the probe into the landfill may be used subject to the approval of the Administrator's designated representative.

8.2.1.1 Remove the pilot probe and drive the sample probe into the hole left by the pilot probe. The sample probe shall extend at least 0.9 m (3 ft) below the landfill cover and shall protrude about 0.3 m (1 ft) above the landfill cover. Seal around the sampling probe with bentonite and cap the sampling probe with the sampling probe cap.

8.2.2 Auger Procedure. Use an auger to drill a hole to at least 0.9 m (3 ft) below the landfill cover. Place the sample probe in the hole and backfill with pea gravel to a level 0.6 m (2 ft) from the surface. The sample probe shall protrude at least 0.3 m (1 ft) above the landfill cover. Seal the remaining area around the probe with bentonite. Allow 24

hours for the landfill gases to equilibrate inside the augured probe before sampling.

8.2.3 Driven Probes. Closed-point probes may be driven directly into the landfill in a single step. This method may not require backfilling if the probe is adequately sealed by its insertion. Unperforated probes that are inserted in this manner and withdrawn at a distance from a detachable tip to create an open space are also acceptable.

8.3 Sample Train Assembly. Just before assembling the sample train, measure the sample tank vacuum using the pressure gauge. Record the vacuum, the ambient temperature, and the barometric pressure at this time. Assemble the sampling probe purging system as shown in Figure 25C–1.

8.4 Sampling Procedure. Open the sampling valve and use the purge pump and the flow control valve to evacuate at least two sample probe volumes from the system at a flow rate of 500 ml/min or less. Close the sampling valve and replace the purge pump with the sample tank apparatus as shown in Figure 25C–2. Open the sampling valve and the sample tank valve and, using the flow control valve, sample at a flow rate of 500 ml/min or less until either a constant flow rate can no longer be maintained because of reduced sample tank vacuum or the appropriate composite volume is attained. Disconnect the sampling tank apparatus and pressurize the sample cylinder to approximately 1,060 mm Hg (567 in. H_2O) absolute pressure with helium, and record the final pressure. Alternatively, the sample tank may be pressurized in the lab.

8.4.1 The following restrictions apply to compositing samples from different probe sites into a single cylinder: (1) Individual composite samples per cylinder must be of equal volume; this must be verified by recording the flow rate, sampling time, vacuum readings, or other appropriate volume measuring data, (2) individual composite samples must have a minimum volume of 1 liter unless data is provided showing smaller volumes can be accurately measured, and (3) composite samples must not be collected using the final cylinder vacuum as it diminishes to ambient pressure.

8.4.2 Use Method 3C to determine the percent N_2 in each cylinder. The presence of N_2 indicates either infiltration of ambient air into the landfill gas sample or an inappropriate testing site has been chosen where anaerobic decomposition has not begun. The landfill gas sample is acceptable if the concentration of N_2 is less than 20 percent. Alternatively, Method 3C may be used to determine the oxygen content of each cylinder as an air infiltration test. With this option, the oxygen content of each cylinder must be less than 5 percent.

9.0 Quality Control

9.1 Miscellaneous Quality Control Measures.

Section	Quality control measure	Effect
8.4.2	Verify that landfill gas sample contains less than 20 percent N_2 or 5 percent O_2.	Ensures that ambient air was not drawn into the landfill gas sample and gas was sampled from an appropriate location.
10.1, 10.2	NMOC analyzer initial and daily performance checks.	Ensures precision of analytical results.

10.0 Calibration and Standardization

NOTE: Maintain a record of performance of each item.

10.1 Initial NMOC Analyzer Performance Test. Same as in Method 25, section 10.1, except omit the linearity checks for CO_2 standards.

10.2 NMOC Analyzer Daily Calibration.

10.2.1 NMOC Response Factors. Same as in Method 25, section 10.2.2.

10.3 Sample Tank Volume. The volume of the gas sampling tanks must be determined. Determine the tank volumes by weighing them empty and then filled with deionized water; weigh to the nearest 5 g, and record the results. Alternatively, measure the volume of water used to fill them to the nearest 5 ml.

11.0 Analytical Procedures

11.1 The oxidation, reduction, and measurement of NMOC's is similar to Method 25. Before putting the NMOC analyzer into routine operation, conduct an initial performance test. Start the analyzer, and perform all the necessary functions in order to put the analyzer into proper working order. Conduct the performance test according to the procedures established in section 10.1. Once the performance test has been successfully completed and the NMOC calibration response factor has been determined, proceed with sample analysis as follows:

11.1.1 Daily Operations and Calibration Checks. Before and immediately after the analysis of each set of samples or on a daily basis (whichever occurs first), conduct a calibration test according to the procedures established in section 10.2. If the criteria of the daily calibration test cannot be met, repeat

the NMOC analyzer performance test (Section 10.1) before proceeding.

11.1.2 Operating Conditions. Same as in Method 25, section 11.2.1.

11.1.3 Analysis of Sample Tank. Purge the sample loop with sample, and then inject the sample. Under the specified operating conditions, the CO_2 in the sample will elute in approximately 100 seconds. As soon as the detector response returns to baseline following the CO_2 peak, switch the carrier gas flow to backflush, and raise the column oven temperature to 195 °C (383 °F) as rapidly as possible. A rate of 30 °C/min (54 °F/min) has been shown to be adequate. Record the value obtained for any measured NMOC. Return the column oven temperature to 85 °C (185 °F) in preparation for the next analysis. Analyze each sample in triplicate, and report the average as C_{tm}.

12.0 Data Analysis and Calculations

NOTE: All equations are written using absolute pressure; absolute pressures are determined by adding the measured barometric pressure to the measured gauge or manometer pressure.

12.1 Nomenclature

B_w = Moisture content in the sample, fraction.

C_{N2} = N_2 concentration in the diluted sample gas.

C_{mN2} = Measured N_2 concentration, fraction in landfill gas.

C_{mOx} = Measured Oxygen concentration, fraction in landfill gas.

C_{Ox} = Oxygen concentration in the diluted sample gas.

C_t = Calculated NMOC concentration, ppmv C equivalent.

C_{tm} = Measured NMOC concentration, ppmv C equivalent.

P_b = Barometric pressure, mm Hg.

P_t = Gas sample tank pressure after sampling, but before pressurizing, mm Hg absolute.

P_{tf} = Final gas sample tank pressure after pressurizing, mm Hg absolute.

P_{ti} = Gas sample tank pressure after evacuation, mm Hg absolute.

P_w = Vapor pressure of H_2O (from Table 25C–1), mm Hg.

r = Total number of analyzer injections of sample tank during analysis (where j = injection number, 1 . . . r).

T_t = Sample tank temperature at completion of sampling, °K.

T_{ti} = Sample tank temperature before sampling, °K.

T_{tf} = Sample tank temperature after pressuring, °K.

12.2 Water Correction. Use Table 25C–1 (Section 17.0), the LFG temperature, and barometric pressure at the sampling site to calculate B_w.

$$B_w = \frac{P_w}{P_b} \qquad \text{Eq. 25C-1}$$

12.3 Nitrogen Concentration in the landfill gas. Use equation 25C–2 to calculate the measured concentration of nitrogen in the original landfill gas.

$$C_{N2} = \left[\frac{\left(\frac{P_{tf}}{T_{tf}}\right)}{\left(\left(\frac{P_t}{T_t}\right)-\left(\frac{P_{ti}}{T_{ti}}\right)\right)}\right] C_{mN2} \qquad \text{Eq.25C-2}$$

12.4 Oxygen Concentration in the landfill gas. Use equation 25C–3 to calculate the measured concentration of oxygen in the original landfill gas.

$$C_{Ox} = \left[\frac{\left(\frac{P_{tf}}{T_{tf}}\right)}{\left(\left(\frac{P_t}{T_t}\right)-\left(\frac{P_{ti}}{T_{ti}}\right)\right)}\right] C_{mOx} \qquad \text{Eq.25C-3}$$

12.5 You must correct the NMOC Concentration for the concentration of nitrogen or oxygen based on which gas or gases passes the requirements in section 9.1.

12.5.1 NMOC Concentration with nitrogen correction. Use Equation 25C–4 to calculate the concentration of NMOC for each sample tank when the nitrogen concentration is less than 20 percent.

$$C_t = \frac{\frac{P_{tf}}{T_{tf}}}{\left(\frac{P_t}{T_t}-\frac{P_{ti}}{T_{ti}}\right)\left(1-\frac{99}{78}C_{N2}\right)-B_w}\frac{1}{r}\sum_{j=1}^{r} C_{tm(j)} \qquad \text{Eq. 25C-4}$$

12.5.2 NMOC Concentration with oxygen correction. Use Equation 25C–5 to calculate the concentration of NMOC for each sample tank if the landfill gas oxygen is less than 5 percent and the landfill gas nitrogen concentration is greater than 20 percent.

$$C_t = \frac{\frac{P_{tf}}{T_{tf}}}{\left(\frac{P_t}{T_t}-\frac{P_{ti}}{T_{ti}}\right)\left(1-\frac{99}{21}C_{Ox}\right)-B_w}\frac{1}{r}\sum_{j=1}^{r} C_{tm(j)} \qquad \text{Eq. 25C-5}$$

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. Salo, Albert E., Samuel Witz, and Robert D. MacPhee. Determination of Solvent Vapor Concentrations by Total Combustion Analysis: A Comparison of Infrared with Flame Ionization Detectors. Paper No. 75–33.2. (Presented at the 68th Annual Meeting of the Air Pollution Control Association. Boston, Massachusetts. June 15–20, 1975.) 14 p.

2. Salo, Albert E., William L. Oaks, and Robert D. MacPhee. Measuring the Organic Carbon Content of Source Emissions for Air Pollution Control. Paper No. 74–190. (Presented at the 67th Annual Meeting of the Air Pollution Control Association. Denver, Colorado. June 9–13, 1974.) 25 p.

17.0 Tables, Diagrams, Flowcharts, and Validation Data

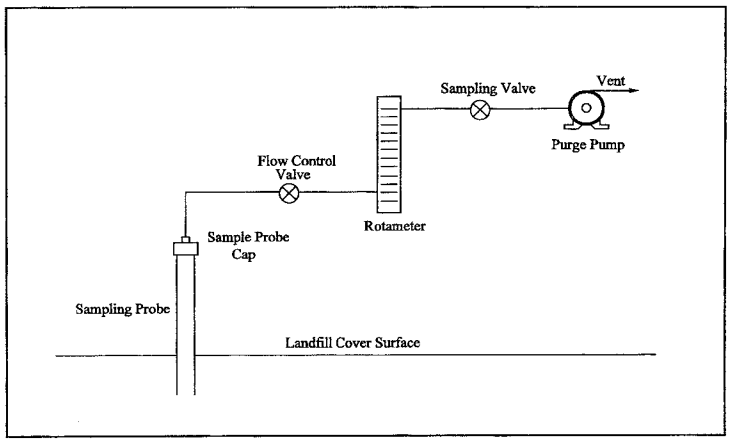


Figure 25C-1. Schematic of Sampling Probe Purging System

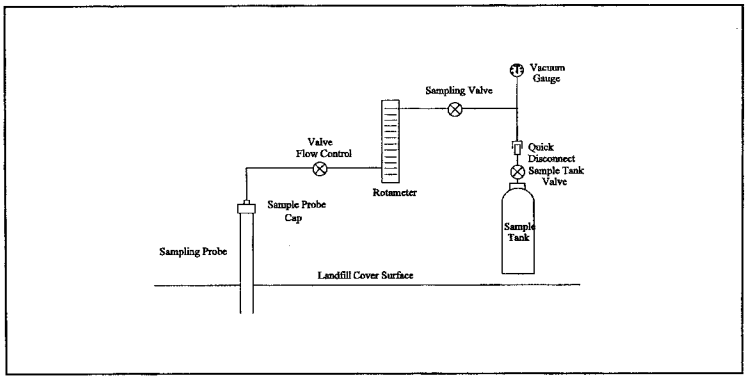


Figure 25C-2. Schematic of Sampling Train.

TABLE 25C–1—MOISTURE CORRECTION

Temperature, °C	Vapor Pressure of H_2O, mm Hg	Temperature, °C	Vapor Pressure of H_2O, mm Hg
4	6.1	18	15.5
6	7.0	20	17.5
8	8.0	22	19.8
10	9.2	24	22.4
12	10.5	26	25.2
14	12.0	28	28.3

TABLE 25C–1—MOISTURE CORRECTION—Continued

Temperature, °C	Vapor Pressure of H_2O, mm Hg	Temperature, °C	Vapor Pressure of H_2O, mm Hg
16	13.6	30	31.8

METHOD 25D—DETERMINATION OF THE VOLATILE ORGANIC CONCENTRATION OF WASTE SAMPLES

NOTE: Performance of this method should not be attempted by persons unfamiliar with the operation of a flame ionization detector (FID) or an electrolytic conductivity detector (ELCD) because knowledge beyond the scope of this presentation is required.

1.0 Scope and Application

1.1 Analyte. Volatile Organic Compounds. No CAS No. assigned.

1.2 Applicability. This method is applicable for determining the volatile organic (VO) concentration of a waste sample.

2.0 Summary of Method

2.1 Principle. A sample of waste is obtained at a point which is most representative of the unexposed waste (where the waste has had minimum opportunity to volatilize to the atmosphere). The sample is suspended in an organic/aqueous matrix, then heated and purged with nitrogen for 30 min. in order to separate certain organic compounds. Part of the sample is analyzed for carbon concentration, as methane, with an FID, and part of the sample is analyzed for chlorine concentration, as chloride, with an ELCD. The VO concentration is the sum of the carbon and chlorine content of the sample.

3.0 Definitions

3.1 *Well-mixed* in the context of this method refers to turbulent flow which results in multiple-phase waste in effect behaving as single-phase waste due to good mixing.

4.0 Interferences [Reserved]

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to performing this test method.

6.0 Equipment and Supplies

NOTE: Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

6.1 Sampling. The following equipment is required:

6.1.1 Sampling Tube. Flexible Teflon, 0.25 in. ID (6.35 mm).

6.1.2 Sample Container. Borosilicate glass, 40-mL, and a Teflon-lined screw cap capable of forming an air tight seal.

6.1.3 Cooling Coil. Fabricated from 0.25 in (6.35 mm). ID 304 stainless steel tubing with a thermocouple at the coil outlet.

6.2 Analysis. The following equipment is required.

6.2.1 Purging Apparatus. For separating the VO from the waste sample. A schematic of the system is shown in Figure 25D–1. The purging apparatus consists of the following major components.

6.2.1.1 Purging Flask. A glass container to hold the sample while it is heated and purged with dry nitrogen. The cap of the purging flask is equipped with three fittings: one for a purging lance (fitting with the #7 Ace-thread), one for the Teflon exit tubing (side fitting, also a #7 Ace-thread), and a third (a 50-mm Ace-thread) to attach the base of the purging flask as shown in Figure 25D–2. The base of the purging flask is a 50-mm ID (2 in) cylindrical glass tube. One end of the tube is open while the other end is sealed. Exact dimensions are shown in Figure 25D–2.

6.2.1.2 Purging Lance. Glass tube, 6-mm OD (0.2 in) by 30 cm (12 in) long. The purging end of the tube is fitted with a four-arm bubbler with each tip drawn to an opening 1 mm (0.04 in) in diameter. Details and exact dimensions are shown in Figure 25D–2.

6.2.1.3 Coalescing Filter. Porous fritted disc incorporated into a container with the same dimensions as the purging flask. The details of the design are shown in Figure 25D–3.

6.2.1.4 Constant Temperature Chamber. A forced draft oven capable of maintaining a uniform temperature around the purging flask and coalescing filter of 75 ±2 °C (167 ±3.6 °F).

6.2.1.5 Three-way Valve. Manually operated, stainless steel. To introduce calibration gas into system.

6.2.1.6 Flow Controllers. Two, adjustable. One capable of maintaining a purge gas flow rate of 6 ±0.06 L/min (0.2 ±0.002 ft^3/min) The other capable of maintaining a calibration gas flow rate of 1–100 mL/min (0.00004–0.004 ft^3/min).

6.2.1.7 Rotameter. For monitoring the air flow through the purging system (0–10 L/min)(0–0.4 ft^3/min).

6.2.1.8 Sample Splitters. Two heated flow restrictors (placed inside oven or heated to 120 ±10 °C (248 ±18 °F)). At a purge rate of 6 L/min (0.2 ft^3/min), one will supply a constant flow to the first detector (the rest of the flow will be directed to the second sample splitter). The second splitter will split the analytical flow between the second detector and the flow restrictor. The approximate flow to the FID will be 40 mL/min (0.0014 ft^3/min) and to the ELCD will be 15 mL/min (0.0005 ft^3/min), but the exact flow must be adjusted to be compatible with the individual detector and to meet its linearity requirement. The two sample splitters will be connected to each other by 1/8′ OD (3.175 mm) stainless steel tubing.

6.2.1.9 Flow Restrictor. Stainless steel tubing, 1/8″ OD (3.175 mm), connecting the second sample splitter to the ice bath. Length is determined by the resulting pressure in the purging flask (as measured by the pressure gauge). The resulting pressure from the use of the flow restrictor shall be 6–7 psig.

6.2.1.10 Filter Flask. With one-hole stopper. Used to hold ice bath. Excess purge gas is vented through the flask to prevent condensation in the flowmeter and to trap volatile organic compounds.

6.2.1.11 Four-way Valve. Manually operated, stainless steel. Placed inside oven, used to bypass purging flask.

6.2.1.12 On/Off Valves. Two, stainless steel. One heat resistant up to 130 °C (266 °F) and placed between oven and ELCD. The other a toggle valve used to control purge gas flow.

6.2.1.13 Pressure Gauge. Range 0–40 psi. To monitor pressure in purging flask and coalescing filter.

6.2.1.14 Sample Lines. Teflon, 1/4″ OD (6.35 mm), used inside the oven to carry purge gas to and from purging chamber and to and from coalescing filter to four-way valve. Also used to carry sample from four-way valve to first sample splitter.

6.2.1.15 Detector Tubing. Stainless steel, 1/8″ OD (3.175 mm), heated to 120 ±10 °C (248 ±18 °F) . Used to carry sample gas from each sample splitter to a detector. Each piece of tubing must be wrapped with heat tape and insulating tape in order to insure that no cold spots exist. The tubing leading to the ELCD will also contain a heat-resistant on-off valve (Section 6.2.1.12) which shall also be wrapped with heat-tape and insulation.

6.2.2 Volatile Organic Measurement System. Consisting of an FID to measure the carbon concentration of the sample and an ELCD to measure the chlorine concentration.

6.2.2.1 FID. A heated FID meeting the following specifications is required.

6.2.2.1.1 Linearity. A linear response (±5 percent) over the operating range as demonstrated by the procedures established in section 10.1.1.

6.2.2.1.2 Range. A full scale range of 50 pg carbon/sec to 50 µg carbon/sec. Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale.

6.2.2.1.3 Data Recording System. A digital integration system compatible with the FID for permanently recording the output of the detector. The recorder shall have the capability to start and stop integration at points selected by the operator or it shall be capable of the ''integration by slices'' technique (this technique involves breaking down the chromatogram into smaller increments, integrating the area under the curve for each portion, subtracting the background for each portion, and then adding all of the areas together for the final area count).

6.2.2.2 ELCD. An ELCD meeting the following specifications is required. 1-propanol must be used as the electrolyte. The electrolyte flow through the conductivity cell shall be 1 to 2 mL/min (0.00004 to 0.00007 ft^3/min).

NOTE: A ¼-in. ID (6.35 mm) quartz reactor tube is strongly recommended to reduce carbon buildup and the resulting detector maintenance.

6.2.2.2.1 Linearity. A linear response (±10 percent) over the response range as demonstrated by the procedures in section 10.1.2.

6.2.2.2.2 Range. A full scale range of 5.0 pg/sec to 500 ng/sec chloride. Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale.

6.2.2.2.3 Data Recording System. A digital integration system compatible with the output voltage range of the ELCD. The recorder must have the capability to start and stop integration at points selected by the operator or it shall be capable of performing the ''integration by slices'' technique.

7.0 Reagents and Standards

7.1 Sampling.

7.1.1 Polyethylene Glycol (PEG). Ninety-eight percent pure with an average molecular weight of 400. Before using the PEG, remove any organic compounds that might be detected as volatile organics by heating it to 120 °C (248 °F) and purging it with nitrogen at a flow rate of 1 to 2 L/min (0.04 to 0.07 ft^3/min) for 2 hours. The cleaned PEG must be stored under a 1 to 2 L/min (0.04 to 0.07 ft^3/min) nitrogen purge until use. The purge apparatus is shown in Figure 25D–4.

7.2 Analysis.

7.2.1 Sample Separation. The following are required for the sample purging step.

7.2.1.1 PEG. Same as section 7.1.1.

7.2.1.2 Purge Gas. Zero grade nitrogen (N_2), containing less than 1 ppm carbon.

7.2.2 Volatile Organics Measurement. The following are required for measuring the VO concentration.

7.2.2.1 Hydrogen (H_2). Zero grade H_2, 99.999 percent pure.

7.2.2.2 Combustion Gas. Zero grade air or oxygen as required by the FID.

7.2.2.3 Calibration Gas. Pressurized gas cylinder containing 10 percent propane and 1 percent 1,1-dichloroethylene by volume in nitrogen.

7.2.2.4 Water. Deionized distilled water that conforms to American Society for Testing and Materials Specification D 1193–74, Type 3, is required for analysis. At the option of the analyst, the $KMnO_4$ test for oxidizable organic matter may be omitted when high concentrations are not expected to be present.

7.2.2.5 1-Propanol. ACS grade or better. Electrolyte Solution. For use in the ELCD.

8.0 Sample Collection, Preservation, Storage, and Transport

8.1 Sampling.

8.1.1 Sampling Plan Design and Development. Use the procedures in chapter nine of Reference 1 in section 16 as guidance in developing a sampling plan.

8.1.2 Single Phase or Well-mixed Waste.

8.1.2.1 Install a sampling tap to obtain the sample at a point which is most representative of the unexposed waste (where the waste has had minimum opportunity to volatilize to the atmosphere). Assemble the sampling apparatus as shown in Figure 25D–5.

8.1.2.2 Prepare the sampling containers as follows: Pour 30 mL of clean PEG into the container. PEG will reduce but not eliminate the loss of organics during sample collection. Weigh the sample container with the screw cap, the PEG, and any labels to the nearest 0.01 g and record the weight (m_{st}). Store the containers in an ice bath until 1 hour before sampling (PEG will solidify at ice bath temperatures; allow the containers to reach room temperature before sampling).

8.1.2.3 Begin sampling by purging the sample lines and cooling coil with at least four volumes of waste. Collect the purged material in a separate container and dispose of it properly.

8.1.2.4 After purging, stop the sample flow and direct the sampling tube to a preweighed sample container, prepared as described in section 8.1.2.2. Keep the tip of the tube below the surface of the PEG during sampling to minimize contact with the atmosphere. Sample at a flow rate such that the temperature of the waste is less than 10 °C (50 °F). Fill the sample container and immediately cap it (within 5 seconds) so that a minimum headspace exists in the container. Store immediately in a cooler and cover with ice.

8.1.3 Multiple-phase Waste. Collect a 10 g sample of each phase of waste generated using the procedures described in section 8.1.2 or 8.1.5. Each phase of the waste shall be analyzed as a separate sample. Calculate the weighted average VO concentration of the waste using Equation 25D–13 (Section 12.14).

8.1.4 Solid waste. Add approximately 10 g of the solid waste to a container prepared in the manner described in section 8.1.2.2, minimizing headspace. Cap and chill immediately.

8.1.5 Alternative to Tap Installation. If tap installation is impractical or impossible, fill a large, clean, empty container by submerging the container into the waste below the surface of the waste. Immediately fill a container prepared in the manner described in section 8.1.2.2 with approximately 10 g of the waste collected in the large container. Minimize headspace, cap and chill immediately.

8.1.6 Alternative sampling techniques may be used upon the approval of the Administrator.

8.2 Sample Recovery.

8.2.1 Assemble the purging apparatus as shown in Figures 25D–1 and 25D–2. The oven shall be heated to 75 ±2 °C (167 ±3.6 °F). The sampling lines leading from the oven to the detectors shall be heated to 120 ±10 °C (248 ±18 °F) with no cold spots. The flame ionization detector shall be operated with a heated block. Adjust the purging lance so that it reaches the bottom of the chamber.

8.2.2 Remove the sample container from the cooler, and wipe the exterior of the container to remove any extraneous ice, water, or other debris. Reweigh the sample container to the nearest 0.01 g, and record the weight (m_{sf}). Pour the contents of the sample container into the purging flask, rinse the sample container three times with a total of 20 mL of PEG (since the sample container originally held 30 mL of PEG, the total volume of PEG added to the purging flask will be 50 mL), transferring the rinsings to the purging flask after each rinse. Cap purging flask between rinses. The total volume of PEG in the purging flask shall be 50 mL. Add 50 mL of water to the purging flask.

9.0 Quality Control

9.1 Quality Control Samples. If audit samples are not available, prepare and analyze the two types of quality control samples (QCS) listed in Sections 9.1.1 and 9.1.2. Before placing the system in operation, after a shutdown of greater than six months, and after any major modifications, analyze each QCS in triplicate. For each detector, calculate the percent recovery by dividing measured concentration by theoretical concentration and multiplying by 100. Determine the mean percent recovery for each detector for each QCS triplicate analysis. The RSD for any triplicate analysis shall be ≤10 percent. For QCS 1 (methylene chloride), the percent recovery shall be ≥90 percent for carbon as methane, and ≥55 percent for chlorine as chloride. For QCS 2 (1,3-dichloro-2-propanol), the percent recovery shall be ≤15 percent for carbon as methane, and ≤6 percent for chlorine as chloride. If the analytical system does not meet the above-mentioned criteria for both detectors, check the system parameters (temperature, system pressure, purge rate, etc.), correct the problem, and repeat the triplicate analysis of each QCS.

9.1.1 QCS 1, Methylene Chloride. Prepare a stock solution by weighing, to the nearest 0.1 mg, 55 μL of HPLC grade methylene chloride in a tared 5 mL volumetric flask. Record the weight in milligrams, dilute to 5 mL with cleaned PEG, and inject 100 μL of the stock solution into a sample prepared as a water blank (50 mL of cleaned PEG and 60 mL of water in the purging flask). Analyze

the QCS according to the procedures described in sections 10.2 and 10.3, excluding section 10.2.2. To calculate the theoretical carbon concentration (in mg) in QCS 1, multiply mg of methylene chloride in the stock solution by 3.777×10^{-3}. To calculate the theoretical chlorine concentration (in mg) in QCS 1, multiply mg of methylene chloride in the stock solution by 1.670×10^{-2}.

9.1.2 QCS 2, 1,3-dichloro-2-propanol. Prepare a stock solution by weighing, to the nearest 0.1 mg, 60 μL of high purity grade 1,3-dichloro-2-propanol in a tared 5 mL volumetric flask. Record the weight in milligrams, dilute to 5 mL with cleaned PEG, and inject 100 μL of the stock solution into a sample prepared as a water blank (50 mL of cleaned PEG and 60 mL of water in the purging flask). Analyze the QCS according to the procedures described in sections 10.2 and 10.3, excluding section 10.2.2. To calculate the theoretical carbon concentration (in mg) in QCS 2, multiply mg of 1,3-dichloro-2-propanol in the stock solution by 7.461×10^{-3}. To calculate the theoretical chlorine concentration (in mg) in QCS 2, multiply mg of 1,3-dichloro-2-propanol in the stock solution by 1.099×10^{-2}.

9.1.3 Routine QCS Analysis. For each set of compliance samples (in this context, set is per facility, per compliance test), analyze one QCS 1 and one QCS 2 sample. The percent recovery for each sample for each detector shall be ±13 percent of the mean recovery established for the most recent set of QCS triplicate analysis (Section 9.4). If the sample does not meet this criteria, check the system components and analyze another QCS 1 and 2 until a single set of QCS meet the ±13 percent criteria.

10.0 Calibration and Standardization

10.1 Initial Performance Check of Purging System. Before placing the system in operation, after a shutdown of greater than six months, after any major modifications, and at least once per month during continuous operation, conduct the linearity checks described in sections 10.1.1 and 10.1.2. Install calibration gas at the three-way calibration gas valve. See Figure 25D–1.

10.1.1 Linearity Check Procedure. Using the calibration standard described in section 7.2.2.3 and by varying the injection time, it is possible to calibrate at multiple concentration levels. Use Equation 25D–3 to calculate three sets of calibration gas flow rates and run times needed to introduce a total mass of carbon, as methane, (m_c) of 1, 5, and 10 mg into the system (low, medium and high FID calibration, respectively). Use Equation 25D–4 to calculate three sets of calibration gas flow rates and run times needed to introduce a total chloride mass (m_{ch}) of 1, 5, and 10 mg into the system (low, medium and high ELCD calibration, respectively). With the system operating in standby mode, allow the FID and the ELCD to establish a stable baseline. Set the secondary pressure regulator of the calibration gas cylinder to the same pressure as the purge gas cylinder and set the proper flow rate with the calibration flow controller (see Figure 25D–1). The calibration gas flow rate can be measured with a flowmeter attached to the vent position of the calibration gas valve. Set the four-way bypass valve to standby position so that the calibration gas flows through the coalescing filter only. Inject the calibration gas by turning the calibration gas valve from vent position to inject position. Continue the calibration gas flow for the appropriate period of time before switching the calibration valve to vent position. Continue recording the response of the FID and the ELCD for 5 min after switching off calibration gas flow. Make triplicate injections of all six levels of calibration.

10.1.2 Linearity Criteria. Calculate the average response factor (Equations 25D–5 and 25D–6) and the relative standard deviation (RSD) (Equation 25D–10) at each level of the calibration curve for both detectors. Calculate the overall mean of the three response factor averages for each detector. The FID linearity is acceptable if each response factor is within 5 percent of the overall mean and if the RSD for each set of triplicate injections is less than 5 percent. The ELCD linearity is acceptable if each response factor is within 10 percent of the overall mean and if the RSD for each set of triplicate injections is less than 10 percent. Record the overall mean value of the response factors for the FID and the ELCD. If the calibration for either the FID or the ELCD does not meet the criteria, correct the detector/system problem and repeat sections 10.1.1 and 10.1.2.

10.2 Daily Calibrations.

10.2.1 Daily Linearity Check. Follow the procedures outlined in section 10.1.1 to analyze the medium level calibration for both the FID and the ELCD in duplicate at the start of the day. Calculate the response factors and the RSDs for each detector. For the FID, the calibration is acceptable if the average response factor is within 5 percent of the overall mean response factor (Section 10.1.2) and if the RSD for the duplicate injection is less than 5 percent. For the ELCD, the calibration is acceptable if the average response factor is within 10 percent of the overall mean response factor (Section 10.1.2) and if the RSD for the duplicate injection is less than 10 percent. If the calibration for either the FID or the ELCD does not meet the criteria, correct the detector/system problem and repeat sections 10.1.1 and 10.1.2.

10.2.2 Calibration Range Check.

10.2.2.1 If the waste concentration for either detector falls below the range of calibration for that detector, use the procedure outlined in section 10.1.1 to choose two calibration points that bracket the new target

concentration. Analyze each of these points in triplicate (as outlined in section 10.1.1) and use the criteria in section 10.1.2 to determine the linearity of the detector in this ''mini-calibration'' range.

10.2.2.2 After the initial linearity check of the mini-calibration curve, it is only necessary to test one of the points in duplicate for the daily calibration check (in addition to the points specified in section 10.2.1). The average daily mini-calibration point should fit the linearity criteria specified in section 10.2.1. If the calibration for either the FID or the ELCD does not meet the criteria, correct the detector/system problem and repeat the calibration procedure mentioned in the first paragraph of section 10.2.2. A mini-calibration curve for waste concentrations above the calibration curve for either detector is optional.

10.3 Analytical Balance. Calibrate against standard weights.

11.0 Analysis

11.1 Sample Analysis.

11.1.1 Turn on the constant temperature chamber and allow the temperature to equilibrate at 75 ±2 °C (167 ±3.6 °F). Turn the four-way valve so that the purge gas bypasses the purging flask, the purge gas flowing through the coalescing filter and to the detectors (standby mode). Turn on the purge gas. Allow both the FID and the ELCD to warm up until a stable baseline is achieved on each detector. Pack the filter flask with ice. Replace ice after each run and dispose of the waste water properly. When the temperature of the oven reaches 75 ±2 °C (167 ±3.6 °F), start both integrators and record baseline. After 1 min, turn the four-way valve so that the purge gas flows through the purging flask, to the coalescing filter and to the sample splitters (purge mode). Continue recording the response of the FID and the ELCD. Monitor the readings of the pressure gauge and the rotameter. If the readings fall below established setpoints, stop the purging, determine the source of the leak, and resolve the problem before resuming. Leaks detected during a sampling period invalidate that sample.

11.1.2 As the purging continues, monitor the output of the detectors to make certain that the analysis is proceeding correctly and that the results are being properly recorded. Every 10 minutes read and record the purge flow rate, the pressure and the chamber temperature. Continue the purging for 30 minutes.

11.1.3 For each detector output, integrate over the entire area of the peak starting at 1 minute and continuing until the end of the run. Subtract the established baseline area from the peak area. Record the corrected area of the peak. See Figure 25D–6 for an example integration.

11.2 Water Blank. A water blank shall be analyzed for each batch of cleaned PEG prepared. Transfer about 60 mL of water into the purging flask. Add 50 mL of the cleaned PEG to the purging flask. Treat the blank as described in sections 8.2 and 8.3, excluding section 8.2.2. Calculate the concentration of carbon and chlorine in the blank sample (assume 10 g of waste as the mass). A VO concentration equivalent to ≤10 percent of the applicable standard may be subtracted from the measured VO concentration of the waste samples. Include all blank results and documentation in the test report.

12.0 Data Analysis and Calculations

12.1 Nomenclature.

A_b = Area under the water blank response curve, counts.

A_c = Area under the calibration response curve, counts.

A_s = Area under the sample response curve, counts.

C = Concentration of volatile organics in the sample, ppmw.

C_c = Concentration of carbon, as methane, in the calibration gas, mg/L.

C_{ch} = Concentration of chloride in the calibration gas, mg/L.

C_j = VO concentration of phase j, ppmw.

DR_f = Average daily response factor of the FID, mg CH_4/counts.

Dr_{th} = Average daily response factor of the ELCD, mg Cl^-/counts.

F_j = Weight fraction of phase j present in the waste.

m_c = Mass of carbon, as methane, in a calibration run, mg.

m_{ch} = Mass of chloride in a calibration run, mg.

m_s = Mass of the waste sample, g.

m_{sc} = Mass of carbon, as methane, in the sample, mg.

m_{sf} = Mass of sample container and waste sample, g.

m_{sh} = Mass of chloride in the sample, mg.

m_{st} = Mass of sample container prior to sampling, g.

m_{VO} = Mass of volatile organics in the sample, mg.

n = Total number of phases present in the waste.

P_p = Percent propane in calibration gas (L/L).

P_{vc} = Percent 1,1-dichloroethylene in calibration gas (L/L).

Q_c = Flow rate of calibration gas, L/min.

t_c = Length of time standard gas is delivered to the analyzer, min.

W = Weighted average VO concentration, ppmw.

12.2 Concentration of Carbon, as Methane, in the Calibration Gas.

$$C_c = (19.681 \times P_p) + (13.121 \times P_{vc}) \qquad \text{Eq. 25D-1}$$

12.3 Concentration of Chloride in the Calibration Gas.

$$C_{ch} = 28.998 \times P_{vc} \qquad \text{Eq. 25D-2}$$

12.4 Mass of Carbon, as Methane, in a Calibration Run.

$$M_c = C_c \times Q_c \times t_c \qquad \text{Eq. 25D-3}$$

12.5 Mass of Chloride in a Calibration Run.

$$m_{ch} = C_{ch} \times Q_c \times t_c \qquad \text{Eq. 25D-4}$$

12.6 FID Response Factor, mg/counts.

$$DR_t = \frac{m_c}{A_c} \qquad \text{Eq. 25D-5}$$

12.7 ELCD Response Factor, mg/counts.

$$DR_{th} = \frac{m_{ch}}{A_c} \qquad \text{Eq. 25D-6}$$

12.8 Mass of Carbon in the Sample.

$$m_{sc} = DR_t(A_s - A_b) \qquad \text{Eq. 25D-7}$$

12.9 Mass of Chloride in the Sample.

$$m_{sh} = DR_{th}(A_s - A_b) \qquad \text{Eq. 25D-8}$$

12.10 Mass of Volatile Organics in the Sample.

$$m_{vo} = m_{sc} + m_{sh} \qquad \text{Eq. 25D-9}$$

12.11 Relative Standard Deviation.

$$RSD = \frac{100}{\bar{x}} \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}} \qquad \text{Eq. 25D-10}$$

12.12 Mass of Sample.

$$m_s = m_{sf} - m_{st} \qquad \text{Eq. 25D-11}$$

12.13 Concentration of Volatile Organics in Waste.

$$C = \frac{(m_{vo} \times 1000)}{m_s} \qquad \text{Eq. 25D-12}$$

12.14 Weighted Average VO Concentration of Multi-phase Waste.

$$W = \sum_{j=1}^{n} F_j x \bar{C}_j \qquad \text{Eq. 25D-13}$$

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. ''Test Methods for Evaluating Solid Waste, Physical/Chemistry Methods'', U.S. Environmental Protection Agency. Publication SW–846, 3rd Edition, November 1986 as amended by Update I, November 1990.

17.0 Tables, Diagrams, Flowcharts, and Validation Data

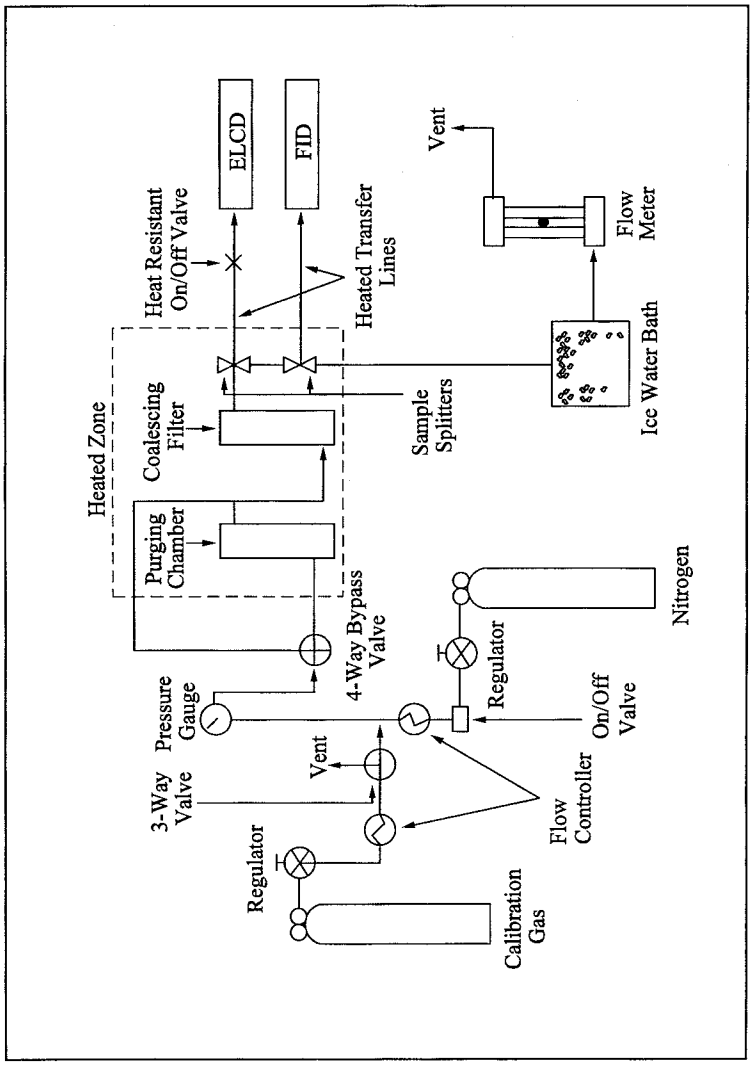


Figure 25D-1. Schematic of Purging Apparatus.

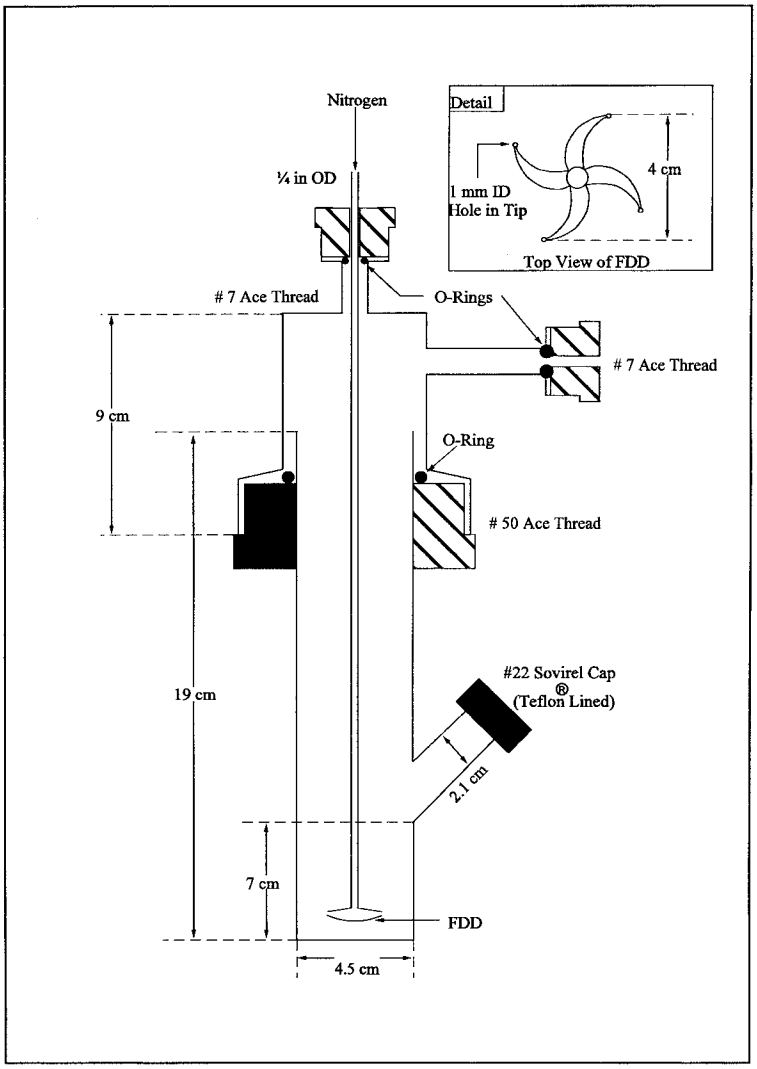
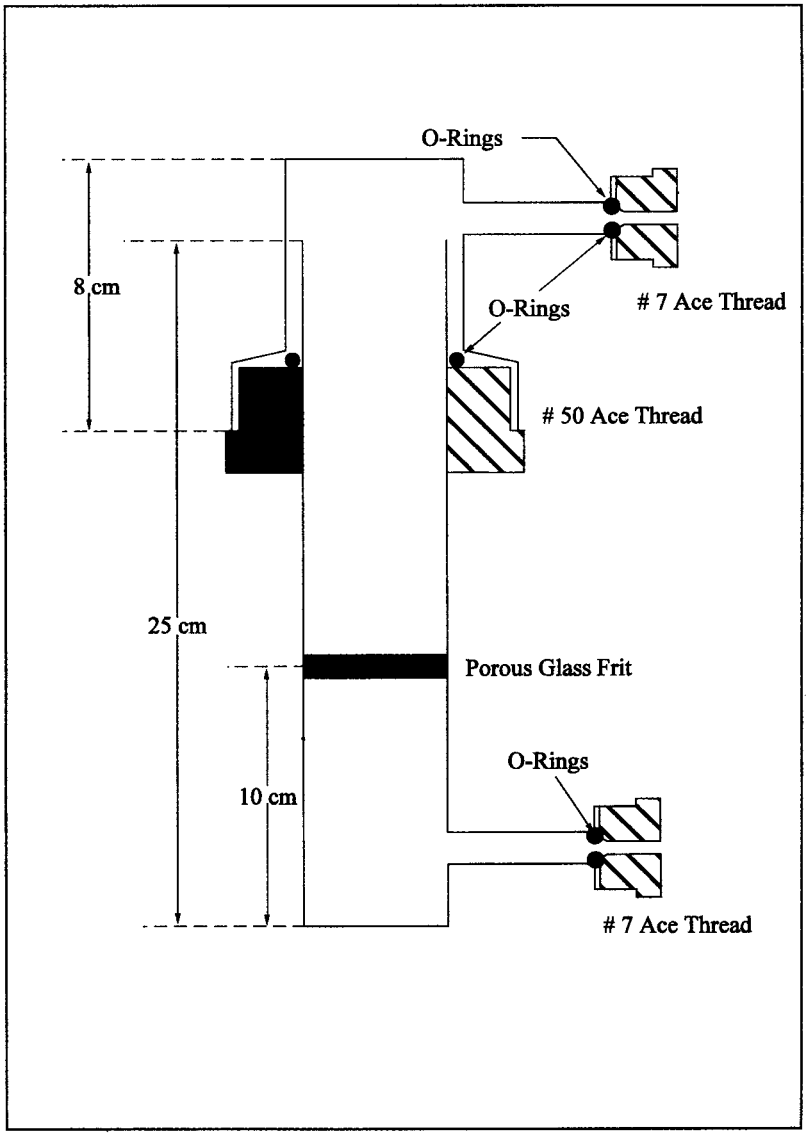


Figure 25D-2. Purging Lance.


O-Rings
8 cm
O-Rings
7 Ace Thread
50 Ace Thread
25 cm
Porous Glass Frit
O-Rings
10 cm
7 Ace Thread

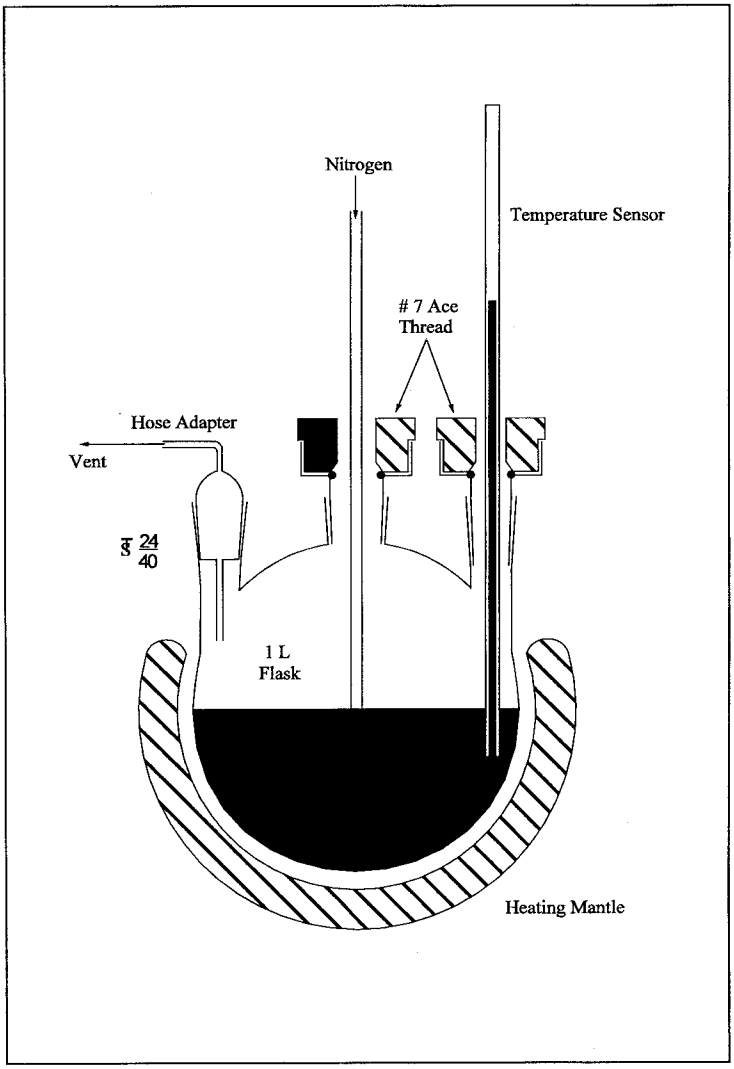


Figure 25D-4. Schematic of PEG Cleaning System.

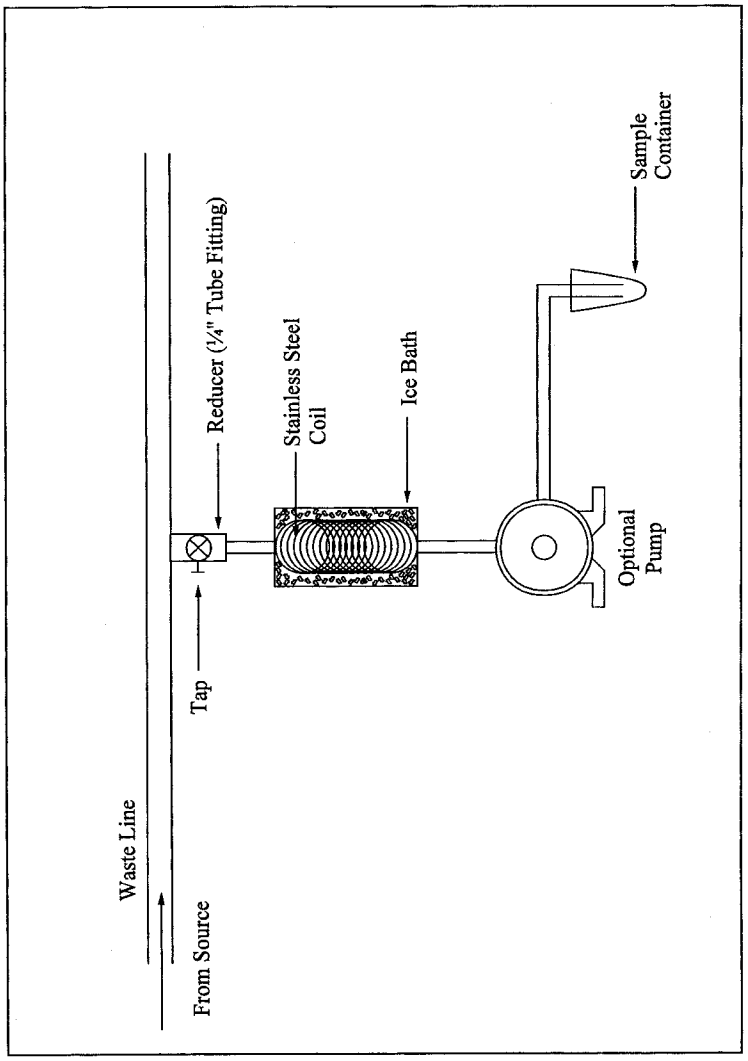


Figure 25D-5. Schematic of Sampling Apparatus.

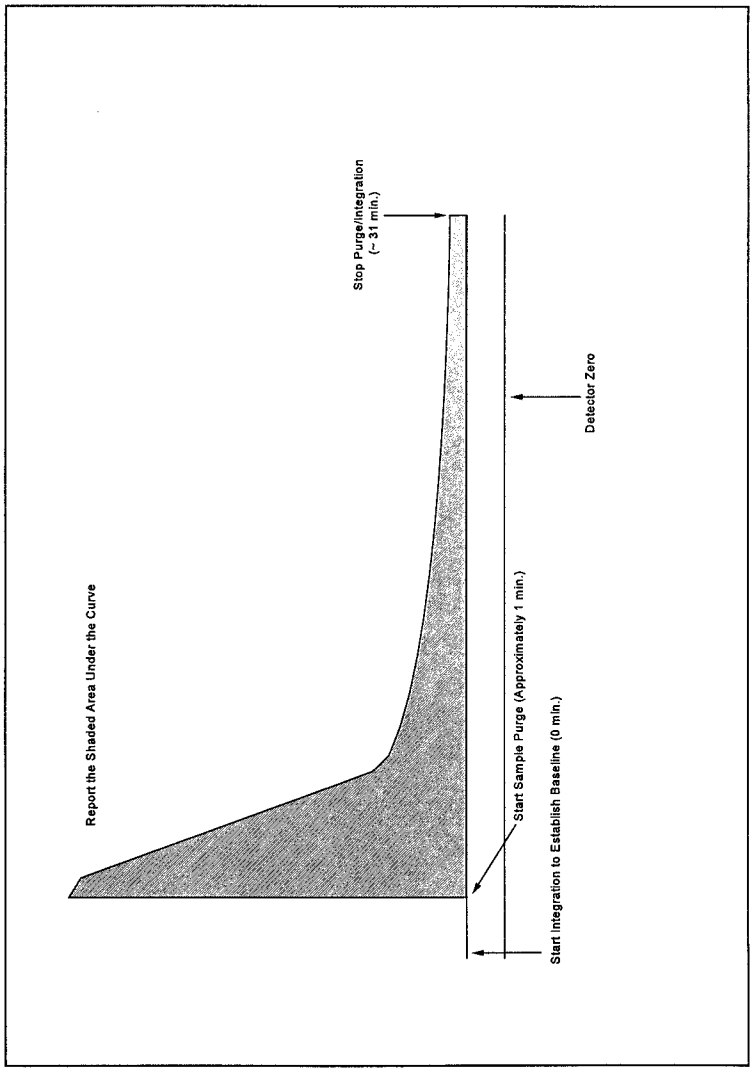


Figure 25D-6. Example Integration of Either Detector.

METHOD 25E—DETERMINATION OF VAPOR PHASE ORGANIC CONCENTRATION IN WASTE SAMPLES

NOTE: Performance of this method should not be attempted by persons unfamiliar with the operation of a flame ionization detector (FID) nor by those who are unfamiliar with source sampling because knowledge beyond the scope of this presentation is required. This method is not inclusive with respect to specifications (*e.g.*, reagents and standards) and calibration procedures. Some material is incorporated by reference from other methods. Therefore, to obtain reliable results, persons using this method should have a thorough knowledge of at least the following additional test methods: Method 106, part 61, Appendix B, and Method 18, part 60, Appendix A.

1.0 Scope and Application

1.1 Applicability. This method is applicable for determining the vapor pressure of waste cited by an applicable regulation.

1.2 Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.

2.0 Summary of Method

2.1 The headspace vapor of the sample is analyzed for carbon content by a headspace analyzer, which uses an FID.

3.0 Definitions [Reserved]

4.0 Interferences

4.1 The analyst shall select the operating parameters best suited to the requirements for a particular analysis. The analyst shall produce confirming data through an adequate supplemental analytical technique and have the data available for review by the Administrator.

5.0 Safety [Reserved]

6.0 Equipment and Supplies

6.1 Sampling. The following equipment is required:

6.1.1 Sample Containers. Vials, glass, with butyl rubber septa, Perkin-Elmer Corporation Numbers 0105–0129 (glass vials), B001–0728 (gray butyl rubber septum, plug style), 0105–0131 (butyl rubber septa), or equivalent. The seal must be made from butyl rubber. Silicone rubber seals are not acceptable.

6.1.2 Vial Sealer. Perkin-Elmer Number 105–0106, or equivalent.

6.1.3 Gas-Tight Syringe. Perkin-Elmer Number 00230117, or equivalent.

6.1.4 The following equipment is required for sampling.

6.1.4.1 Tap.

6.1.4.2 Tubing. Teflon, 0.25-in. ID.

NOTE: Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

6.1.4.3 Cooling Coil. Stainless steel (304), 0.25 in.-ID, equipped with a thermocouple at the coil outlet.

6.2 Analysis. The following equipment is required.

6.2.1 Balanced Pressure Headspace Sampler. Perkin-Elmer HS–6, HS–100, or equivalent, equipped with a glass bead column instead of a chromatographic column.

6.2.2 FID. An FID meeting the following specifications is required.

6.2.2.1 Linearity. A linear response (±5 percent) over the operating range as demonstrated by the procedures established in section 10.2.

6.2.2.2 Range. A full scale range of 1 to 10,000 parts per million (ppm) propane (C_3H_8). Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale.

6.2.3 Data Recording System. Analog strip chart recorder or digital integration system compatible with the FID for permanently recording the output of the detector.

6.2.4 Temperature Sensor. Capable of reading temperatures in the range of 30 to 60 °C (86 to 140 °F) with an accuracy of ±0.1 °C (±0.2 °F).

7.0 Reagents and Standards

7.1 Analysis. The following items are required for analysis.

7.1.1 Hydrogen (H_2). Zero grade hydrogen, as required by the FID.

7.1.2 Carrier Gas. Zero grade nitrogen, containing less than 1 ppm carbon (C) and less than 1 ppm carbon dioxide.

7.1.3 Combustion Gas. Zero grade air or oxygen as required by the FID.

7.2 Calibration and Linearity Check.

7.2.1 Stock Cylinder Gas Standard. 100 percent propane. The manufacturer shall: (a) Certify the gas composition to be accurate to ±3 percent or better (see section 7.2.1.1); (b) recommend a maximum shelf life over which the gas concentration does not change by greater than ±5 percent from the certified value; and (c) affix the date of gas cylinder preparation, certified propane concentration, and recommended maximum shelf life to the cylinder before shipment to the buyer.

7.2.1.1 Cylinder Standards Certification. The manufacturer shall certify the concentration of the calibration gas in the cylinder by (a) directly analyzing the cylinder and (b) calibrating his analytical procedure on the day of cylinder analysis. To calibrate his analytical procedure, the manufacturer shall use, as a minimum, a three-point calibration curve.

7.2.1.2 Verification of Manufacturer's Calibration Standards. Before using, the manufacturer shall verify each calibration standard by (a) comparing it to gas mixtures prepared in accordance with the procedure described in section 7.1 of Method 106 of Part 61, Appendix B, or by (b) calibrating it against Standard Reference Materials (SRM's) prepared by the National Bureau of Standards, if such SRM's are available. The agreement between the initially determined concentration value and the verification concentration value must be within ±5 percent. The manufacturer must reverify all calibration standards on a time interval consistent with the shelf life of the cylinder standards sold.

8.0 Sampling Collection, Preservation, Storage, and Transport

8.1 Install a sampling tap to obtain a sample at a point which is most representative of the unexposed waste (where the waste has had minimum opportunity to volatilize to

the atmosphere). Assemble the sampling apparatus as shown in Figure 25E–1.

8.2 Begin sampling by purging the sample lines and cooling coil with at least four volumes of waste. Collect the purged material in a separate container and dispose of it properly.

8.3 After purging, stop the sample flow and transfer the Teflon sampling tube to a sample container. Sample at a flow rate such that the temperature of the waste is <10 °C (<50 °F). Fill the sample container halfway (±5 percent) and cap it within 5 seconds. Store immediately in a cooler and cover with ice.

8.4 Alternative sampling techniques may be used upon the approval of the Administrator.

9.0 Quality Control

9.1 Miscellaneous Quality Control Measures.

Section	Quality control measure	Effect
10.2, 10.3	FID calibration and response check	Ensure precision of analytical results.

10.0 Calibration and Standardization

NOTE: Maintain a record of performance of each item.

10.1 Use the procedures in sections 10.2 to calibrate the headspace analyzer and FID and check for linearity before the system is first placed in operation, after any shutdown longer than 6 months, and after any modification of the system.

10.2 Calibration and Linearity. Use the procedures in section 10 of Method 18 of Part 60, Appendix A, to prepare the standards and calibrate the flowmeters, using propane as the standard gas. Fill the calibration standard vials halfway (±5 percent) with deionized water. Purge and fill the airspace with calibration standard. Prepare a minimum of three concentrations of calibration standards in triplicate at concentrations that will bracket the applicable cutoff. For a cutoff of 5.2 kPa (0.75 psi), prepare nominal concentrations of 30,000, 50,000, and 70,000 ppm as propane. For a cutoff of 27.6 kPa (4.0 psi), prepare nominal concentrations of 200,000, 300,000, and 400,000 ppm as propane.

10.2.1 Use the procedures in section 11.3 to measure the FID response of each standard. Use a linear regression analysis to calculate the values for the slope (k) and the y-intercept (b). Use the procedures in sections 12.3 and 12.2 to test the calibration and the linearity.

10.3 Daily FID Calibration Check. Check the calibration at the beginning and at the end of the daily runs by using the following procedures. Prepare 2 calibration standards at the nominal cutoff concentration using the procedures in section 10.2. Place one at the beginning and one at the end of the daily run. Measure the FID response of the daily calibration standard and use the values for k and b from the most recent calibration to calculate the concentration of the daily standard. Use an equation similar to 25E–2 to calculate the percent difference between the daily standard and C_s. If the difference is within 5 percent, then the previous values for k and b can be used. Otherwise, use the procedures in section 10.2 to recalibrate the FID.

11.0 Analytical Procedures

11.1 Allow one hour for the headspace vials to equilibrate at the temperature specified in the regulation. Allow the FID to warm up until a stable baseline is achieved on the detector.

11.2 Check the calibration of the FID daily using the procedures in section 10.3.

11.3 Follow the manufacturer's recommended procedures for the normal operation of the headspace sampler and FID.

11.4 Use the procedures in sections 12.4 and 12.5 to calculate the vapor phase organic vapor pressure in the samples.

11.5 Monitor the output of the detector to make certain that the results are being properly recorded.

12.0 Data Analysis and Calculations

12.1 Nomenclature.

A = Measurement of the area under the response curve, counts.
b = y-intercept of the linear regression line.
C_a = Measured vapor phase organic concentration of sample, ppm as propane.
C_{ma} = Average measured vapor phase organic concentration of standard, ppm as propane.
C_m = Measured vapor phase organic concentration of standard, ppm as propane.
C_s = Calculated standard concentration, ppm as propane.
k = Slope of the linear regression line.
P_{bar} = Atmospheric pressure at analysis conditions, mm Hg (in. Hg).
P* = Organic vapor pressure in the sample, kPa (psi).
PD = Percent difference between the average measured vapor phase organic concentration (C_m) and the calculated standard concentration (C_s).
RSD = Relative standard deviation.
$\beta = 1.333 \times 10^{-7}$ kPa/[(mm Hg)(ppm)], $(4.91 \times 10^{-7}$ psi/[(in. Hg)(ppm)])

12.2 Linearity. Use the following equation to calculate the measured standard concentration for each standard vial.

$$C_m = kA + b \qquad \text{Eq. 25E-1}$$

12.2.1 Calculate the average measured standard concentration (C_{ma}) for each set of triplicate standards and use the following equation to calculate PD between C_{ma} and C_s. The instrument linearity is acceptable if the PD is within five for each standard.

$$PD = \frac{C_s - C_{ma}}{C_s} \times 100 \qquad \text{Eq. 25E-2}$$

12.3. Relative Standard Deviation (RSD). Use the following equation to calculate the RSD for each triplicate set of standards.

$$RSD = \frac{100}{C_{ma}} \sqrt{\frac{\sum (C_m - C_{ma})^2}{2}} \qquad \text{Eq. 25E-3}$$

The calibration is acceptable if the RSD is within five for each standard concentration.

12.4 Concentration of organics in the headspace. Use the following equation to calculate the concentration of vapor phase organics in each sample.

$$C_a = kA + b \qquad \text{Eq. 25E-4}$$

12.5 Vapor Pressure of Organics in the Headspace Sample. Use the following equation to calculate the vapor pressure of organics in the sample.

$$P^* = \beta P_{bar} C_a \qquad \text{Eq. 25E-5}$$

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. Salo, Albert E., Samuel Witz, and Robert D. MacPhee. ''Determination of Solvent Vapor Concentrations by Total Combustion Analysis: a Comparison of Infared with Flame Ionization Detectors. Paper No. 75–33.2. (Presented at the 68th Annual Meeting of the Air Pollution Control Association. Boston, Massachusetts.

2. Salo, Albert E., William L. Oaks, and Robert D. MacPhee. ''Measuring the Organic Carbon Content of Source Emissions for Air Pollution Control. Paper No. 74–190. (Presented at the 67th Annual Meeting of the Air Pollution Control Association. Denver, Colorado. June 9–13, 1974.) p. 25.

17.0 Tables, Diagrams, Flowcharts, and Validation Data

Attachment E: Draft Noxious Weed Control Plan

Sunstone Solar Project
Draft Noxious Weed Control Plan

Prepared for

Sunstone Solar, LLC

Prepared by

Tetra Tech, Inc.

April 2024

Revised by Department June 2024

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List of Tables

Appendices

1.0 Introduction

Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Applicant), proposes to construct and operate the Sunstone Solar Project (Facility), a photovoltaic solar energy generation facility and related or supporting facilities in Morrow County, Oregon. The proposed Facility will generate up to 1,200 megawatts (MW) of nominal and average generating capacity using solar panels wired in series and in parallel to form arrays, which in turn are connected to electrical infrastructure. Additionally, the Facility will also include a 1,200-MW distributed battery energy storage system for the purpose of stabilizing the solar resource. The Applicant proposes to permit a range of photovoltaic and related or associated technology within a site boundary that allows for micrositing flexibility in consideration of the perpetual evolution of technology and maximization of space efficiency, thereby allowing developmental flexibility to address varying market requirements. These facilities are all described in greater detail in Exhibit B of the Application for Site Certificate (ASC).

This Draft Noxious Weed Control Plan has been prepared to comply with Oregon Administrative Rule 660-033-0130 (38)(h)(D), which states, in regard to photovoltaic solar power generation facilities, that:

> "C*onstruction or maintenance activities will not result in the unabated introduction or spread of noxious weeds and other undesirable weed species. This provision may be satisfied by the submittal and county approval of a weed control plan prepared by an adequately qualified individual that includes a long-term maintenance agreement. The approved plan shall be attached to the decision as a condition of approval*."

Noxious weeds are non-native, aggressive plants with the potential to cause significant damage to native ecosystems and/or cause significant economic losses. Noxious weeds are opportunistic plant species that readily flourish in disturbed areas, are difficult to control, and thereby can compete with and/or prevent native plant species from re-establishing. Notably, the likelihood of introduction or explosion of noxious weeds is correlated with new disturbances in a region, such as large-scale construction projects. In addition, noxious weed species can adversely affect the structure, composition, and success of revegetation efforts associated with construction-related temporary disturbances.

The intent of this Plan is to provide clear methods to prevent the introduction and spread of designated noxious weeds from the construction and operation of the Facility, control existing populations of noxious weeds within construction areas, and monitor the success of efforts to prevent and control noxious weeds. The Applicant and its contractors will be responsible for implementing the methods detailed in this Plan.

Prior to construction, the Applicant shall finalize this plan by completing the following:

- Develop final noxious weed monitoring methods in consultation with ODOE and incorporate as an amendment to this plan upon ODOE approval.

- Update Table 2 in consultation with ODOE and the Morrow County Weed Department.
- Provide records demonstrating all personnel have been trained on noxious weed control.
- Provide evidence that existing noxious weed infestations have been identified and treated in a manner consistent with Morrow County recommendations.
- Consult with the Morrow County Weed Department on timing, method, and application rates for each identified weed species of concern.

2.0 Regulatory Framework

2.1 State of Oregon

In Oregon, a noxious weed is defined under Oregon Revised Statutes (ORS) 569.175 as "a terrestrial, aquatic, or marine plant designated by the State Weed Board under ORS 569.615 as among those representing the greatest public menace and as a top priority for action by weed control programs.". Noxious weeds have been declared by ORS 569.350 as a menace to public welfare, and control of these plants is the responsibility of private landowners and operators, as well as county, state, and federal governments.

The Oregon State Weed Board (OSWB) was created by the Oregon Department of Agriculture (ODA) under ORS 569.600. OSWB provides recommendations for noxious weed control at the state-level and is responsible for updating the State Noxious Weed List. The OSWB and the ODA classify noxious weeds in Oregon in accordance with the ODA Noxious Weed Classification System (ODA 2022). There are three designations under the State's system:

- **A Listed Weed:** A weed of known economic importance that occurs in the state in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent.
    - **Recommended Action:** Infestations are subject to eradication or intensive control when found.
- **B Listed Weed:** A weed of economic importance that is regionally abundant, but may have limited distribution in some counties.
    - **Recommended Action:** Limited to intensive control at the state, county, or regional level as determined on a site-specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method.
- **T-Designated Weed:** A designated group of weed species selected from either the A or B list as a focus for prevention and control by the Noxious Weed Control Program. Action against these weeds will receive priority. T-designated noxious weeds are determined by the OSWB, which directs ODA to develop and implement a statewide management plan.

2.2 Morrow County

The Morrow County Code Enforcement Ordinance establishes procedures for enforcing Morrow County Code through the authority granted to general law counties by ORS Chapter 203. Section 11 of the county Code Enforcement Ordinance, updated on July 5, 2021, establishes Morrow County as a weed control district, defines what is considered a noxious weed or weed of economic importance, identifies the responsibility of private landowners to control weeds, and outlines the authority of the weed control district and Morrow County Weed ~~Coordinator~~Program Manager/Inspector to administer and enforce weed control in the ordinance (Morrow County 2021).

Morrow County has its own weed classification system that differs from the state. Morrow County defines two classifications of weeds (Morrow County 2022):

- **Noxious Weeds - "A List":** Any plant that is determined by the weed advisory board and so declared by the County Board of Commissioners to be injurious to public health, crops, livestock, land, or property under provisions of Oregon State Statute and thus mandated for control.
- **Weeds of Economic Importance - "B List":** Weeds of limited distribution in the county and subject to intensive control or eradication where feasible.

2.3 State and County Weed Lists

The ODA lists 46 Class A species and 98 Class B species for the state of Oregon, 47 of which are T-designated (ODA 2022; Appendix A). Morrow County specifically recognizes 36 species of noxious weeds (Appendix B; Morrow County 2021). Although not all of the Morrow County listed noxious weeds noted in Appendix B occur in the vicinity of the Facility, the Applicant and its contractors should be aware of the entire list while monitoring and controlling weeds. Noxious weeds known to occur in the vicinity of the site boundary are discussed in Section 3.0.

3.0 Noxious Weeds Identified at the Facility

In June, 2022 Tetra Tech completed rare plant and habitat categorization surveys within and adjacent to Facility site boundary. During those surveys, four listed noxious weed species were documented, including three ODA-listed noxious weed species and four Morrow County listed species noxious weed species. Table 1 lists the noxious weed species observed, their noxious weed designation (i.e., status), and the frequency of observations. Locations of these noxious weeds documented during surveys are included in Exhibit P, Attachment P-1 of the ASC. Three of the four noxious weed species observed were state and/or County "B" listed weeds (Table 1; Morrow County 2021, ODA 2022). One species, rush skeletonweed (*Chondrilla juncea*), is an "A" List Weed in Morrow County and a state "T"-designated weed, meaning that ODA has targeted this species for prevention and control (Morrow County 2021; ODA 2022).

Cereal rye (*Secale cereale*) was abundant in the previously disturbed areas outside of active crop fields and was generally found in previously disturbed ground. Rush skeletonweed was found in isolated small populations or single individuals on the hillside between active cropland and a gravel county road. Puncturevine (*Tribulus terrestris*) and jointed goatgrass (*Aegilops cylindrica*) were found in the highly disturbed border in between active cropland and roads. The Applicant ~~may~~ will conduct an additional pre-construction noxious weed survey to identify the noxious weeds present at the Facility at the time of construction to inform management actions. ~~and/or~~The Applicant may coordinate with landowners regarding noxious weed presence ~~to identify the noxious weeds present at the Facility at the time of construction to inform management actions~~. Identified noxious weed infestations will be treated prior to construction.

Table 1. Noxious Weeds Observed during Surveys in 2022

Scientific Name	Common Name	Oregon State Status[1]	Morrow County Status[1]	Frequency
Aegilops cylindrica	Jointed goatgrass	B	B	Few small patches.
Chondrilla juncea	Rush skeletonweed	B*, T	A	Occasional single plants.
Secale cereale	Cereal rye	Not listed	B	Scattered large-sized patches.
Tribulus terrestris	Puncturevine	B*	B	Few small to large-sized patches.

1. Definitions for state and county noxious weed status are provided in Sections 2.1 and 2.2, respectively. Species marked with a (*) are targeted for biocontrol (ODA 2022).

In addition to noxious weeds, cheatgrass, an invasive annual grass, was identified in grassland habitats within the site boundary. While this species is not listed as a noxious weed by the state or county, it and other invasive annual grasses can adversely impact habitat and can increase fire risk. To address these issues, and maintain compliance with the requirements of the Revegetation Plan required under Condition PRE-FW-01, the certificate holder will monitor the spread of these species as explained in section 4.3 and 4.4.

4.0 Noxious Weed Management

This section of this Plan describes the steps the Applicant will take to prevent and control the establishment and spread of noxious weed species during both construction and operation of the Facility. Noxious weed control methods for the Facility described in this Plan have been developed utilizing information from the ODA Noxious Weed Control Program and the Morrow County Weed Department.

The management of noxious weeds will be considered throughout all stages of construction and operation of the Facility and will include:

- **Prevention:** Implementing measures to prevent the spread of noxious weeds during construction, operation, and maintenance activities.

- **Treatment:** Treating noxious weed populations with their appropriate control methods, at appropriate time intervals.
- **Monitoring:** Assessing noxious weed changes within the Facility site boundary over time and ensuring that legacy as well as new weed populations are not increasing their distributions.

The Applicant's objective is to prevent the introduction of new noxious weed populations and the spread of existing noxious weed populations. The methods described below will be implemented to minimize the spread of noxious weeds during construction activities. New noxious weeds detected during post-construction revegetation will be considered a result of construction activities and will be controlled accordingly.

4.1 Prevention

Prior to the start of construction, all personnel will be ~~instructed~~ trained on ~~of~~ the importance of noxious weed control. As part of start-up activities, and to help facilitate the avoidance of existing infestations and identification of new infestations, the Applicant or their construction contractor will provide information and training to all construction personnel regarding noxious weed identification and prevention strategies. Operations and maintenance personnel will be similarly informed. The importance of preventing the spread of noxious weeds in areas not currently infested and controlling the proliferation of noxious weeds already present within or near the Facility will be emphasized.

~~Implementation of the~~The Applicant will implement the following best management practices ~~will also~~to ~~aid in minimizing~~minimize the spread of noxious weeds during construction activities, revegetation efforts, and operation and maintenance activities. The following practices center around ensuring that noxious weed seeds or reproductive plant fragments are not unintentionally dispersed within or outside of the Facility boundaries by personnel or their vehicles. These practices allow for responsible movement around sites with noxious weeds already present, and ensure that new populations or species are not accidentally introduced into the Facility boundaries.

- Flagging and treating areas of noxious weed infestations prior to construction to alert construction personnel;
- Limiting vehicle access to designated routes, whether existing roads or newly constructed roads, and the outer limits of construction disturbances per the final design for the Facility;
- Limiting vehicle traffic in noxious weed-infested areas;
- Cleaning construction vehicles ~~prior to~~each time ~~entering~~ they enter or exit the Facility ~~for the first time and upon completion of work at the Facility~~ at a wash station located inside the Facility at vehicle ingress/egress points;~~within at an onsite location, or at a public car wash in the vicinity of the Facility;~~
- Cleaning vehicles and equipment associated with ground disturbance and movement of topsoil utilizing a mobile wash station after performing work in noxious weed-infested areas and prior to performing work in non-infested areas;

- Where feasible, not moving topsoil and other soils from noxious weed infested areas outside of the infested areas and returning them to their previous location during reclamation activities;
- Treating soils from infested areas with a pre-emergent herbicide prior to initiation of revegetation efforts~~, depending on site-specific conditions~~;
- Providing information regarding target noxious weed species at the operations and maintenance buildings;
- Treating noxious weeds via biological, mechanical or chemical control (see Section 4.2);
- Preventing conditions favorable for noxious weed germination and spread by revegetating temporarily disturbed areas as soon as practicable;
- Monitoring areas of disturbance for noxious weeds after construction (see Section 4.3), during the normal course of revegetation maintenance of temporary workspaces, and implementing control measures as appropriate;
- Revegetating the site with appropriate, local native seed or native plants; when these are not available, non-invasive, and non-persistent non-native species may be used; and
- Ensuring that seed and straw mulch used for site rehabilitation and revegetation are certified free of noxious weed seed and propagules.

4.2 Treatment

Control of noxious weeds and other invasive weed species will be implemented through biological, mechanical, ~~or~~ chemical, or biological control measures. The Applicant will be responsible for hiring a qualified contractor to implement the treatment of noxious weeds. The Applicant will ensure that noxious weed management actions will be conducted by specialists with the following qualifications:

- Experience in native plant, non-native and invasive plants, and noxious weed identification;
- Experience in noxious weed mapping;
- If chemical control is used, specialists must possess a Commercial or Public Pesticide Applicator License from the ODA or possess an Immediately Supervised Pesticide Trainee License and be supervised by a licensed applicator;
- Training in noxious weed management or Integrated Pest Management with an emphasis in noxious weeds; and
- Experience in coordination with agencies and private landowners.

Existing noxious weed populations ~~should~~ will be prevented from expanding in size and density and ~~should~~ will not be spread to new sites. ~~Where practicable, e~~Existing populations of A listed noxious weeds ~~should~~ will be ~~eradicated~~eliminated. If it is determined that noxious weeds have invaded areas immediately adjacent to the Facility (e.g., areas visible just beyond the outer limits of construction disturbances associated with the Facility or along access roads) as a result of

construction, the Applicant will contact the landowner and seek approval to treat those noxious weed populations.

Long-term weed control methods will be described in a long-term monitoring plan as described in Section 4.3. The main factor in long-term weed control is successful revegetation with non-weedy species as described in the Draft Revegetation Plan (see Exhibit P, Attachment P-4). If feasible, long-term management of vegetation within the Facility solar array fence line may include prescriptive sheep and goat grazing by an authorized contractor, if approved by Morrow County, ODFW and ODOE. As noted above, short-term noxious weed control will be done through mechanical or chemical treatment. However, it will be important to ensure that the short-term treatment does not affect the establishment of the native perennial cover that will help provide the long-term control. Additionally, early detection and control of small noxious weed populations before they can expand into larger populations is extremely important for successful weed control efforts.

Noxious weed control will continue ~~until the disturbed areas~~ for the life of the Facility to meet the identified success criteria described in Section 4.3. Supplemental seeding of desirable species may be needed to ~~achieve this goal~~meet and/or maintain compliance with success criteria. Fertilizer application will be limited in areas treated for noxious weeds, as fertilizer can stimulate the growth of noxious weeds, and the timing of revegetation activities will need to be coordinated with noxious weed treatments.

4.2.1 Biological

Biological control involves the use of prescribed insects, fungi and livestock to control noxious weeds to achieve management objectives. Biological control methods are typically targeted to a specific species or plant to control its persistence. They are also used for maintenance in targeted areas for vegetation management control in height and density that includes mitigating fire risk and erosion. Biological control is environmentally friendly and should be the first consideration when applicable.

~~4.2.1~~4.2.2 Mechanical Treatment

Mechanical treatment will be the primary method of treatment for existing noxious weed populations within the boundaries of the Facility. Mechanical control methods rely on removal of plants, seed heads, and/or cutting roots with a shovel or other hand tools or equipment that can be used to remove, mow, or disc noxious weed populations. Hand removal of plants is also included under this treatment method. Mechanical methods are useful for smaller, isolated populations of noxious weeds in areas of sensitive habitats. Additionally, hand removal of small infestations can minimize soil disturbance, allowing desirable species to remain and limiting conditions favorable for noxious weeds.

Some rhizomatous plants can spread by discing or tillage. In addition, rush skeletonweed, which has been identified within the Facility site boundary (Section 3.0), can reproduce vegetatively from small segments of root, and discing or tilling can facilitate the spread of this species. As such,

implementation of discing will be species-specific and avoided in areas where rush skeletonweed individuals have been found.

If discing is employed in areas that will be revegetated following construction, subsequent seeding will be conducted to re-establish desirable vegetative cover that will stabilize the soils and slow the potential re-invasion of noxious weeds. Discing, tilling, or other mechanical treatments that disturb the soil surface within native habitats will also be avoided in favor of herbicide application, which is an effective means of reducing the size of noxious weed populations as well as preventing the establishment of new infestations.

~~4.2.2~~4.2.3 Chemical Treatment

Chemical control can effectively remove noxious weeds through use of selective herbicides. The specific herbicide used and the timing of application will be chosen based on the specific noxious weed being treated, as appropriate herbicides differ between species and types of plants (i.e., dicots such as rush skeletonweed versus monocots such as jointed goatgrass). Example treatment methods, as well as the recommended timing of treatments for the four target noxious weeds identified within the Facility, are summarized in Table 2. The status of herbicide approval (e.g., confirming herbicides are approved for use by the U.S. Environmental Protection Agency [EPA] and ODA) will be checked annually.

Prior to construction and every fall season during facility operation, the Applicant or its contractor will consult with the Morrow County Weed ~~Coordinator~~ Department on timing, method, and application rates for each identified weed species of concern, to allow for adaptive weed management given changes in weed control effectiveness from noxious weed species tolerance to herbicide treatment over time. Results of the consultation shall be reported in the Applicant's annual monitoring report. Any alternative control methods can be proposed by the Applicant or its contractors after consulting with the Morrow County Weed ~~Coordinator~~ Department and included in the Applicant's annual monitoring report.

~~The application of h~~Herbicides will be applied on ~~to~~ identified, treatable, noxious weed infestations. The Applicant or their contractors will coordinate with the Morrow County Weed ~~Coordinator~~ Department to determine which populations are treatable and will notify landowners of proposed herbicide use on their lands prior to application. If a noxious weed population is deemed to be untreatable (e.g., too widespread and established in an area to successfully control), the Applicant will implement the applicable prevention measures discussed in Section 4.1, except for treatment with herbicides.

Table 2. Recommended Treatment for Target Noxious Weed Species

Scientific Name	Common Name	Treatment Method and Timing
Aegilops cylindrica	Jointed goatgrass	**Glyphosate** – Apply to actively growing plants emerged before bolt stage (i.e., stage of growth where growth is focused on seed development versus leaf development).

Scientific Name	Common Name	Treatment Method and Timing
		• Rate: 0.38 to 0.75 lb ae/a[1] **Imazapic –** Apply pre-emergence in fall. Due to the residual effect of this herbicide, it will not be used in areas to be revegetated. • Rate: 0.063 to 0.188 lb/a[1] **Sulfometuron** – Apply in fall or in late winter before jointed goatgrass is 3 inches tall. • Rate: 1 to 1.5 oz ai/a (1.33 to 2 oz/a)[1]
Chondrilla juncea	Rush skeletonweed	**2,4-D or MCPA –** Apply to rosettes in the spring immediately before or during bolting. • Rate: 2 lb ae/a[1] ~~**Aminocyclopyrachlor + chlorsulfuron** – Apply to actively growing plants in spring.~~ ~~• Rate: 1.8 to 3.2 oz/a1 aminocyclopyrachlor + 0.7 to 1.3 oz/a chlorsulfuron (4.5 to 8 oz/a of product)~~ **Aminopyralid (Milestone) –** Spring or fall when rosettes are present. • Rate: 1.75 oz ae/a (7 fluid oz/a Milestone)[1] **Clopyralid –** Apply to rosettes in fall or up to early bolting in spring. • Rate: 0.25 to 0.375 lb ae/a (0.66 to 1 pint/a)[1] **Picloram –** Apply from late fall to early spring. For best results, apply just before or during bolting. • Rate: 1 lb ae/a[1]
Secale cereale	Cereal rye	Postemergence, non-selective herbicides such as glyphosate can control cereal rye. Glyphosate does not provide residual weed control, so any plants that emerge after treatment will not be controlled. Other herbicides that have found to provide control include Clethodim, Hexazinone, Rimsulfuron, Sethoxydim, and Sulfometuron.

Scientific Name	Common Name	Treatment Method and Timing
Tribulus terrestris	Puncturevine	**2,4-D amine or 2,4-D LV ester–** Apply every 3 weeks during growing season or when new seedlings appear. • Rate: 1 to 2 lb ae in 10 to 20 gal water for spot treatments ~~**Aminocyclopyrachlor + chlorsulfuron–** Apply to actively growing plants in spring.~~ ~~• Rate: 1.8 to 3.2 oz/a aminocyclopyrachlor + 0.7 to 1.3 oz/a chlorsulfuron (4.5 to 8 oz/a of product)~~ **Bentazon (Basagran) + imazamox (Raptor)–** Apply to small, actively growing puncture vine • Rate: 0.75 to 1 lb ai/A bentazon + 0.031 lb ai/a imazamox (4 oz/A Raptor) **Bromacil + diuron–** Apply before weeds emerge. • Rate: 8 lb ai/A (10 lb/a)[1] **Chlorsulfuron–** Apply late fall or late winter preemergence to growth. Needs moisture to activate. • Rate: 1 oz ai/a (1.5 oz/a)[1] **Fomesafen –** Apply pre- and postemergence, depending on crop. • Rate: 1 to 2 pints/A (0.25 to 0.5 lb ai/a)[1] **Imazapic –** Apply early postemergence when plants are cracking. • Rate: 0.125 to 0.188 lb ai/a[1] **Indaziflam –** Apply at least several weeks prior to expected germination of puncture vine. Apply to dry soils when rain is not expected for at least 48 hours. Can be successfully applied several months in advance of weed germination. • Rate: Grazed areas 0.046 to 0.065 lb ai/a (3.5 to 5 oz/a Rejuvra); areas not grazed or cut for hay 0.046 to 0.09 lb ai/A (3.5 to 7 oz/a Rejuvra). Use lower rates only where weed pressure is light and shorter period of residual activity is desired. **Norflurazon –** Apply in fall to spring, before puncture vine emerges. • Rate: Refer to label. Adjust rates depending on soil texture and organic matter **Paraquat –** Apply as a postemergence spray to puncture vine foliage • Rate: 0.38 to 0.49 lb ai/a[1] •
Sources: DiTomaso e al. 2013; LCNWCB 2022; Prather and Peachey 2022. [1] a = acre; ae = acid equivalent; ai = active ingredient; lb= pound; oz = ounces		

~~4.2.2.1~~4.2.3.1 *Herbicide Application and Handling*

Herbicide application will adhere to EPA and ODA standards. Only those herbicides that are approved by the EPA and ODA will be used. In general, application of herbicides will not occur when the following conditions exists:

- Wind velocity exceeds 15 miles per hour for granular application, or exceeds 10 miles per hour for liquid applications;
- Snow or ice covers the foliage of target species; or
- Adverse weather conditions are forecasted within the next few days.

Hand application methods (e.g., backpack spraying) may be used in roadless areas or in rough terrain. Vehicle-mounted sprayers (e.g., handgun, boom, and injector) will be used mainly in open areas that are readily accessible by vehicle. Calibration checks of equipment will be conducted prior to spraying activities, as well as periodically throughout use, to ensure that appropriate application rates are achieved.

Herbicides will be transported to the Facility daily with the following stipulations:

- Only the quantity needed for that day's work will be transported.
- Concentrate will be transported in approved containers only, and in a manner that will prevent spilling, stored separately from food, clothing, and safety equipment.
- Mixing will be done off-site and at a distance greater than 200 feet from open or flowing water, wetlands, or other sensitive species' habitat. No herbicides will be applied at these areas unless authorized by the appropriate regulatory agencies.
- All herbicide equipment and containers will be inspected daily for leaks.
- Herbicides use will be in accordance with all manufacture's label recommendations and warnings.

~~4.2.2.2~~4.2.3.2 *Herbicide Spills and Cleanups*

All appropriate precautions will be taken to avoid herbicide spills. In the event of a spill, cleanup will be immediate. Contractors will keep spill kits in their vehicles and in an appropriate storage shed to allow for quick and effective response to spills. Items included in the spill kit will be:

- Protective clothing and gloves;
- Adsorptive clay, "kitty litter," or other commercial adsorbent;
- Plastic bags and a bucket;
- A shovel;
- A fiber brush and screw-in handle;
- A dustpan;
- Caution tape;
- Highway flares (use on existing hard-top roads only); and
- Detergent.

Response to an herbicide spill will vary with the size and location of the spill, but general procedures include:

- Stopping the leak;

- Containing the spilled material;
- Traffic control;
- Dressing the clean-up team in protective clothing;
- Cleaning up and removing the spilled herbicide, as well as the contaminated adsorptive material and soil; and
- Transporting the spilled herbicide and contaminated material to an authorized disposal site.

~~*4.2.2.3*~~*4.2.3.3 Herbicide Spill Reporting*

All herbicide contractors will have readily available copies of the appropriate material safety data sheets for the herbicides used at their disposal and will keep copies of the material safety data sheets in the application vehicle. All herbicide spills will be reported in accordance with applicable laws and requirements. If a spill occurs, the appropriate agency and spill coordinators will be notified promptly. In case of a spill into wetlands and waterbodies, the appropriate federal, state, and county agencies will be notified immediately.

~~***Biological Control Treatments***~~

4.3 Monitoring

Weed inspections will occur across the entire Facility through visual inspection of the site while driving and/or walking. Final monitoring methods will be determined in consultation with ODOE prior to construction and will be incorporated as an amendment to this plan upon ODOE approval. Monitoring will be conducted by a qualified botanist or weed specialist and will begin in the first growing season after seeding. ~~Following construction, m~~Monitoring for noxious weeds and other undesirable weed species will ~~be conducted~~ occur at least five times per year including in the spring, June, July, and August for summer annuals and in the fall during the first two years following construction to capture the different life cycles of noxious weed species. ~~annually for the first 5 five years~~ T~~t~~his will allow real-time ~~o~~ assessment of weed growth and inform proactive ~~noxious~~ weed control measures to prevent large scale infestations. ~~Annual~~ Frequent checks during early revegetation efforts will ~~for noxious weed infestations will also~~ enable the Applicant to respond to new ~~noxious~~ weed~~s~~ infestations in a timely manner and ensure the success of the site's revegetation. ~~Annual noxious weed inspections will occur across the entire Facility through visual inspection of the site while driving and/or walking.~~ These inspections will be used to inform ongoing ~~noxious~~ weed control efforts.

The initial monitoring survey will be scheduled slightly before herbicide application, as applicable, to identify any noxious weed species within the areas to be treated, with a focus on target noxious

weed species observed prior to construction (Table 1), or other populations of target noxious weeds not previously observed.

Monitoring will assess the success of noxious weed treatments and will document any new noxious weed infestations observed. During the first two years following construction, the Applicant will meet with ODOE and the Morrow County Weed Department at least once per season to provide updates on weed infestations and control measures at the Facility. These results will also be summarized in annual monitoring reports that describe the treatments performed, treatment success, make recommendations to improve treatment success (if necessary), and note any new target noxious weed species or emergence. Reports will be submitted to the Oregon Department of Energy (ODOE), Oregon Department of Fish and Wildlife (ODFW), and Morrow County annually.

Based on the success of control efforts after the ~~fifth~~ second year of ~~annual~~ monitoring, the Applicant will consult with ODOE and ODFW to determine if the monitoring cycle can be reduced for years three to five. After five years of monitoring, the Applicant will ~~-~~design a long-term weed control plan in consultation with ODOE and the Morrow County Weed Department. The Applicant will maintain ongoing communication with individual landowners, the Morrow County Weed ~~Coordinator~~Department, and ODOE regarding noxious weeds within the Facility. Landowners may also contact the Applicant directly to report the presence of noxious weeds related to Facility activity. The Applicant will control the noxious weeds on a case-by-case basis and prepare a summary of measures taken for that landowner. During the operational period of the Facility, the Applicant will control noxious weeds as described in the long-term weed control plan. The Applicant will report the investigator's findings and recommendations regarding weed control in the Facility's annual report required per OAR 345-026-0080.

The following contact information for the Morrow County Weed ~~Coordinator~~ Program Manager will be used and updated as needed:

Corey Sweeney, Weed ~~Coordinator~~Program Manager
Morrow County Public Works
365 West Highway 74
Lexington, OR 97839
(541) 989-9502
mcweed@co.morrow.or.us

4.4 Success Criteria

Success criteria outlined below are designed to demonstrate compliance with OAR 660-033-0130(38)(D) to prevent the introduction and spread of noxious weed species. In each annual monitoring report, the Applicant will include an assessment of whether the Facility is meeting or trending toward meeting the noxious weed control success criteria. Compliance with the Facility Site Certificate will be demonstrated through documentation of meeting these success criteria for the life of the Facility.

- Class A and Class B noxious weed presence within the solar array fence line will not exceed 15 total populations (i.e., contiguous patches of individuals), and each respective population will not exceed 20 individuals or 20 square feet.
- Class T noxious weed presence within the solar array fence line will not exceed 5 total populations (i.e., contiguous patches of individuals), and each respective population will not exceed 20 individuals or 20 square feet.
- Invasive Annual Grasses and other Undesirable Species will not exceed more ~~XX~~then 50 percent cover within any 1~~X~~ acre area or more than 30~~XX~~ percent cover ~~wothin~~within the solar array fence line.
- During revegetation of temporary disturbance areas outside of the solar array fence line~~s~~ presence and cover of noxious weeds is 75 percent or less than that of the reference site.

5.0 Roles and Responsibilities

The Applicant is the overall responsible party for construction and operation of the Facility and implementation of the noxious weed management activities described in this Plan. However, the Applicant may use contractors to complete tasks associated with noxious weed management and monitoring. Example responsible parties and their roles may include:

Monitoring Contractor

- Perform site visits to document noxious weed occurrences.
- Provide summary memo after each visit to Applicant's operations manager outlining findings and treatment recommendations.
- Communicate directly with Weed Management Contractor and provide maps, and photos of noxious weed species locations to Weed Management Contractor.
- Communicate with Morrow County Weed Program Manager, and ODA about noxious weed survey findings and treatment plans.
- Prepare annual report for the Facility describing noxious weed monitoring findings and treatments.
- Organize and attend quarterly calls with the Applicant and Weed Management Contractor.
- Attend calls with ODOE, ODA, and Morrow County as needed.

Applicant Site Manager

- Communicate findings and recommendations from Monitoring Contractor to the Weed Management Contractor.
- Document the work performed by the Weed Management Contractor and provide documentation to Monitoring Contractor. Documentation should include type and quantity

of herbicides applied, dates applied, and any associated EPA/U.S. Department of Environmental Quality licensing/documentation of chemicals used.

- Reviews annual reports to ensure all treatments performed by the Weed Management Contractor are documented.
- Maintain landowner communications, providing guidance to the Monitoring Contractor and Weed Management Contractor regarding landowner restrictions/requests for performing noxious weed monitoring/treatment on their properties.
- Attend quarterly calls with Monitoring Contractor and the Weed Management Contractor.
- Attend calls with ODOE, ODA, and Morrow County as needed.

Weed Management Contractor

- Review Monitoring Contractor memos describing noxious weed occurrences and recommendations and plan appropriate treatment to address those issues.
- Communicate treatment plan to the Applicant.
- Maintain records of when, where, and what type of noxious weed treatments are being performed.
- Maintain all appropriate documentation of chemicals applied. Shares documentation during the quarterly calls with the Applicant and Monitoring Contractor, and prior to Annual Report preparation.
- Attend quarterly calls with Monitoring Contractor and Applicant.

Morrow County

- Review Monitoring Contractor memos describing weed occurrences and recommendations.
- Attend quarterly calls and provide recommendations.

~~5.0~~6.0 Plan Amendment

This Plan may be amended from time to time by agreement of the Applicant and the Oregon Energy Facility Siting Council (EFSC). Such amendments may be made without amendment of the site certificate. EFSC authorizes ODOE to agree to amendments to this plan. ODOE shall notify EFSC of all amendments, and EFSC retains the authority to approve, reject, or modify any amendment of this plan agreed to by ODOE. This Plan may also be amended periodically as the Applicant continues to evaluate and modify, as needed, agricultural dual use activities at the Facility.

~~6.0~~7.0 References

DiTomaso, J.M., G.B. Kyser, S. R. Oneto, R. G. Wilson, S.B. Orloff, L.W. Anderson, S.D. Wright, J.A. Roncoroni, T.L. Miller, T. S. Prather, C. Ransom, K.G. Beck, C. Duncan, K.A. Wilson, and J. J. Mann. 2013. *Weed Control in Natural Areas in the Western United States.* Weed Research and Information Center, University of California. 544 pp.

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Prather, T., and E. Peachey. 2022. Section Y - Control of Problem Weeds. Pacific Northwest Weed Management Handbook. Oregon State University. Corvallis, OR. Available online at: https://pnwhandbooks.org/weed (Accessed March 2023).

Appendix A: Oregon State Noxious Weed List

Appendix B: Morrow County Noxious Weed List

Attachment F: Memorandum of Agreement for Agricultural Mitigation Fund/Agricultural Mitigation Plan

Notes:

1. Memo of Agreement (MOA) for Agricultural Mitigation has been executed between applicant and Morrow County
2. Agricultural Mitigation Plan was the basis for MOA and is provided as an attachment to the MOA

MEMORANDUM OF AGREEMENT FOR AGRICULTURAL MITIGATION FUND

THIS MEMORANDUM OF AGREEMENT FOR AGRICULTURAL MITIGATION FUND ("Agreement") is entered into this 20 day of March 2024 ("Effective Date"), between Sunstone Solar, LLC, an Oregon limited liability company (hereinafter "Sunstone Solar"), and the Morrow County Board of Commissioners (hereinafter "Commission").

WHEREAS, Sunstone Solar proposes to construct and operate a solar power generation energy facility on private agricultural-zoned land in Morrow County, Oregon ("the Project") that is under review by the Oregon Energy Facility Siting Council ("EFSC") for a Site Certificate.

WHEREAS, the Commission commented on Sunstone Solar's Application for Site Certificate in a letter to EFSC dated September 20, 2023, expressing support for an agricultural mitigation package to reduce, minimize and mitigate impacts to the local agricultural economy and provide additional "reasons" for EFSC to grant exception to Oregon's Statewide Planning Goal 3 for Sunstone Solar's proposal.

WHEREAS, Sunstone Solar has quantified impacts from the Project on Morrow County's agricultural economy and has developed an Agricultural Mitigation Plan that has identified potential mitigation projects and programs capable of reducing impacts to the local agricultural economy.

WHEREAS, Sunstone Solar and the Commission wish to support the agricultural economy in Morrow County through mitigation projects funded by the Agricultural Mitigation Plan, which may include the increased use of weed control technologies, investments in wheat harvest facilities, or other measures.

WHEREAS, the Commission and Sunstone Solar have determined that it is in the best interest of the Morrow County's agriculture economy that Sunstone Solar donate certain funds to be used to increase the economic productivity and resilience of Morrow County farming as set forth below.

WHEREAS, the Commission desires to accept such funds under the terms and conditions set forth herein.

NOW THEREFORE, Sunstone Solar and Commission agree as follows:

1) **Agricultural Mitigation Donations**: Sunstone Solar shall pay Morrow County a one-time payment of $1,179 per acre for up to approximately 9,400 acres of cropland that is utilized for the Project ("Donation") to be used to mitigate agricultural impacts of the Project in Morrow County. The Donation shall be deposited into a separate Sunstone Solar Agricultural Mitigation Account ("Mitigation Account") established and administered by Morrow County. Sunstone Solar shall pay the Donation to the Commission within 60 days of commencing construction on the first phase of the Project. If for any reason, Sunstone Solar terminates the development of the Project before commencing construction, then Sunstone Solar shall have no obligation to perform any obligation under this Agreement, including payment of all or a portion of the Donation. Construction will begin only once Sunstone Solar has initiated material infield earthworks for the construction of the Project under a signed engineering, procurement, and construction agreement. Construction shall not be triggered by (i) Sunstone Solar's due diligence activities on the Project's site (including, without limitation, geotechnical boring, preliminary studies, field tiling surveys, plans, entitlement-related studies, push-pull tests, and other site assessments, surveys, environmental assessments, reports, or test results) or (ii) any work performed by or on behalf of the servicing utility company. Sunstone Solar and the Committee

recognize that the final acreage of crop land that is utilized for the Project and used as a basis for calculating the Donation may be less than the approximate 9,400 acres described in this section.

2) **Creation of a County Advisory Committee**: The Commission shall establish a nine-person Advisory Committee to make recommendations on the distribution of Agricultural Mitigation Funds ("Mitigation Funds") from the Mitigation Account. The Advisory Committee shall be composed of:
   a) one representative from Morrow County government, selected by the Commission;
   b) one representative from an academic institution engaged in agriculture research in Morrow County or an agricultural-related nonprofit entity located in Morrow County, selected by the Commission;
   c) one dryland farm producer in the County, selected by the Commission;
   d) two representatives from the Morrow Soil and Water Conservation District, selected by the Morrow Soil and Water Conservation District Board;
   e) two representatives from Morrow County Grain Growers, selected by the Morrow County Grain Growers Board; and
   f) two representatives with subject matter expertise over statewide or regional agriculture issues, selected by the Energy Facility Siting Council.

3) **Advisory Committee**: The Advisory Committee shall make recommendations to the Commission regarding uses of the Mitigation Funds based on the guidelines provided by the Sunstone Solar Agricultural Mitigation Plan. Such uses may include projects described in the Agricultural Mitigation Plan or other projects recommended by the Committee to accomplish the purposes of this Agreement and the Agricultural Mitigation Plan. The Commission shall only approve a distribution of Mitigation Funds to projects recommended by the Advisory Committee.

4) **Donation To Be Used Only to Benefit Dryland Wheat Agriculture**: The Commission shall only use the Donation to fund proposed mitigation projects objectively designed to mitigate the impacts of the Project on Morrow County's dryland wheat agricultural economy, including proposed mitigation projects designed to increase the economic productivity and resilience of Morrow County dryland wheat farming and dryland wheat farmers. The Commission shall be allowed to use a maximum of one percent (1%) of the Donation to pay for administrative expenses solely necessary to evaluate proposals to receive Mitigation Funds and to prepare annual reports required by this Agreement.

5) **Reporting**: The Advisory Committee will provide an annual report to the Commission, the Oregon Department of Energy's Energy Facility Siting Council and Sunstone Solar describing the use of the Donation for each year of the Term of this Agreement or until the Donation is fully spent. Each annual report will include details, to the extent possible, regarding how the Donation is being disbursed or invested and an evaluation of how each disbursement, in general, complies with agricultural mitigation projects. The annual report will include the impact of each use of the Donation, including statistics on the number of farmers benefiting, impacts on agriculture yields, and other relevant benefits. Copies of the reports shall be provided by April 15 each year.

6) **Audit Rights**: The Advisory Committee agrees that Sunstone Solar or their authorized representative(s), and any governmental agency that regulates the Advisory Committee or Sunstone Solar, may, at all reasonable times during the Term and for four (4) years thereafter and upon reasonable notice, inspect and audit the books and records of the Advisory Committee for the sole purpose of evaluating the Advisory Committee's compliance with this Agreement and any law applicable to the Advisory Committee. Sunstone Solar and the Advisory Committee agree that at least one audit will occur within five (5) years of the Donation payment. The Advisory Committee will retain all applicable books and records for 4 years after the expiration or termination of this Agreement or such longer period as required by applicable law. Any such audit will be conducted by Sunstone Solar's corporate internal audit personnel or by a certified public accountant firm selected by Sunstone Solar and the Advisory

Committee. Sunstone Solar will provide reasonable notice to the Advisory Committee before the audit or inspection. Audit reports will be provided to the Oregon Department of Energy.

7) **Notification of Government Agencies**. Sunstone Solar and the Commission are committed to submitting appropriate documentation relating to this Agreement to the Oregon Department of Energy, as soon as practicable after the Parties execute this Agreement. The Commission also agrees to participate in any necessary discussions with the Oregon Department of Energy regarding the Project. Within ten (10) business days of mutual acceptance of the Agreement, the Commission will provide a letter or other suitable notification to the Oregon Department of Energy stating, based on the mitigation provided pursuant to this Agreement, that the Commission's agricultural impact concerns have otherwise been satisfied in connection with the Project.

8) **Term**: The Donation shall be fully spent within 10 years of receiving payment. This Agreement shall automatically terminate when the Donation is fully spent. Sections 7, 8, and 9 will survive the termination of this Agreement.

9) **Indemnification**: The Commission agrees to defend, indemnify, and hold Sunstone Solar and its parents, employees, agents, affiliates, and successors harmless from and against any and all claims, actions, losses, damages or other liabilities arising out of the Commission's actions under this Agreement as a result of (a) any action that is based upon any negligent act or omission or willful misconduct of the Commission; or (b) any action that is based upon property damage or bodily harm, including death.

10) **Compliance with Laws**: Sunstone Solar and the Commission will comply at all times with all applicable state laws, regulations, and any other applicable legal requirements, including any applicable nondiscrimination laws.

11) **Governing Law**: This Agreement will be governed by and interpreted according to the laws of the State of Oregon.

12) **Amendments**: This Agreement may be amended, supplemented or modified only by a writing signed by the Commission and Sunstone Solar. The Commission and Sunstone Solar agree that this Agreement may not be modified in any manner that conflicts with EFSC's findings on the Agricultural Mitigation Plan without EFSC's prior consent. This includes, but is not limited to, any amendment or modification that allows the Donation to be spent on another purpose besides to mitigate agricultural impacts of the Project in Morrow County.

13) **Assignment**: Sunstone Solar will provide notice to the Commission regarding the assignment of this Agreement.

14) **Entire Agreement**: This Agreement constitutes the entire agreement between the parties and supersedes all prior representations and statements. The Commission represents, and the parties acknowledge, that the Commission cannot approve Sunstone Solar's Application for Site Certificate under review by EFSC.

15) **Counterparts**: This Agreement may be executed in counterparts, each of which will constitute an original and all of which together will constitute one document. A facsimile or electronic signature will have the same effect as an original.

16) **Notice**: Any notice required by this Agreement shall be given by hand delivery or by placing said notice in the United States Mail, first-class postage prepaid, and addressed as follows:

Sunstone Solar:

Sunstone Solar, LLC
130 Roberts Street
Asheville, NC 28801

Commission:

Morrow County Board of Commissioners
P.O. Box 788
Heppner, OR 97836

[SIGNATURES ON FOLLOWING PAGE]

Executed in duplicate, and mutually delivered as effective, on the Effective Date.

SUNSTONE SOLAR, LLC, an Oregon limited liability company

By DocuSigned by: Jon Saxon 3331B059643945C

Name Jon Saxon

Title: Authorized Representative

MORROW COUNTY BOARD OF COMMISSIONERS

By _____

Name David Sykes

Title: Chair

By Recused

Name Jeff Wenholz

Title: Commissioner

By _____

Name Roy Drago Jr.

Title: Commissioner

Agricultural Mitigation Plan (basis for the MOA)

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Acronyms and Abbreviations

EFSC, or Council	Energy Facility Siting Council
EFU	Exclusive Farm Use
MCBOC	Morrow County Board of Commissioners
MCGG	Morrow County Grain Growers
MCZC	Morrow County Zoning Code
MSWCD	Morrow Soil and Water Conservation District
OAR	Oregon Administrative Rule
ODOE	Oregon Department of Energy
ORS	Oregon Revised Statutes
pASC	preliminary Application for Site Certificate
Project	Sunstone Solar Project
Sunstone	Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC
USDA	U.S. Department of Agriculture

EXECUTIVE SUMMARY

Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Sunstone), proposes to construct and operate the Sunstone Solar Project (Project), a solar energy generation facility and related or supporting facilities in Morrow County, Oregon. The Project would be located on up to approximately 9,400 acres of private land zoned Exclusive Farm Use (EFU) located adjacent to Oregon Route 207 (Lexington-Echo Highway) and Bombing Range Road. As the land underlying the proposed Project is currently cultivated for dryland winter wheat, the Project would cause up to approximately 9,400 acres to be taken out of agricultural production during its operational period.

As discussed in more detail below, Sunstone is seeking a Site Certificate and a Goal 3 exception approval from the Oregon Energy Facility Siting Council (EFSC or Council). In acknowledgement of the Project's potential impacts on dryland winter wheat farmland in Morrow County, Sunstone plans to mitigate these impacts by making substantial investments in the local agricultural economy. These investments will be implemented through a new agricultural mitigation fund. The goals of the fund are to:

1. Improve the long-term viability and resilience of Morrow County's wheat farms and supporting organizations; and
2. Minimize the economic impact of lost agricultural land resource productivity due to the construction and operation of the proposed Project.

Sunstone proposes to contribute **$1,179 per acre (or up to approximately $11.08 million for 9,400 acres)** to the agricultural mitigation fund upon start of construction of the Project. This amount is equivalent to the Project's estimated indirect impact on the Morrow County agricultural economy, over the 40-year life of the Project (ECOnorthwest 2023) and is in excess of the mitigation spending assumed in the ECOnorthwest economic analysis (Attachment 1) that would be sufficient to offset the measured economic impact of the project.

Three potential mitigation projects are outlined by Sunstone in this document. These mitigation projects were identified through outreach with key Morrow County agricultural stakeholders that operate within the local dryland wheat agricultural sector. These mitigation projects were carefully reviewed for their applicability to the farming economy of Morrow County, potential magnitude of impacts, and additional benefits.

The mitigation projects identified in this document are not intended to be a prescriptive guide detailing where agricultural mitigation funds should be spent, but rather to provide strong examples of projects that can be shown to generate net positive impacts in the agricultural economy of Morrow County. It is anticipated that Morrow County will establish a decision-making body that will administer the mitigation fund and will be staffed by local, knowledgeable agricultural specialists who are active in the local farming community and are capable of deciding where to allocate funds to maximize the benefits the County receives from agricultural mitigation.

The following document and its technical attachments provide the Oregon Department of Energy, EFSC, and Morrow County stakeholders evidence that the Project's mitigation plan is sufficient to mitigate the Project's potential negative economic impacts to the local agricultural economy, thereby

not just making the agricultural economy whole but improving the long-term viability and resilience of Morrow County's wheat farms and supporting organizations.

In partnership with Project stakeholders, Sunstone is proud of the opportunity to advance clean energy generation, thriving local agriculture, and industrial development in Morrow County and the State of Oregon.

1.0 INTRODUCTION

Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Sunstone), proposes to construct and operate the Sunstone Solar Project (Project), a solar energy generation facility and related or supporting facilities in Morrow County, Oregon. The Project would be located on up to approximately 9,400 acres of private land zoned Exclusive Farm Use (EFU) located adjacent to Oregon Route 207 (Lexington-Echo Highway) and Bombing Range Road. As the land underlying the proposed Project is currently cultivated for dryland winter wheat, the Project would cause up to approximately 9,400 acres to be taken out of agricultural production and converted to a clean energy generation facility during its operational period.

As discussed in more detail below, Sunstone is seeking a Site Certificate and a Goal 3 exception approval from the Oregon Energy Facility Siting Council (EFSC or Council). In acknowledgement of the Project's impact on dryland winter wheat farmland in Morrow County, Sunstone will mitigate these impacts by making substantial investments in the local agricultural economy. These investments will target: 1) improving the long-term viability and resilience of Morrow County's wheat farms and supporting organizations; and 2) minimizing the economic impact of lost agricultural land resource productivity.

1.1 Background on the Sunstone Solar Project

Development of the Project began in 2021 and is expected to conclude as early as 2025. Construction of the first phase of the Project is scheduled to begin in early 2026, with full commercial operation of the Project expected by 2030. The Project will interconnect to existing transmission infrastructure operated by Umatilla Electric Cooperative and Bonneville Power Administration. Renewable energy generated from sunlight will be exported from the Project to serve regional loads.

1.2 Overview of Permitting Process and Need for Mitigation Plan

1.2.1 Oregon Energy Facility Siting Council and Application for Site Certificate

The proposed Project is subject to the jurisdiction of the Oregon EFSC because the Project would use and occupy more than 1,280 acres of predominately cultivated land.[1] Under Oregon Revised Statutes (ORS) 469.320, no energy facility subject to EFSC jurisdiction may be constructed or operated in Oregon without a Site Certificate from the Council. Sunstone submitted the preliminary Application for Site Certificate (pASC) to the Oregon Department of Energy (ODOE) on August 8, 2023. A copy of the pASC is available to review on the ODOE website: https://www.oregon.gov/energy/facilities-safety/facilities/Pages/esp.aspx. On October 6, 2023, ODOE notified Sunstone that the preliminary application was incomplete and requested additional information needed to complete its evaluation of compliance with applicable laws, rules, and standards. This Agricultural Mitigation Plan responds to ODOE's request for additional information relative to the Goal 3 Exception request (see Section 1.2.2).

[1] Under ORS 469.300(11)(a)(D), any solar photovoltaic energy generation facilities that would use or occupy more than 160 acres of high value farmland, 1,280 acres of predominately cultivated or soil capability class I to IV, or 1,920 acres of "other land" is an "energy facility" which requires approval and issuance of a site certificate by the Oregon Energy Facility Siting Council prior to construction and operation of the facility.

1.2.2 Goal 3 Exception

The foundation of Oregon's statewide program for land use planning is a set of 19 Statewide Land Use Planning Goals. Oregon Statewide Planning Goal 3 requires counties to identify farmland on its comprehensive plan map, and zone those lands as Exclusive Farm Use (EFU). An EFU zone places certain restrictions on developments in order to minimize uses that conflict with farming (DLCD 2023). Oregon Administrative Rule (OAR) Chapter 660, Division 33 and similar provisions under Morrow County Zoning Code (MCZC) Chapter 3 regulate EFU lands and permitted uses on these lands. Per OAR 660-033-0130(38)(g) and MCZO 3.010(K)(3)(f), a photovoltaic solar power generation facility shall not use, occupy, or cover more than 12 acres of high-value farmland unless certain criteria under OAR 660-033-0130(38)(h) are met or an exception is taken pursuant to ORS 194.732. Similarly, per OAR 660-033-0130(38)(i) and MCZO 3.010(K)(3)(g), a photovoltaic solar power generation facility shall not use, occupy, or cover more than 20 acres of arable lands unless certain criteria under OAR 660-033-0130(38)(i) are met or an exception is taken pursuant to ORS 194.732.

As the Project will occupy more than 12 acres of high-value farmland and more than 20 acres of arable land, it does not meet the acreage standards under MCZO 3.010(K)(3)(f) and (g) and OAR 660-033-0130(38)(g) and (i) and requires an exception to Statewide Planning Goal 3 (i.e., Goal 3). EFSC may approve an exception to Goal 3 for an energy facility that meets the criteria listed under ORS 469.504(2)(c) and OAR 345-022-0030(4)(c). These criteria include the following:

- Reasons justify why the state policy embodied in the applicable goal should not apply;
- The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the council applicable to the siting of the proposed facility; and
- The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.

In Exhibit K of the pASC, Sunstone provides evidence to support the Council's finding that an exception to Goal 3 is justified for the Project, including a description of measures that will be taken to ensure compatibility with other adjacent uses (i.e., weed management, dust control, etc.). The purpose of this Agricultural Mitigation Plan is to provide further evidence to justify the Goal 3 exception, including support for how the Project will mitigate its impacts to Morrow County's agricultural economy. See Section 1.4 for more discussion of the purpose and intent of the Agricultural Mitigation Plan.

1.2.3 Morrow County and Local Partners

Although the permitting jurisdiction for the Project is with EFSC, ORS 469.480(1) requires the Council to designate the governing body of any local government within whose jurisdiction a facility is proposed to be located as a Special Advisory Group (or SAG). The Council appointed the Morrow County Board of Commissioners (MCBOC) as the Special Advisory Group for the proposed Project on June 28, 2022. Sunstone has been in coordination with the MCBOC throughout the development of the pASC and this mitigation plan.

As detailed further in this document, Sunstone has worked to identify several opportunities to partner with local organizations to support agricultural mitigation projects in Morrow County. Potential mitigation projects were identified through outreach to Morrow County agricultural stakeholders including the Morrow Soil and Water Conservation District (MSWCD), Morrow County Grain Growers (MCGG), and other organizations and experts embedded within the Morrow County community.

After obtaining initial input from the MCBOC in a November 9, 2023 work session, Sunstone conducted further due-diligence into the potential economic benefit of these programs by conducting a series of interviews with MSWCD, MCGG, precision-agricultural technology specialists, and Morrow County dryland wheat producers in November and December of 2023.Through discussions with these local entities, Sunstone has identified several potential mitigation projects that can mitigate the economic impacts of the Project on Morrow County's agricultural sector and create value for Morrow County's agricultural producers. Three of these potential projects are described in further detail in the economic analysis completed by ECOnorthwest (Attachment 1) and in Section 3 below.

1.3 Overview of the County Agricultural Economy in Context of the Site Boundary

To understand the potential impacts the Project may have on Morrow County's agricultural economy, Sunstone worked with ECOnorthwest to conduct an agricultural lands assessment describing agricultural crops and existing agricultural practices on agricultural lands in Morrow County. The following information is from the Sunstone Solar Project Economic and Agricultural Impact analysis (ECOnorthwest 2023) included as Attachment K-2 to Exhibit K in the pASC.

1.3.1 Morrow County Agricultural Economy

Morrow County represents 12 percent of state agriculture sales (USDA 2017). Most of the land in Morrow County (87 percent) is farmland (USDA 2017; U.S. Census Bureau 2023). According to the most recent available agricultural census, in 2017 a total of 375 farms operated in the county, with an average farm size of 3,003 acres. Just under half (45 percent) of the farmland in Morrow County (511,874 acres) is cropland, with 54 percent (275,833 acres) of total cropland harvested in 2017 (Table 1).

1.3.1.1 Morrow County Cultivated and Harvested Crops

Viewed in terms of acres, the primary crop grown in Morrow County is wheat for grain, specifically winter wheat (Table 1). Winter wheat accounted for more than half (56 percent, or 155,414 acres) of total harvested acres in 2017, followed by land used for forage (hay and haylage, grass silage, and greenchop) (14 percent, or 38,113 acres), and vegetables harvested for sale (12 percent, or 31,767 acres).

Table 1. Land in Farms and Selected Crops Harvested in Morrow County, 2012 and 2017

Item	2017		2012	
	Number of Farms	Acres	Number of Farms	Acres
Total Farms/Land in Farms	375	1,126,101	401	1,165,126
Total Cropland	257	511,874	305	486,433
Harvested cropland	182	275,833	193	248,356

Item	2017		2012	
	Number of Farms	Acres	Number of Farms	Acres
Irrigated land	190	111,486	188	65,637
Selected crops harvested				
Wheat for grain, all	107	165,386	96	144,249
Winter wheat for grain	105	155,414	91	126,928
Forage	92	38,113	98	25,696
Vegetables harvested for sale	13	31,767	15	20,351
Potatoes	10	16,362	5	8,544

Source: USDA 2012, 2017

Gross farm sales in Morrow County in 2017 by commodity group are presented in Table 2. Crops made up $190,739,000 in gross sales while livestock and poultry sales were $405,748,000. Wheat (specifically winter wheat) for grain may be the top crop grown in Morrow County in terms of acres (Table 1) but only represented 17 percent of the total crop sales in Morrow County in 2017 (Table 2). The top reported commodities in terms of sales were vegetables (including melons, potatoes, and sweet potatoes as grouped by the U.S. Department of Agriculture [USDA]) and grains (including oilseeds, dry beans, and dry peas) (Table 2).

Table 2. Sales by Commodity Group in Morrow County, 2017

Commodity Group	Sales ($ million)	Percent of Total Sales	Percent of Crop Sales
Crops	**$190.7**	**32%**	**100%**
Grains, oilseeds, dry beans, dry peas	$66.3	11%	35%
Corn	$32.9	6%	17%
Wheat	$33.1	6%	17%
Vegetables, melons, potatoes, sweet potatoes	$97.3	16%	51%
Other crops and hay	$25.3	4%	13%
Livestock	**$405.7**	**68%**	**--**
Cattle and calves	$234.2	39%	--
Milk from cows	$168.9	28%	--
Other livestock, poultry, and aquaculture	$2.7	0%	--
Total sales	**$596.5**	**100%**	**--**

Source: USDA 2017

The ECOnorthwest analysis (2023) also reports that grain farming, which includes wheat, corn, dry beans, and dry peas, accounted for an estimated 89 jobs, about 4 percent of total agricultural employment in Morrow County in 2021. Viewed in terms of economic output, grain farming contributed an estimated $75.5 million in sales, about 13 percent of total agricultural output in Morrow County in 2021. In summary, wheat land takes up over half of the total acreage of cropland in Morrow County, but only represents a small portion of the agricultural economy.

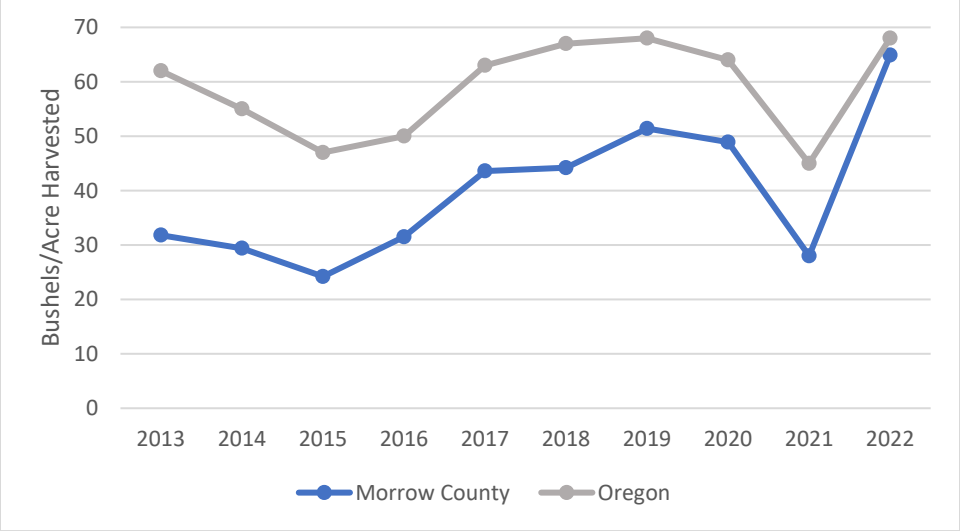
1.3.1.2 Winter Wheat Production and Value

Winter wheat yields vary by location and from year-to-year. Annual average yields in bushels per acre over the last decade are shown for Morrow County and the State of Oregon in Table 3 and Figure 1. Yields in both areas have followed similar trends over the last decade, with yields in Morrow County consistently lower than the state average. Average annual yields from 2013 to 2022 were 39.8 bushels/acre in Morrow County and 58.9 bushels/acre in Oregon. Morrow County yields over this period were on average 19.1 bushels/acre lower, equivalent on average to about two-thirds (66 percent) of the corresponding statewide values. Average yield dropped sharply in both Morrow County and statewide in 2021 due to poor growing conditions, but more than rebounded in 2022, especially in Morrow County where the average yield increased from 28 bushels/acre to 64.9 bushels/acre.

Table 3. Average Annual Yield for Winter Wheat (Bushels/Acre), 2013-2022

Year	Morrow County	Oregon	Difference
2013	31.8	62.0	30.2
2014	29.4	55.0	25.6
2015	24.2	47.0	22.8
2016	31.5	50.0	18.5
2017	43.6	63.0	19.4
2018	44.2	67.0	22.8
2019	51.4	68.0	16.6
2020	48.9	64.0	15.1
2021	28.0	45.0	17.0
2022	64.9	68.0	3.1
2013-2022 Average	**39.8**	**58.9**	**19.1**

Source: USDA 2023



Source: USDA 2023

Figure 1. Average Annual Yield for Winter Wheat (Bushels/Acre)

1.3.2 Project Site Boundary Agricultural Value

A total of four property owners actively farm on land tracts located in the Project site boundary. In support of the ASC process, the Sunstone team surveyed the four main landowners, who together own about 98 percent of the land within the Project site boundary. The survey requested information about crop practices, historic revenues, crop yield, water availability, and value from farming operations that would be impacted. Review of this information indicates that all farmland within the Project site boundary is dedicated to dryland wheat production and farmed on rotation. Roughly half of each farm is planted and harvested in any given year, with the other half left in summer fallow.

Information on crop yields provided by the surveyed landowners is summarized in Table 4. This information is generally consistent with the Morrow County average annual yield over the past 10 years, which was 39.8 bushels/acre (Table 3). One landowner (Grieb) also provided total yield information for the past 4 years. Assuming approximately 2,200 acres were harvested each year, as indicated by the landowner, yields on the Grieb property ranged from about 11 to 40 bushels/acre and were below the corresponding Morrow County averages for these 4 years.

Table 4. Project Site Average Winter Wheat Yields

Landowner	Bushels per Acre		
	Average	Low	High
Grieb	30-40	20	60
Doherty	32	12	45
Matheny	38	20	60
Ashbeck[1/]	40	-	-

Note:
1/ Low and high ranges were not provided for the Ashbeck property.
Source: 2023 Sunstone Solar landowner surveys

ECOnorthwest used two estimates to calculate the average annual yield (bushels/acre). The first set of estimates uses the average yield values provided by the surveyed landowners, which results in a weighted average of 35.2 bushels/acre. The second set uses the 10-year average annual yield for Morrow County (39.8 bushels/acre) (Table 3).

Using these average yields and the 10-year average annual price per bushel for Oregon ($6.61) results in estimated average values of $233 to $263 per acre. If half of the land used for dryland wheat production is harvested each year (4,700 acres) and these average yields are applied per acre, the total annual estimated values would be $1.09 million to $1.24 million (Table 5).

Table 5. Estimated Value of Agricultural Production in Site Boundary

Measure	Low[1/]	High[1/]
Acres Harvested	4,700	4,700
Average Bushel/Acre	35.2	39.8
Average Value/Acre[2/]	$233	$263
Total Production (1,000s Bushels)	165	187
Total Production Value ($1,000)	$1,094	$1,236

Notes:
1/ The low and high estimates use average bushels/acre from the landowner survey (low) and the 10-year average for Morrow County (high). Note that the Morrow County average includes irrigated and non-irrigated land.
2/ Average value per acre is estimated using the average annual price per bushel for Oregon for 2013 to 2022.

1.3.3 Estimated Impacts to Wheat Production and Value

The site boundary harvests approximately 4,700 acres of winter wheat each year. Taking this into context with the rest of the Morrow County and Oregon's winter wheat harvested acres, the acres that would be removed from production by the Project represent 3.7 percent and 0.7 percent of the average annual acres of winter wheat harvested in Morrow County and Oregon, respectively (Table 6).

Table 6. Affected Agricultural Production as a Share of County and State Winter Wheat Totals

Area	2013-2022	
	Average Acres Harvested	Average Value of Production ($000)
Morrow County	127,880	30,793
Oregon	723,000	281,554
Affected Values	4,700	$1,165
As a Percent of Total		
Morrow County	3.7%	3.8%
Oregon	0.7%	0.4%

In Table 5, ECOnorthwest estimates the total production value of the dryland winter wheat in the site boundary. The midpoint of the estimated value of production on the Project site (Table 5) is $1.165 million. Viewed as a share of annual average revenue, the estimated value of production on the Project site ($1.165 million) is equivalent to 3.8 percent and 0.4 percent of the estimated values in Morrow County and Oregon, respectively (Table 6).

Viewed either in terms of annual harvested acres of wheat or in terms of average value of production, the site boundary represents a small portion of the total winter wheat production and value in the County.

1.3.4 Estimated Impacts to Economic Output and Employment

The economic impacts of removing agricultural land from production include reducing crop production and associated farm revenue (i.e., direct impacts), leading to a reduction in spending for agricultural inputs in the local economy (i.e., indirect impacts) and a reduction in associated household expenditures (i.e., induced impacts). The Project will remove up to approximately 9,400

acres of agricultural land from production generating economic impacts in the local agricultural economy. The economic impacts of the Project are documented in the Sunstone Solar Project Economic and Agricultural Impact Analysis (ECOnorthwest 2023) included as Attachment K-2 to Exhibit K in the pASC. Economic impacts are estimated using the IMPLAN economic modeling package. Please refer to Exhibit K for a complete review of the economic impacts of the Project.

The ECOnorthwest analysis of economic impacts uses IMPLAN, which provides estimates in terms of direct, indirect, and induced impacts.

- Direct Impacts
  - The direct impact component consists of economic activity (output, jobs, and income) associated with a specific activity, in this case wheat farming. These direct impacts generate economic activity elsewhere in the local economy through the multiplier effect, as initial changes in demand "ripple" through the local economy and generate indirect and induced impacts (ECOnorthwest 2023).
  - Sunstone will compensate landowners for land used for the Project and thus taken out of production. Although farmers experience the loss of direct agricultural production revenue, they gain revenue through lease payments or land sales and this revenue is substantially greater in value than the agricultural production revenue. Therefore, direct impacts are not included in the economic impacts that need to be mitigated (see Attachment 1 to this plan).
- Indirect Impacts
  - Indirect impacts are generated by expenditures on goods and services by suppliers who provide goods and services to the producers. Indirect effects are often referred to as "supply-chain" impacts because they involve interactions among businesses (ECOnorthwest 2023).
  - Indirect impacts of the Project represent impacts to businesses that supply inputs to agricultural production on the Project site. For example, farmers purchase inputs to grow wheat and these purchases (e.g., fuel, chemicals, seed, equipment) support economic activity elsewhere in the local economy. The effects of these purchases are captured by the IMPLAN model as indirect impacts. Removal of the Project site from agricultural production would result in a reduction in local indirect impacts as farmers in Morrow County almost exclusively purchase production inputs in the local area and more specifically through MCGG. For this reason, the focus of agricultural mitigation is the agriculture supply sector of the Morrow County economy and specifically MCGG. The indirect economic impacts of the lost agricultural production related to the Project are estimated at $478,566 or $51/acre per year (ECOnorthwest 2023).
- Induced Impacts
  - Induced impacts represent spending in the local economy by households associated either directly or indirectly with the economic activity (in this case agricultural production).

- Due to lease payments or other compensation to landowners by the Project, minimal changes in landowner household income and spending are expected due to the Project. Spending by indirectly associated households (such as the households of MCGG employees) could be reduced, but the associated impacts would be to the economy in general and not to the agricultural economy.

Therefore, the indirect economic impact identified above ($478,566 or $51/acre per year) is assumed to represent the annual value of losses to the agricultural economy of Morrow County due to reduced production each year over the life of the Project. However, because the proposed mitigation plan currently contemplates a one-time payment intended to compensate for the impacts over the life of the project, the annual payment needs to be converted to a single value, known as a present value. Per Attachment 1, ECOnorthwest calculated that the present value of adverse indirect Project impacts, over the 40-year life of the Project is $11.08 million or $1,179/acre.

1.4 Purpose and Intent of Agricultural Mitigation Plan

The overall goal of this Agricultural Mitigation Plan is to:

1. Improve the long-term viability and resilience of Morrow County's wheat farms and supporting organizations; and
2. Minimize the economic impact of lost agricultural land resource productivity.

More specifically, the purpose of this Agricultural Mitigation Plan is to support the Goal 3 exception request by providing evidence of how the Project meets components of the following standards under OAR 345-022-0030(4)(c):

(A) Reasons justify why the state policy embodied in the applicable goal should not apply:

- One of the Reason's provided in Exhibit K is: "The Facility creates local economic benefit and mitigates economic impacts to local agricultural economy."
- ECOnorthwest (2023) details how the Project will provide economic benefits in the form of full-time jobs; construction jobs; compensation to landowners via commercial contracts including leases; taxes; and community service fees. These direct benefits will in turn support economic activity elsewhere in the local economy.
- This mitigation plan provides the details of how the Project will mitigate negative economic impacts to the local agricultural economy, thereby making the agricultural economy whole in addition to the broader economic benefits offered by construction and operation of the Project.

(B) The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the Council applicable to the siting of the proposed facility;

- Evidence regarding the consideration of potential adverse impacts to environmental, social, and energy consequences is included in Exhibit K of the ASC.
- This program provides the details of how the Project will mitigate potential adverse impacts to economic resources in Morrow County to a less than significant level.

As detailed in Section 3 below, Sunstone has worked to identify several mitigation opportunities through outreach to Morrow County agricultural stakeholders including MSWCD, MCGG, and other organizations and experts embedded within the Morrow County community.

As explained in Section 1.3.4, the primary adverse impacts to the local agricultural economy from the Project would occur to agricultural suppliers like MCGG as wheat farmers in Morrow County almost exclusively purchase production inputs in the local area through MCGG. Therefore, MCGG could face a reduction in sales due to the Project. MCGG is a producer-owned marketing and farm supply cooperative started in the early 1930s and provides grain storage, bulk fuel, agronomy services (e.g. sale of crop nutrients, seed, pesticides, fertilizers, and/or crop protection), and farm equipment sales and service including sales and service of precision agriculture technology. The cooperative has over 650 members and serves seven counties in north-central Oregon and 4 counties in Washington through its farm equipment dealership, energy division, and agronomy division (MCGG 2023). As MCGG is a critical stakeholder in the dryland wheat economy in Morrow County and would be directly affected by the loss of approximately 9,400 acres of wheat production, two of the agricultural mitigation projects described in Section 3 directly benefit MCGG. It is the intent of the agricultural mitigation plan to invest in dryland wheat suppliers (i.e., MCGG) in ways that replace lost income or otherwise increase net revenue.

It is also the intent of the agricultural mitigation plan to provide economic benefit directly to dryland wheat producers in Morrow County. As Morrow County wheat farmers are part of the MCGG cooperative and share in the profits/equity of the cooperative, economic benefits to MCGG also directly benefit producers. Additionally, the purpose of the MCGG cooperative was for farmers to pool resources and make collective investments to benefit their operations (MCGG 2023). Improved facilities at the North Lexington MCGG elevator (see Section 2.2) will directly benefit dryland wheat producers. However, Sunstone has also identified a mitigation project that would offer wheat producers an opportunity to purchase precision agricultural equipment through a cost-share grant program. This program was initially identified by MSWCD, which provides technical, financial, and educational resources from various sources to meet the needs and objectives of the local land user (MSWCD 2024). The program described in Section 3.1 is for a grant program for farmers to enter into a cost-share agreement to purchase precision weed technology which allows farmers to target weeds and weed seeds more precisely than under traditional weed management. The cost share grant program is assumed to increase the number of farmers who otherwise would not have access to weed precision management technology due to the significant upfront cost barrier. These technologies could benefit farmers by decreasing chemical expenditures and increasing production and revenue. Based on discussions with MSWCD, MCGG, Morrow County wheat farmers, and other agricultural stakeholders, Sunstone understands that precision weed technology is in demand and is an example of the type of agricultural investment these key stakeholders would like to see agricultural mitigation funding be used for.

In Attachment 1 of this plan, ECOnorthwest describes the economic benefits of the mitigation programs identified in Section 3 of this plan. The mitigation programs would economically support dryland wheat farming in several ways but, as further discussed in Attachment 1, some economic benefits are difficult to quantify in monetary terms, but would nevertheless represent positive

economic outcomes of the agricultural mitigation program. For example, investments in capital (e.g., farming equipment) can reduce other agricultural input costs or improve the efficiency of production, ultimately increasing annual net revenue from production for farmers (a benefit). Benefits may also materialize as improvements in environmental quality, reduced uncertainty and risk, and better quality of life for local community members. ECOnorthwest was unable to quantify the potential for precision agricultural technology to increase wheat yield per acre and thereby create more wheat in replacement for the dryland wheat production lost due to the construction and operation of the Project.

The ECOnorthwest economic analysis of the mitigation program in Attachment 1 does validate that the mitigation plan is sufficient to make the economy whole. The benefits that would materialize also reflect positive outcomes for Morrow County's agricultural economy that further demonstrate the agricultural mitigation plan more than does its job in offsetting the Project's impact from taking agricultural land out of production.

2.0 MITIGATION FUND

2.1 Description and Administration

The mitigation projects identified in this agricultural mitigation plan are not intended to be a prescriptive guide detailing where agricultural mitigation funds should be spent, but rather are intended to provide example projects that would generate net positive impacts in the agricultural economy of Morrow County. It is anticipated that Morrow County will establish a decision-making body that will administer the mitigation fund and will be staffed by local, knowledgeable agricultural specialists capable of deciding where to allocate funds to maximize the benefits the County receives from agricultural mitigation.

In discussions with the Morrow County Commission, Sunstone is proposing to fund a "Sunstone Solar Agricultural Mitigation Account" equal to the Project's total indirect economic impacts on Morrow County's agricultural sector on a per acre basis, as identified in the ECONorthwest Economic Impact Analysis (pASC, Attachment K-2, Economic Impact Analysis). Contributions to the fund will be calculated by multiplying the total number of acres removed from agricultural production for any phase of the Project that begins construction by $1,179 (i.e., the per acre portion of the indirect economic impacts on Morrow County's agriculture sector for the expected 40-year life of the Project).

Morrow County shall establish and administer the Sunstone Solar Agricultural Mitigation Account in accordance with a Memorandum of Agreement for Agriculture Mitigation Fund between Morrow County and Sunstone Solar. The Memorandum of Agreement requires that the MCBOC establish a nine-person Advisory Committee to make recommendations on the distribution of Agricultural Mitigation Funds. After a recommendation from the Advisory Committee, the MCBOC can approve a distribution of funds to proposed mitigation projects.

As contemplated in the Memorandum of Agreement, the Advisory Committee shall be composed of:

- One representative from Morrow County government, selected by the MCBOC;

- One representative from an academic institution engaged in agriculture research in Morrow County or an agricultural related nonprofit entity located in Morrow County, selected by the MCBOC;
- One dryland farm producer in the County, selected by the MCBOC;
- Two representatives from the Morrow Soil and Water Conservation District, selected by the MSWCD;
- Two representatives from the Morrow County Grain Growers, selected by the Morrow County Grain Growers Board; and
- Two representatives with subject matter expertise over statewide or regional agriculture issues, selected by the Energy Facility Siting Council.

The Memorandum of Agreement for Agriculture Mitigation Fund further requires that (i) all funds in the Sunstone Solar Agricultural Mitigation Account must be spent within 10 years of being received, (ii) that funds from the Sunstone Solar Agricultural Mitigation Account only be used to mitigate the impacts of the Project on Morrow County's dryland wheat agricultural economy, and that (iii) the Advisory Committee overseeing the Sunstone Solar Agricultural Mitigation Account must provide an annual report to the MCBOC, ODOE, EFSC, and Sunstone describing the use of the funds.

A copy of the Memorandum of Agreement is attached (see Attachment 2). The Memorandum of Agreement will be finalized and executed upon review and approval by the MCBOC and review and approval of this Agricultural Mitigation Plan document. Within 10 business days of mutual acceptance of the Agreement, the MCBOC will provide a letter or other suitable notification to ODOE stating, based on the mitigation provided pursuant to this Agreement, that the MCBOC agricultural impact concerns have otherwise been satisfied in connection with the Project.

2.2 Criteria for Alternative Mitigation Projects

This plan assumes that other mitigation projects, different than the ones discussed in this document and Attachment 1, that are allocated funding by this program are expected to demonstrate equal or greater positive impacts as those disclosed in this document and Attachment 1.

For a potential agricultural mitigation project to be deemed suitable for funding, the applicant to the Agricultural Mitigation Fund must demonstrate to the Advisory Committee that the proposed project has the ability to create positive impacts in the agricultural economy of Morrow County and, more specifically, to the local suppliers of agricultural production inputs that are adversely affected by the Project.

Alternative mitigation projects should:

- Directly benefit the dryland wheat economy
- Directly benefit MCGG; or
- Directly benefit dryland wheat farmers in Morrow County.

2.3 Funding Amounts

Sunstone proposes to provide **$1,179/acre (or up to $11.08 million for 9,400 acres)** to the agricultural mitigation fund, based on the final acreage of crop land that is utilized for the Project. This amount is equivalent to the Project's indirect impact on the Morrow County agricultural economy over the 40-year life of the Project. As discussed in Attachment 1, this amount is in excess of the mitigation spending assumed in the ECOnorthwest economic analysis of the example mitigation projects described in Section 3 below. ECOnorthwest concludes that an $11.08 million mitigation investment can be assumed sufficient to make the Morrow County agricultural economy whole regardless of the final selected mitigation projects, assuming they demonstrate equal or greater positive impacts as the projects presented in this analysis.

3.0 PROPOSED MITIGATION

Three projects were identified and examined as potential mitigation to agricultural production reductions in Morrow County due to the Project. As noted earlier, these mitigation projects were identified through outreach with key Morrow County agricultural stakeholders that work within the dryland wheat agricultural sector. These mitigation projects are reviewed for their applicability to the farming economy of Morrow County, potential magnitude of impacts, and additional benefits.

For each project, potential economic impacts were estimated by ECOnorthwest to understand the level of impact the Project would have in the local agricultural economy (see Attachment 1). Projects were also examined to understand the benefits provided to dryland wheat producers in the region as is consistent with the agricultural mitigation plan's goal of improving the long-term viability of the agricultural economy in Morrow County.

The projects identified in this section are presented for representational purposes. The purpose of these example projects is to illustrate mitigation spending at the proposed level that generates a positive net impact more than the adverse Project impacts. The following potential agricultural mitigation projects are reviewed in depth in Attachment 1:

1. ***Grant program for purchase of precision weed management equipment.***
    a) The precision weed management grant program is intended to increase access to precision weed management technology in Morrow County through a cost sharing agreement between farmers and the agricultural mitigation program fund, while also increasing spending in the local agricultural economy.
    b) This program would share a portion of the cost of purchasing precision weed management equipment through a local agricultural supplier (e.g., MCGG). The cost share is assumed to be 50 percent of the total cost of weed precision management equipment and installation. MSWCD suggested this grant program be structured as a cost-share program as it ensures prospective recipients of the program are fully invested in the use and maintenance of the precision agricultural technology.
    c) The cost share grant program is assumed to increase the number of farmers who otherwise would not have access to weed precision management technology due to the significant upfront cost barrier.
    d) The WEED-IT, a precision herbicide applicator, is chosen as a representative precision weed management technology due to available data, its current availability for sale at

local agricultural suppliers (i.e., MCGG), and the WEED-IT's demonstrated beneficial use by dryland wheat farmers in Morrow County. A WEED-IT is installed directly onto a farmer's existing tractor and targets chemical application directly to specific weeds for an overall reduction in chemical application.

2. ***Funding for Morrow County Grain Grower's North Lexington grain facility electrical upgrades and liner upgrades***
    a) The North Lexington facility, which is owned by MCGG, is roughly 75-years-old and is need of electrical and concrete liner upgrades.
    b) These upgrades will translate to cost and time savings to MCGG and farmers.
    c) These upgrades were identified as a priority project for MCGG.
3. ***Funding for construction of Morrow County Grain Grower's North Lexington new grain facility***
    a) MCGG has proposed the construction and operation of a new grain storage facility at North Lexington with the capacity to hold 2 million bushels of wheat.
    b) North Lexington's current storage capacity is 300,000 bushels and, depending on the year, can receive upwards towards 1.3 million bushels in a harvest season, requiring MCGG to conduct multiple transfers to the Boardman facility (over 30 miles away) to keep up with capacity demands.
    c) The construction of a new facility will generate additional storage capacity in North Lexington, allowing North Lexington to handle all the south county grain transfers without the need to transfer grain to the Boardman facility during harvest time. The new facility would also reduce the potential that incoming grain during harvest will overrun storage capacity at North Lexington (which currently occurs periodically during harvest season), requiring grain to be temporarily stored outside, exposing the grain to the elements and increasing risk for adverse impacts.

4.0 REFERENCES

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ATTACHMENT 1: ECONORTHWEST MEMO

Date:	February 14, 2024
To:	Tetra Tech; Sunstone Solar, LLC
From:	ECOnorthwest
Subject:	Economic Effects of Sunstone Agricultural Mitigation Program

Introduction

Sunstone Solar, LLC (Sunstone Solar), a subsidiary of Pine Gate Renewables, LLC, is proposing to construct and operate the Sunstone Solar Project (Project), an up to 1,200 megawatt (MW) alternating current (AC) photovoltaic (PV) solar energy generation facility and associated components in Morrow County, Oregon. The Project will connect with the Umatilla Electric Cooperative (UEC) 230-kV Blue Ridge Transmission Line via a new UEC switchyard to be located just outside the solar array fence line area. The Project is sited on agricultural land utilized for dryland winter wheat and zoned by Morrow County as Exclusive Farm Use (EFU). Sunstone Solar is presently seeking an exception from Oregon's Land Use Planning Goal 3 for up to approximately 9,400 acres to site the facility (Oregon Planning Department of Land Conservation and Development, Accessed 2023).

As part of the Goal 3 exception request, Sunstone Solar is proposing agricultural mitigation to improve the long-term viability and resilience of the agricultural economy in Morrow County, and specifically the dryland wheat economy to offset agricultural crop production reductions due to the Project. As documented in the *Sunstone Solar Project Economic and Agricultural Impact Analysis* (ECOnorthwest, 2023) construction and operation of the Project are expected to generate economic and fiscal impacts that are significantly larger than the potential negative impacts on the agricultural economy.

The total economic output of Project construction is estimated at roughly $86.9 million or $9,244/acre in Morrow County over a five-year period. The economic output impacts of Project operation are estimated at approximately $20 million or $2,127/acre annually over the 40-year operational life of the project in Morrow County. Because the spending patterns associated with the economic output of Project construction and operation would be different that the current spending on dryland wheat production (which would no longer take place within the Project footprint), the distribution of economic impacts could potentially shift resources from the agricultural economy to other sectors of the economy. Thus, although overall economic impact would increase in Morrow County with the Project over its lifespan, mitigation of foregone spending in sectors most closely connected with dryland wheat production would ensure these sectors remain viable and resilient to market fluctuations over time.

Tetra Tech, on behalf of Sunstone Solar, asked ECOnorthwest to conduct an economic analysis of a proposed agricultural mitigation program intended to address the Project's potential distributional effects on the dryland wheat economy in Morrow County. This Memo presents the assumptions and findings of this analysis. The goal of the agricultural mitigation program is to adequately mitigate for the adverse impacts the Project has on the local agricultural economy of Morrow County. This analysis provides examples of where the mitigation money could be spent to illustrate agricultural mitigation opportunities that will generate positive impacts sufficient to more than offset the adverse impacts of the Project. Example mitigation projects were identified through outreach to Morrow County agricultural stakeholders including Morrow County Soil and Water Conservation District, Morrow County Grain Growers (MCGG), precision-agricultural technology specialists, and dry-land wheat farmers operating in

Morrow County with experience operating precision weed technology. A series of interviews with these stakeholders were held in November and December of 2023 and the information provided from these interviews informed this analysis.

As further discussed below, it should be noted that this memo analyzes the economic sufficiency of the identified mitigation projects to offset the expected economic impacts of the Project to the agricultural economy of Morrow County (with particular focus on Morrow County's agricultural suppliers, the economic sector most impacted by the reduction in spending from removing 9.400 acres from dry-land wheat production). This memo also describes the economic benefits that are expected to accrue to individual Morrow County agricultural producers who are also likely to realize significant economic benefit from the proposed mitigation activities. For example, investments in capital (e.g., farming equipment) can reduce other agricultural input costs or improve the efficiency of production, ultimately increasing annual net revenue from production for farmers (a benefit). Benefits may also materialize as improvements in environmental quality, reduced uncertainty and risk, and better quality of life for local community members. Many of these benefits are difficult to quantify in monetary terms, but nevertheless represent positive economic outcomes of the agricultural mitigation program. This analysis validates that the mitigation program is sufficient to make the economy whole. The benefits that would materialize also reflect positive outcomes for Morrow County's agricultural economy that further demonstrate the agricultural mitigation program more than does its job in offsetting the Project's impact from taking agricultural land out of production.

Finally, this analysis is not intended to be a prescriptive guide detailing where agricultural mitigation funds should be spent, but rather is intended to provide example projects that generate positive impacts in the agricultural economy of Morrow County in excess of Project related negative impacts in the agricultural economy of Morrow County. It is anticipated that the organization that administers the mitigation fund will be staffed by local, knowledgeable agricultural specialists capable of deciding where to allocate funds to maximize the benefits the County receives from agricultural mitigation. If the organization that administers the mitigation fund ultimately decides to allocate funds to projects different than the ones discussed in this memo, it is expected that those projects will demonstrate equal or greater positive impacts in the context of this analysis.

Agricultural Mitigation Analysis Approach

Agricultural mitigation of the Project, under the Goal 3 exception request, is intended to improve the long-term viability and resilience of the agricultural economy in Morrow County, and specifically to offset the adverse effects of the Project on the Morrow County agricultural economy. One way to understand the Project's impact on the local agricultural economy is by looking at the estimated negative economic impacts of the Project.

Economic Impacts of the Project on the Agricultural Economy

The economic impacts of removing agricultural land from production includes reducing crop production and associated farm revenue (i.e. direct impacts), leading to a reduction in spending for agricultural inputs in the local economy and a reduction in gross profit (i.e. indirect impacts), and reducing associated household expenditures (i.e. induced impacts). The Project will remove up to approximately 9,400 acres of agricultural land from production generating economic impacts in the local agricultural economy.

The economic impacts of the Project are documented in the *Sunstone Solar Project Economic and Agricultural Impact Analysis* (ECOnorthwest, 2023), which was included in the Project's Application for Site Certificate as Attachment K-2 to Exhibit K. Please refer to Exhibit K for a complete review of the economic impacts of the Project. Economic impacts of the Project are estimated using IMPLAN software. IMPLAN is a regional input-output model widely used to assess economic impacts. The IMPLAN model divides the economy into 546 sectors, including government, households, farms, and other industries, and models the linkages between the various sectors. The linkages are modeled through input-output tables that account for all dollar flows between different sectors of the economy. The economic relationships modeled by IMPLAN allow the user to estimate the overall change in the economy that would result from a proposed project. The dollars spent within the selected analysis area (Morrow County, in this case) are analyzed to determine the total economic impact within that area. The direct investments in a project trigger successive rounds of spending that result in an overall increase in employment, labor income, and economic output in the local economy. Economic multipliers derived from the model are used to estimate total economic impacts.

Within IMPLAN, economic impacts consist of three components: direct, indirect, and induced impacts. The *direct* impact component consists of expenditures made specifically for the proposed project, such as construction labor and materials. These direct impacts generate economic activity elsewhere in the local economy through the multiplier effect, as initial changes in demand "ripple" through the local economy and generate indirect and induced impacts. *Indirect* impacts are generated by expenditures on goods and services by suppliers who provide goods and services to the producers. Indirect effects are often referred to as "supply-chain" impacts because they involve interactions among businesses. *Induced* impacts are generated by the spending of households associated with the proposed project. Impacts are assessed using three measures that are reported by the IMPLAN model. Output is the value of goods and services produced, which serves as a broad measure of economic activity. Jobs are measured as the average number of employees engaged in full- or part-time work. And personal income (or labor income) is expressed as the sum of employee compensation and proprietary income.

Sunstone Solar will compensate landowners for land used for the project and thus taken out of production. Although farmers experience the loss of direct agricultural production revenue, they gain revenue through lease payments or land sales and this revenue is assumed to be equal to or greater in value than the agricultural production revenue. Therefore, direct impacts are not included in the economic impacts that need to be mitigated.

Indirect impacts of the Project related to agriculture represent the economic activity supported by agricultural production on the Project site. For example, as farmers purchase inputs to grow wheat, their purchases (e.g., chemicals, seed, equipment) ultimately materialize as indirect impacts of their agricultural production. Farmers in Morrow County almost exclusively purchase production inputs in the local area and more specifically through Morrow County Grain Growers (MCGG), which could face a reduction in gross profit due to the Project. For this reason, the focus of agricultural mitigation is the agriculture supply sector of the Morrow County economy and specifically MCGG, as measured through indirect impacts. The indirect economic impacts of the lost agricultural production related to the Project are estimated at $478,566 or $51/acre per year (ECOnorthwest, 2023).[1]

[1] The third category, induced impacts represent household spending in the local economy. Due to lease payments to landowners, no change in household income and ultimately household spending is expected due to the Project.

MCGG is a critical stake holder in the dryland wheat economy in Morrow County and the surrounding region. MCGG is a producer-owned marketing and farm supply cooperative with over 650 members. It was started in the early 1930s and provides grain storage, bulk fuel, agronomy services (e.g. sale of crop nutrients, seed, pesticides, fertilizers, and/or crop protection), and farm equipment sales and service including sales and service of precision agriculture technology. MCGG is headquartered in Lexington, Oregon has 80 full-time employees and currently operates eight grain elevators, including two barge facilities at the Columbia River, with a total capacity of 6.2 million bushels. Currently the cooperative is serving 7 counties in north-central Oregon and 4 counties in Washington through its farm equipment dealership, energy division, and agronomy division (MCGG, Accessed 2023).

Quantifying Total Project-Related Agricultural Economic Impacts

The indirect economic impact identified in the previous section represents the annual value of losses to the agricultural economy of Morrow County due to reduced production each year over the life of the Project. Because the proposed mitigation program is currently designed as a one-time payment intended to compensate for the impacts over the life of the project, the annual payment needs to be converted to a single value, known as a *present value*.

A present value calculation is an economic tool to transform annual payments into a one-time payment, accounting for the foregone rate of return of investing that money. The present value of the Project's indirect impacts is equivalent to the foregone gross profit in the agricultural supply sector of the economy over the 40-year life of the Project invested at an appropriate rate of return. We apply the "Single A" corporate bond yield as the assumed rate of return. Single A bonds are investment grade borrowing with relatively low risk over a 30- to 40-year time horizon. The Single-A Corporate Index Effective Yield rate is 3 percent when adjusted for inflation.[2] This would be comparable to companies like Idaho Power, Bank of America, and Caterpillar Tractor. This reflects a level of investment risk appropriate to MCGG.

The resulting present value of adverse indirect Project impacts, over the 40-year life of the Project is $11.08 million or $1,179/acre. This value is higher than if using the US Treasury rate of return with no associated risk. For example, the long-term inflation adjusted US Treasury rate of return is 2.50 percent (OMB, 2023), resulting in a present value of $12.01 million or $1,278/acre. A 30-year mortgage rate provides an alternative consumer-focused rate for comparison. A 30-year fixed mortgage rate of 6.82 percent[3] results in a present value of $8.65 million or $920/acre. Using the middle rate, which reflects an assumed appropriate level of risk on rate of return, **the present value of the Project's agricultural impacts is estimated as $11.08 million or $1,179/acre over the 40-year life of the Project.**

Mitigation Analysis Overview

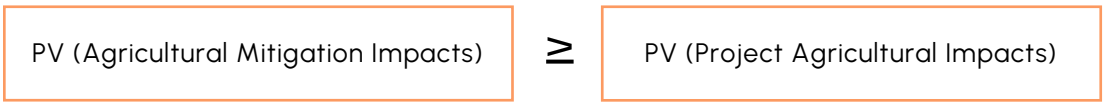
A present value calculation creates a consistent value metric against which the positive impacts of agricultural mitigation projects can be estimated in comparison with the adverse impacts of the Project. This analysis assumes the present value of economic impacts generated by agricultural mitigation activities undertaken by Sunstone Solar (i.e. *PV (Agricultural Mitigation Impacts))* must be equal to or

[2] This figure represents the Single-A Corporate Index Effective Yield rate of 5.18 percent (Federal Reserve Economic Data, 2023), adjusted for the 30-year applied inflation rate of 2.19 percent (Federal Reserve Economic Data, 2023).

[3] This rate of return represents a 30-year fixed mortgage rate of 6.82 percent (Freddie Mac, 2023) adjusted for the 30-year applied inflation rate of 2.19 percent (Federal Reserve Economic Data, 2023).

greater than the present value of economic impacts of the Project on the agricultural economy of Morrow County (i.e. *PV (Agricultural Project Impacts)*) as is presented in **Error! Reference source not found.**.

Figure 1: Agricultural Mitigation of Adverse Impacts to Agricultural Production in Morrow County



Defining Economic Impacts versus Economic Benefits

An important distinction in the following analysis is the difference between *economic impacts* and *economic benefits*. Where impacts are related to economic activity in the agricultural economy of Morrow County measured in terms of employment, income, and economic output (sales), benefits are related to changes in the value of goods and services that farmers produce. In the Morrow County agricultural economy, where farmers purchase agricultural supplies almost exclusively in the local area (ECOnorthwest, 2023), the indirect economic impacts affect the local businesses that sell agricultural supplies (e.g. MCGG), while economic benefits affect individual Morrow County farmers. For example, if a dryland wheat farmer in Morrow County reduces the amount of agricultural chemicals they purchase at MCGG due to a reduction in weeds that year, the farmer's net revenue from growing wheat may increase because the farmer produces the same amount of wheat with fewer inputs (i.e. an economic benefit). However, the reduction in spending on chemicals at MCGG may reduce its net revenue, generating a negative economic impact. As this example illustrates, economic impacts and economic benefits are two different measures, and as such, are not additive.

The intent of the agricultural mitigation program is to offset potential impacts of the Project on the agricultural economy in Morrow County, thus sustaining the resilience and long-term viability of the agricultural economy of Morrow County. As explained earlier, the primary adverse economic impacts would occur to agricultural suppliers like MCGG (because landowners are compensated for use of their land), and these impacts are measured through IMPLAN as lost output, jobs, and income. These are all *economic impacts.* The agricultural mitigation program would invest in these suppliers in ways that replace lost income or otherwise increase net revenue. This analysis measures and compares the lost indirect output with the indirect output associated with the mitigation program.

The investments outlined in the agricultural mitigation program would also generate potential economic benefits for farmers. For example, investments in capital (e.g. precision agricultural technology) can reduce other agricultural input costs (e.g. chemicals/herbicides) and/or improve the efficiency of production (e.g. produce more bushels per acre), ultimately increasing annual net revenue from production for farmers (a benefit). Increased revenue could also provide farmers the opportunity to reinvest in their current farming operations. For example, converting CRP lands back to active agricultural use, investing in irrigation equipment, investing in other technology that assist with increasing production, or utilizing full production techniques on marginal land to increase yield. Benefits may also materialize as improvements in environmental quality, reduced uncertainty and risk, and better quality of life for local community members. However, many of these benefits are difficult to quantify in monetary terms as there are many different factors that influence a particular farmers annual costs and production input (e.g. weather, fluctuation in agricultural input costs, fluctuation in price of wheat).

Nevertheless, these economic benefits represent positive economic outcomes of the agricultural mitigation program.

Although both the economic impacts and economic benefits that arise from the agricultural mitigation program's investments reflect it's intended outcome of improving the resilience and viability of the agricultural economy in Morrow County, they are not additive because they measure outcomes in different ways. The value of the agricultural mitigation program is scaled to offset the measured economic impacts (and thus represents an apples-to-apples comparison). This analysis validates that the agricultural mitigation program is sufficient to make the economy whole. The benefits that would materialize also reflect positive outcomes for Morrow County's agricultural economy that further demonstrate the agricultural mitigation program more than does its job in offsetting the Project's impact from taking agricultural land out of production.

Economic Analysis of Identified Agricultural Mitigation Projects

Three projects are examined as potential mitigation to agricultural production reductions in Morrow County due to the Project. As noted earlier, these mitigation projects were identified through outreach with key Morrow County agricultural stakeholders that work within the dry-land wheat agricultural sector. These mitigation projects are reviewed for their applicability to the farming economy of Morrow County, potential magnitude of impacts, and additional benefits. For a potential agricultural mitigation project to be deemed applicable, it must demonstrate the ability to create positive impacts in the agricultural economy of Morrow County, and more specifically to the local suppliers of agricultural production inputs that are adversely affected by the Project. The potential impacts of mitigation projects are estimated to understand the level of impact in the local agricultural economy. In addition, projects are examined to understand the benefits provided to dryland wheat producers in the region as is consistent with the agricultural mitigation program's goal of improving the long-term viability of the agricultural economy in Morrow County.

The projects identified in this section are presented for representational purposes. The purpose of these example projects is to illustrate mitigation spending at the proposed level that generates a positive net impact more than the adverse Project impacts. The following potential agricultural mitigation projects are reviewed in depth in the following sections:

1. Grant program for purchase of precision weed management equipment.
2. Funding for Morrow County Grain Grower's North Lexington grain facility electrical upgrades + liner upgrades.
3. Funding for construction of Morrow County Grain Grower's North Lexington new grain facility.

The impact of each project is examined in the following sections. Impacts are quantified where possible, and qualitatively described when not possible. In addition, the benefits of each project to the dryland wheat farmers of Morrow County are described and quantitively estimated where possible.

1. Grant Program for Purchase of Precision Weed Management Equipment

Precision weed management technology allows farmers to target weeds and weed seeds more precisely than under traditional weed management. Some technologies that are utilized under precision weed

management include a technology that recognizes weeds and targets herbicide application and weed seed mills that recognize and destroy weed seeds.

The precision weed management grant program is intended to increase access to precision weed management technology in Morrow County through a cost sharing agreement between farmers and the proposed agricultural mitigation program and its administrative body, while also increasing spending in the local agricultural economy. The program would share a portion of the cost of purchasing precision weed management equipment through a local agricultural supplier (e.g. MCGG). The cost share is assumed to be 50% of the total cost of weed precision management equipment and installation. The cost share grant program is assumed to increase the number of farmers who otherwise would not have access to weed precision management technology due to the significant upfront cost barrier. Under the cost-share program modeled in this analysis, farmers are required to invest a share of the funds necessary to purchase the weed management technology. This farmer 'buy-in' demonstrates farmer's intended use of the technology, which in turn indicates that the technology will indeed be used to generate benefits for local farmers, making the agricultural economy more resilient. The WEED-IT, a precision herbicide applicator is chosen as a representative precision weed management technology due to available data, its current availability for sale at local agricultural suppliers (i.e. MCGG), and the WEED-IT's demonstrated beneficial use by dryland wheat farmers in Morrow County (Miller, 2023) (Rauch, 2023). A WEED-IT is installed directly onto a farmer's existing tractor and targets chemical application directly to specific weeds for an overall reduction in chemical application.

Due to rapid technology updates in the field of precision weed management, the analysis presented here estimating the economic impacts and benefits of WEED-IT sales and adoption in Morrow County is expected to serve as a representative example of the impacts and benefits of precision weed management technology. It is assumed that a number of different precision weed management technology products could be included under the proposed grant program. This analysis is not intended to serve as an endorsement for a specific weed precision management technology, but rather as an example of the potential impacts and benefits of precision weed management on the Morrow County agricultural economy.

Economic Impacts of Program

The sale of precision weed management technology through a local agricultural supplier (e.g. MCGG) will generate output or sales dollars in the local agricultural economy. The economic impact of this increase in output to the local agricultural economy can be measured using IMPLAN. The total cost of an average WEED-IT including equipment and instillation totals $191,000 in Morrow County (Herrington, 2023). This amount of spending at MCGG, the local authorized dealer of WEED-ITs in Morrow County would generate $77,109 in associated direct and indirect impacts[4] in the local agricultural economy. Based on conversations with Morrow Soil & Water Conservation District (MSWCD) as many as 50 percent (Payne, 2023) of the 105 Morrow County dryland wheat farmers (USDA NASS, 2017) could potentially be interested in purchasing a WEED-IT at 50 percent cost share, generating roughly $4.05 million in economic impacts in the local agricultural economy.

From a strictly economic perspective, the economic impacts of the precision weed management grant program will accrue to the Morrow County agricultural economy if purchased at MCGG, regardless of

[4] Induced impacts are not included in the impact estimation since the induced impacts of the Project are not relevant to the agricultural impacts being mitigated for.

whether farmers that purchase WEED-ITs through the grant program farm within or outside Morrow County. However, while not imperative to the impact analysis, the farm location is relevant to the benefits generated by WEED-IT use, since the benefits of the WEED-ITs accrue to the users of the WEED-IT, so this analysis focuses on WEED-IT sales made to Morrow County farmers as is consistent with improving the long-term viability of agriculture in Morrow County.

Based on conversations with local dryland wheat farmers, any reduction in expenditures due to a reduction in chemical use associated with WEED-IT use would be reinvested back into their agricultural businesses (Rauch, 2023) (Miller, 2023). Between this and the fact that weed management on the Project site will likely require a significant amount of chemicals to be purchased, likely purchased locally (e.g. MCGG), no overall reduction in spending at the agricultural supplier level is estimated associated with the savings in chemical inputs.

Economic Benefits of Program

The benefits of WEED-IT use includes an average estimated 80 percent reduction in chemical and associated water use (Herrington, 2023) (Rauch, 2023) (Payne, 2023). Assuming the average dryland winter wheat farm in Morrow County is (1) farmed on a two-year winter wheat following fallow rotation with 1,480 acres under production[5] on any given year (USDA NASS, 2017), (2) follows typical regional dryland winter wheat following fallow production practices and associated costs (Powell & Seavert, 2021), and (3) reinvests any chemical expenditure savings back into agricultural production inputs (Powell & Seavert, 2021) (Rauch, 2023), a WEED-IT would generate roughly between $45,000 and $106,000 in annual savings per farm. Countywide, assuming a 50 percent WEED-IT adoption rate, this would generate roughly between $2.3 and $5.6 million in benefits annually to dryland winter wheat farmers in Morrow County. The range in figures represents an estimate of the benefits of WEED-IT use ranging from conservative use (where technology is assumed to be employed on fallow fields only) versus full beneficial use (where technology is assumed to be employed on both fallow and active fields). While one Morrow County dryland winter wheat WEED-IT user reported currently using the technology primarily on fallow land, full beneficial use of the technology would occur with use on both active and fallow land, for which the technology is designed and utilized for elsewhere (Rauch 2024). This range also indicates the potential learning process associated with new technology adoption, where full benefits may be realized after multiple years of use.

Reduced chemical application would potentially also produce benefits to the environment, including better quality of life for the people and animals that depend on clean air and water in the region. It could also have potential benefits for the people who have to handle the chemicals and expose themselves to potential health risk from accidental overexposure. Characterizing these benefits would require scientific and technical analysis outside the scope of this economic analysis, but interviews with farmers indicate these are real perceived benefits of reduced chemical application that would arise from Weed-it purchases.

2. North Lex Facility Upgrades: Electrical Upgrades + New Liner Upgrade

The North Lexington facility, which is owned by MCGG is roughly 75 years old. The current electrical system is out of date and requires updating. Updating this electrical to 480V 3 phase power, as is

[5] The assumed average annual dryland winter wheat harvested acres are based on 105 winter wheat farms in Morrow County with a total harvest acreage of 155,414 acres in the 2017 Census of Agriculture (USDA NASS, 2017).

consistent with industrial facilities electrical systems, would generate significant impacts for MCGG and benefits to dryland wheat farmers.[6] Upgraded electrical will allow a reduction in the amount of time it takes dryland wheat farmers to dump (unload) their crop at the North Lex facility during harvest from roughly 25 minutes to 15 minutes per truck (Gray, 2023). Additionally, facility upgrades will increase the load-out capacity for MCGG trucks from 5,500 bushels (bu) per hour to 11,000 bu per hour. Upgrading the electrical at the North Lexington facility including running new line with 480V 3 phase power to the facility and upgrading the facility electrical is quoted to cost $250,000 (Gray, 2023).

After Morrow County farmers harvest grain, it is transported by farmers to MCGG's North Lexington storage facility where the grain is weighed, and quality is assigned before storage. An estimated 95 percent of Morrow County's annual grain harvest is stored and sold through MCGG (Gray, 2023). After being stored in the North Lexington facility, MCGG grain is trucked to and loaded onto barges in the Columbia River at the Port of Morrow in Boardman. The length of time grain stays in the North Lexington facility is a factor of facility storage capacity and trucking capacity.

The North Lexington facility is a slip-form concrete elevator and currently has structural issues restricting the amount of grain that can be continuously poured during load-out of grain from the facility. A liner can be inserted into the facility to allow for increased load-out speeds at an estimated cost of between $1 to $1.5 million (Gray, 2023). Increased load-out speeds will reduce the strain on MCGG trucking to transport grain from North Lexington to the Port at Morrow during the busy harvest season.

Economic Impacts of Program

Upgrades at the North Lexington facility will allow for an increase in load-out capacity for MCGG trucks, which load grain from the North Lexington facility for transport to the Port of Morrow. Due to current load-out constraints, MCGG trucks are under significant strain to transport grain from storage to port during harvest (Gray, 2023). An increase in load-out speeds will reduce the time required for the load-out, freeing up trucks and drivers for other tasks during the busy harvest season. One impact of increased load-out speeds to MCGG can be quantified as the foregone wage rate of truck drivers during that time. Assumed hourly rates of heavy haul drivers in Oregon, adjusted for benefits is $33.61 an hour (BLS, 2022). Since labor during harvest is under significant time pressure, it is assumed that MCGG staff are working over usual work hours and receiving overtime pay, which is assumed to be a 50 percent markup on traditional wages, or $50.42 per hour. This equates to an annual reduction in expenditures for MCGG of roughly $26,000 annually, or $786,000 as a one-time payment discounted at 3 percent over the assumed life of the facility upgrades.

Upgrades at the North Lexington facility could potentially increase useable storage capacity at the existing North Lexington facility. Storage capacity upgrades will allow for more grain to be stored on site, reducing the strain on MCGG trucking to transport grain from North Lexington to the Port at Morrow during the busy harvest season. The total magnitude of these impacts to MCGG are currently unknown. The impacts of this reduction would be measured as the reduced labor expenditures in terms of overtime pay. Specific impacts are not quantified here, but for every 1,000 bu increase in storage, the impact to MCGG in terms of reduced overtime cost of hauling is expected to generate roughly $1,260 in impacts to MCGG.

[6] MCGG facility upgrades and the new facility are expected to have a 75-year life as is consistent with the current MCGG North Lexington facility.

Economic Benefits of Program

Harvest time is a busy time of year for dryland what farmers in Morrow County. After grain is harvested, farmers load grain into grain haulers and transport it to the North Lexington facility where it is dumped, measured and quality is assigned. The dumping process can be long and farmers may have to wait in line to dump their load. This dump time is currently estimated at 25 minutes per load at North Lexington. The upgrades at the North Lexington facility would decrease this dump time to roughly 15 minutes, generating 10 minutes in time savings for trucks and drivers. The benefit in this reduction in time can be estimated at the wage rate of these drivers. Often the drivers of these trucks are local high school students or family (Gray, 2023), so a conservative wage rate of $32.39 per hour for farmers and laborers is used,[7] which equates to roughly $300 savings per farm annually or $29,000 Countywide in annual farmer benefits per 10 minutes saved. Since there is likely a truck line-up at the North Lexington facility to dump grain, this 10-minute savings per truck is assumed to compound and generate significantly larger time saving benefits.

3. North Lex New Facility

MCGG has proposed the construction and operation of a new grain storage facility at North Lexington with the capacity to hold 2 million bu of wheat. North Lexington's current storage capacity is 300,000 bu and depending on the year, can receive upwards towards 1.3 million bu in a harvest season, requiring MCGG to conduct multiple transfers to the Boardman facility (over 30 miles away) to keep up with capacity demands. The construction of a new facility will generate additional storage capacity in North Lexington, allowing North Lexington to handle all the south county grain transfers without the need to transfer grain to the Boardman facility during harvest time.

Creating additional storage capacity will also reduce the potential that incoming grain during harvest will overrun storage capacity at North Lexington (which currently occurs periodically during harvest season), requiring grain to be temporarily stored outside, exposing the grain to the elements and increasing risk for adverse impacts.

The cost of constructing a new facility at North Lexington is estimated at between $7 and $8 million (Payne 2023). The new facility at North Lexington has not been constructed. A cost-share agreement between MCGG and the proposed agricultural mitigation program and its administrative body to fund construction of a new facility at North Lexington would allow the construction to be undertaken generating significant impacts to the agricultural economy.

Economic Impacts of Program

Construction of a MCGG storage facility at North Lexington will increase MCGG's overall grain storage capacity, allowing for the retirement of two wood crib storage facilities in Morrow County. Wood crib facilities do not meet current code and are difficult and expensive to insure due to the risk associated with wood crib facilities. Recently insurance premiums on each MCGG wood crib facility increased by $25,000 for the structure and between $25,000 and $50,000 for the stock, averaging $125,000 annually in increased insurance premiums for the two wood crib structures. The positive impacts of constructing the MCGG storage facility includes the foregone cost of these additional wood-crib insurance premiums

[7] This figure has been adjusted for benefits and overtime pay and inflated into 2023 dollars.

of $125,000 annually or $3.72 million as a one-time payment discounted at 3 percent over the assumed life of the facility upgrades.

The new facility at North Lexington would allow for a reduction in truck transport travel to the Port of Morrow at Boardman during harvest. These trips are delayed and not avoided trips. This delay may allow for a reduction in the need to pay overtime premiums for drivers or other support staff that are busy during harvest time. The impact of delayed grain transport is quantified as the overtime wages for truck drivers for the number of trips required to haul this grain to the Port at Morrow. These avoided overtime expenditures would equate to roughly $86,000 annually, or a one-time impact of $2.6 million to MCGG discounted at 3 percent over the life of the new facility.

Additionally, construction of a new facility would be built utilizing current electrical code, allowing for the same impacts as described under the North Lexington electrical facility agricultural mitigation project. The impacts of the increased load-out capacity is estimated as roughly $786,000 over the life of the new facility.

In total, the discounted impacts of a new North Lex facility are estimated at $7.07 million. This analysis is not able to capture all potential economic impacts of a new storage facility. Assumedly, MCGG would not be planning for the new storage facility if the costs of construction were not expected to be outweighed by the benefits the facility would provide to their business. Therefore, the facility would be expected to generate more impact to the company than the cost of construction of roughly $7.5 million. Thus, the impacts quantified here likely represent an underestimate of total potential impacts.

Economic Benefits of Program

The construction and operation of a new facility will reduce the grain dump time for farmers during harvest, similar to those benefits described under the North Lexington electrical upgrades project. These benefits are estimated at roughly $29,000 annually for local farmers. Additionally, a new facility will reduce risk of adverse grain quality impacts due to a lack of storage capacity when grain is stored uncovered and open to the elements. New construction built under current building code is expected to include heightened safety standards for MCGG employees.

Summary of Project Impacts

The intent of the agricultural mitigation program is to offset potential impacts of the Project on the agricultural economy in Morrow County, thus sustaining the resilience and long-term viability of the agricultural economy of Morrow County. As described elsewhere in this report, the primary adverse economic impacts of the Project would occur to agricultural suppliers like MCGG, with impacts measured through IMPLAN as lost output, jobs, and income. These are all *economic impacts.* The agricultural mitigation program would invest in these suppliers in ways that replace lost income or otherwise increase net revenue. This analysis measures and compares the lost indirect output of the Project with the indirect output associated with the mitigation program.

The agricultural mitigation project investments detailed in this report would generate positive economic impacts in the local agricultural economy ($11.12 million), in excess of the adverse Project impacts ($11.08 million). See Table 1. The specific projects presented in this report were selected based on local farmer and business support, indicating local preference for the selected mitigation projects. The potential

impacts and benefits of agricultural mitigation programs are summarized in Table 1. The total estimated impacts of the agricultural mitigation programs as detailed in this report, total $11.12 million.

Table 1: Potential Impacts of Agricultural Mitigation Projects

	Impacts (one time)
Project Impacts	
Project Agricultural Impacts	-$11,080,000
Agricultural Mitigation Impacts	
Precision Weed Management	$4,048,000
North Lex Upgrades	$786,000*
North Lex New Facility	$7,070,000
Total Mitigation Impacts	**$11,118,000**

*Note: The impacts of North Lex Upgrades are potentially duplicative with North Lex New Facility impacts so are excluded from the total Impacts.

The investments outlined in the agricultural mitigation program include approximately $9.6 million in mitigation spending (assuming 50 percent cost share for each project), illustrating that this level of mitigation spending would generate a positive net impact in excess of adverse Project impacts. As is demonstrated in this report, different types of impacts would arise from these investments, improving the long-term viability of the Morrow County agricultural economy. The investments outlined in the agricultural mitigation program would also generate economic benefits for farmers. For example, investments in capital (e.g., equipment) can reduce other agricultural input costs or improve production efficiency, ultimately increasing annual net production revenue for farmers (a benefit). Benefits may also materialize as improvements in environmental quality, reduced uncertainty and risk, and better quality of life for the local community. Many of these benefits are difficult to quantify in monetary terms, but nevertheless represent positive economic outcomes of the agricultural mitigation program.

Though both the economic impacts and economic benefits that arise from the agricultural mitigation program's investments reflect the intended outcome of improving the resilience and viability of the agricultural economy in Morrow County, they are not additive because they measure outcomes in different ways. The value of the agricultural mitigation program is scaled to offset the measured economic impacts of the Project (representing an apples-to-apples comparison). This analysis validates that the agricultural mitigation program described in this memo (which has the potential to generate $11.12 million in positive impacts through a $9.6 million Investment by Sunstone Solar) is sufficient to make the economy whole by offsetting the $11.06 million in negative impacts created by the Project. In addition, the benefits that would materialize through the agricultural mitigation projects also reflect positive outcomes for Morrow County's agricultural economy further demonstrating the agricultural mitigation program's ability to improve the resilience and long-term viability of the agricultural economy.

As discussed earlier in this Memo, this analysis is not intended to be a prescriptive guide detailing where agricultural mitigation funds should be spent, but instead, illustrates potential agricultural mitigation projects that generate net positive impacts in excess of negative Project impacts to the agricultural economy of Morrow County. It is anticipated that the organization that administers the mitigation fund will ultimately decide where to allocate funds to maximize the benefits the County receives from agricultural mitigation. This analysis demonstrates the economic sufficiency of the identified mitigation projects to offset the expected economic impacts of the Project to the agricultural economy of Morrow

County, both in magnitude of impact and area of the economy impacted. If the organizational body that administers the funds decides to fund projects different than the ones discussed in this memo, it is expected that those projects will demonstrate equal or greater positive impacts in the context of this analysis. To further support this flexibility in mitigation project selection, Sunstone Solar proposes to provide $11.08 million to the agricultural mitigation fund. This amount is equivalent to the estimated adverse Project impact on the Morrow County agricultural economy but is in excess of the mitigation spending assumed in this analysis ($9.6 million) that would generate $11.12 million in beneficial economic impact. Based on the results of this analysis, an $11.08 million mitigation investment can be assumed sufficient to make the economy whole regardless of the final selected mitigation projects, assuming the final selected projects demonstrate equal or greater positive impacts than the projects presented in this analysis.

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Attachment G: Draft Revegetation and Reclamation Plan

Sunstone Solar Project
Draft Revegetation and Reclamation Plan

Prepared for

PINEGATE RENEWABLES
THE POWER OF TOMORROW™

Sunstone Solar, LLC

Prepared by

TETRA TECH

Tetra Tech, Inc.

April 2024

Revised by Department July 2024

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1.0 Introduction

Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Applicant), proposes to construct and operate the Sunstone Solar Project (Facility), a solar photovoltaic solar energy generation facility and related or supporting facilities in Morrow County, Oregon. The proposed Facility will generate up to 1,200 megawatts (MW) of nominal and average generating capacity using solar panels wired in series and in parallel to form arrays, which in turn are connected to electrical infrastructure. Additionally, the Facility will also include a 1,200 MW distributed battery energy storage system for the purpose of stabilizing the solar resource. The Applicant proposes to permit a range of photovoltaic and related or associated technology within a site boundary that allows for micrositing flexibility in consideration of the perpetual evolution of technology and maximization of space efficiency, thereby allowing developmental flexibility to address varying market requirements. These facilities are all described in greater detail in Exhibit B of the Application for Site Certificate (ASC).

This Draft Revegetation and Reclamation Plan (Plan) has been prepared to guide restoration of areas temporarily disturbed during construction of the Facility, as well as revegetation of areas within the solar array fence line area. This Plan will be updated, as necessary, in coordination with the Oregon Department of Energy (ODOE), the Oregon Department of Fish and Wildlife (ODFW), Oregon Department of Agriculture (ODA) and Morrow County Weed ~~, and~~Department and will be updated as needed to reflect the final layout of the Facility.

Prior to construction, this plan shall be finalized based on the following:

1. Applicant shall finalize the plan based on impacts associated with the final design/layout~~,~~ by disturbance level and habitat type and category.
~~1.~~2. Applicant shall develop and incorporate maps showing anticipated construction disturbance levels along with the total acreage and major activities associated with each level.
3. Applicant shall update Table 1 prior to construction to reflect the final impact acreage by habitat subtype for the final layout.
~~2.~~4. Applicant shall provide the number and location of reference sites to be utilized during short- and long-term monitoring of temporary impact areas for review and approval by ODOE in consultation with ODFW.
5. Applicant shall develop and incorporate revegetation methods for each disturbance level in consultation with ODOE, ODA, ODFW, and the Morrow County Weed Department.
6. Applicant shall develop and incorporate monitoring methods for both temporary and permanent impact areas in consultation with ODOE.

Prior to construction, the following shall be completed:

1. Applicant shall provide shapefiles showing anticipated construction disturbance levels at the site as a submittal to ODOE.

2. Applicant shall provide the restoration and seeding contractor's qualifications and scope of work as a submittal to ODOE.
3. Applicant shall conduct pre-construction habitat surveys at the approved reference sites for the purpose of collecting baseline quantitative data (vascular plant species present, native/non-native species present, percent cover of dominant species, percent cover of state and county listed noxious weed, and evidence of disturbance).
4. Applicant shall submit baseline soil compaction sample locations and baseline compaction results to ODOE.
5. Applicant shall hold a kick-off meeting with their environmental contractor, construction contractor, and ODOE at least 14 days prior to initiation of restoration activities.
6. Applicant shall prepare a crosswalk of the final version of this Plan for use by the construction contractor. A copy of the Plan crosswalk will be provided to all participating parties prior to the kick-off meeting date.

Prior to initiation of revegetation, the following shall be completed:

1. Applicant shall hold a kick-off meeting with their environmental contractor, restoration contractor, and ODOE at least 14 days prior to initiation of restoration activities.
2. Applicant shall prepare a crosswalk of the final version of this Plan for use by the restoration contractor. A copy of the Plan crosswalk will be provided to all participating parties prior to the kick-off meeting date.
3. Applicant shall complete post-construction soil compaction testing and submit results for review and approval to ODOE.

Throughout construction, revegetation, and operation activities, the Applicant will take appropriate actions to prevent the spread of state and county listed noxious weeds. A stand-alone Draft Noxious Weed Control Plan has also been prepared (see Exhibit P, Attachment P-3), which contains information on state and Morrow County listed noxious weeds, noxious weeds observed during surveys, and treatment and monitoring of noxious weeds.

2.0 Site Description

The Facility includes a 10,960-acre site boundary within which all Facility components will be located. The Facility lies within the Columbia Plateau Ecoregion at elevations from approximately 879 to 1,440 feet. The Facility is sited entirely on private land, which primarily consists of agriculture land used for growing dryland wheat. Native vegetation within the site boundary has been modified primarily through agricultural conversion, but also through the introduction of exotic grasses and other non-native vegetation.

Habitat mapping and categorization of the site boundary were conducted for the Facility in 2022. Habitat types within the site boundary include Agriculture, Pasture, and Mixed Environs (habitat

subtype: Orchards, Vineyards, Wheat Fields, Other Row Crops); Urban and Mixed Environs; Upland Grassland, Shrub-steppe, and Shrubland (habitat subtypes: Eastside Grasslands, Sagebrush Shrub-steppe); Wetlands (habitat subtype: Emergent Wetlands); and Open Water-Lakes, Rivers, Streams (habitat subtype: Intermittent or Ephemeral Streams). Details on habitat types, subtypes, and categories can be found in Exhibit P of the Facility's ASC, especially Attachment P-1 which contains the biological survey reports. Details on potential impacts to habitat from construction and operation of the Facility, as well as avoidance and minimization measures, can be found in the ASC Exhibits P and Q.

3.0 Description of ~~Temporary and Permanent~~ Impacts

Construction of the Facility will result in up to about 58 acres of temporary and 9,442 acres of permanent impacts (see Exhibits C and P). Although actual impacts may change depending on the final layout, solar modules, and other associated facilities, this value represents the estimated maximum acreage of impact. Exhibit P details the acres of each habitat subtype that will be temporarily and permanently disturbed during construction and operation of the Facility.

All areas within the solar array fence line area are considered a permanent impact and will be ~~mitigated as such in the Habitat Mitigation Plan (HMP; Exhibit P, Attachment P-2)~~revegetated for the purposes of site stabilization to reduce erosion, dust pollution, and topsoil depletion, and to reduce potential for invasion by noxious and invasive plants. The entire solar array fence line area will occupy approximately 9,441 acres within 20 fenced areas. As noted above, this area is considered permanently impacted; however, vegetation within the solar array fence line area will be retained and/or revegetated and this area would be reclaimed upon retirement.

Temporary impacts will occur in areas outside the solar array fence line area that will be disturbed during construction activities, but which will not be occupied by permanent facilities. Temporary disturbance will occur in association with the construction of aboveground and underground collector and transmission lines, new roads, and perimeter fence line. ~~The entire solar array fence line area will occupy approximately 9,441 acres within 20 fenced areas. As noted above, this area is considered permanently impacted; however, vegetation within the solar array fence line area will be retained and/or revegetated, providing residual (and in some cases increased) wildlife and ecological value during operation of the Facility and this area would be reclaimed upon retirement.~~

Prior to construction, a crosswalk of the final version of this Plan will be prepared for use by the construction contractor prior to construction to facilitate Plan implementation and ensure ground disturbance is minimized to the extent practicable. A kick-off meeting with the Applicant, their environmental contractor, construction contractor, and ODOE will be held at least 14 days prior to construction. A copy of the Plan crosswalk will be provided to ODOE staff prior to the kick-off meeting date. Staff from either the Applicant or their environmental contractor will field-verify anticipated disturbance levels are followed to the extent possible, and will document any variances and the justifications for those variances for ODOE review.

3.1 Disturbance Levels

Revegetation needs will be determined by a combination of disturbance level and existing vegetative cover. Disturbance levels will primarily be determined by site conditions such as slope, gradient, and existing vegetation. Disturbance levels are defined as follows:

Level 1 - Mowing: Mowing is used to conserve vegetative resources within a large project area. Vegetation is mowed to a height of generally 12 inches, but no less than 6 inches during construction. Depending on site objectives, vegetation can be allowed to reach a normal height or kept trimmed to a height between 6 inches and the plant's full height potential. Crushing of vegetation will be minimal and this disturbance level is designed to have a minimal impact on existing vegetation. This method is least likely to result in invasions of undesirable plant species.

Level 2 – Overland Drive and Crush: Disturbance caused by accessing a site without significantly modifying the landscape. Vegetation is crushed but not cropped. No surface soil is removed. Even though vegetation may be damaged and even destroyed, the surface soil and seed bank remains in place. Some crushed vegetation will likely sprout after disturbance ceases. These activities would result in minimal to moderate disturbance. This type of disturbance will result in the fastest recovery time for vegetation. Soil seed banks remain largely in place, perennial vegetation can grow back, and minimal external efforts are necessary. This method is less likely to result in invasions of undesirable plant species. This would involve crushing or mowing vegetation typically to the ground surface.

Level 3 – Clear and Cut: Disturbance caused by accessing the project site but having to remove all vegetation in order to improve or provide suitable access for other equipment. All vegetation is removed, soils are compacted, but no surface soil is removed. Clear and cut activities would result in moderate disturbance. This type of disturbance will result in moderate recovery times for vegetation. This method has a moderate risk for invasion of undesirable plant species. An example is imprinting to crush vegetation down into the soil.

Level 4 – Clear and Cut with Soil Removal: Disturbance is caused by removing all vegetation in the impact zone, the soils are compacted and the surface soil is displaced, and for Facility components requiring underground installation, the subsurface soils are displaced as well. These activities result in heavy disturbance. This type of disturbance results in an extensive recovery time for vegetation, and is most likely to lead to invasions of undesirable plant species, which can result in lengthy and expensive control efforts. Includes disc-and-roll construction, and other traditional construction methods where no vegetation is left intact.

3.1.1 Facility Disturbance

To the maximum extent practicable, Level 1 and Level 2 disturbance will be used. ~~e~~Existing vegetation root systems (e.g., crop stubble, fallow vegetation) will be left intact during construction, although construction vehicles driving across the site may affect these existing root systems. Grading within solar arrays will be limited to areas where the slope and gradient are outside of panel and racking tolerances (10 percent maximum on North slopes and 15 percent maximum in other directions). Areas where the slope and gradient are within the solar panel and racking

tolerances will receive minimal grading, with grading in those areas limited to the roads, inverter, and energy storage footprints only. This preservation of existing root systems will minimize soil erosion, providing both improved compliance with stormwater and dust management requirements, facilitate revegetation success, and preserve soil productivity for future agricultural use. Construction will be coordinated and sequenced with landowners to maintain land in current production and weed control until just prior to construction. This will avoid land being left unmanaged and minimize weed issues that can complicate revegetation.

Prior to construction, the Applicant will provide maps and shapefiles showing anticipated construction disturbance levels at the Facility, along with the total acreage and major activities associate with each level. This will serve to demonstrate the Applicant's avoidance and minimization of ground disturbing activities to the extent practicable

.

Table 1 presents the estimated maximum acreage of temporary and permanent impacts to habitat subtypes associated with Facility construction and operation. Table 1 will be updated prior to construction to reflect the final impact acreage by habitat subtype for the final layout. Figures depicting the location of Facility infrastructure are included in Exhibit C, and a figure depicting ~~these~~ habitat subtypes within the site boundary is available in Exhibit P.

Table 1. Maximum Temporary and Permanent Impacts by Habitat Subtype

ODFW Habitat Category	Habitat Subtype	Permanent ~~Disturbance~~ Impact (Acres)[1, 2]	Temporary Disturbance (Acres) [1]
2	Eastside Grasslands	<0.1	0.4
4	Intermittent or Ephemeral Streams	-	<0.1
4	Eastside Grasslands	17.9	2.7
5	Eastside Grasslands	18.5	2.2
Category 2, 4, and 5 Habitat Total		**36.4**	**5.3**
6	Orchards, Vineyards, Wheat Fields, Other Row Crops	9,397.4	51.3
	Urban and Mixed Environs	7.7	1.2
Category 6 Habitat Subtotal		**9,405.1**	**52.6**
Grand Total[1]		**9,441.5**	**57.8**

Note: Totals in this table may not appear to sum correctly due to rounding. "-" means no impact while <0.1 means greater than zero but less than 0.05 acre impact.

1. Additional details associated with temporary and permanent impacts are provided in Exhibit C of the ASC.

2. Acres of permanent ~~disturbance~~ impact includes the entire area within the solar array area fence line including the footprints of all solar components and supporting facilities, as well as the areas outside of the footprint of permanent components and facilities (e.g., areas underneath and between rows of solar panels).

4.0 Reclamation and Revegetation Methods

This plan addresses revegetation methods for temporary impacts to non-agriculture (i.e., Orchards, Vineyards, Wheat Fields, Other Row Crops habitat subtype) and non-developed (i.e., Urban and Mixed Environs habitat subtype) habitat types, as well as revegetation and vegetation management of lands within the solar array fence line area. Restoration of temporarily disturbed developed habitat (i.e., Urban and Mixed Environs habitat subtype) will be determined on a case-by-case basis and is not covered further in this plan. Temporary disturbances to agricultural habitat (i.e., Orchards, Vineyards, Wheat Fields, Other Row Crops habitat subtype) will be restored as described in Section 4.5.1~~2~~. The Applicant will restore temporarily disturbed areas by re-establishing slope, surface stability, and drainage features, as needed, followed by soil preparation and seeding. Soil preparation and seeding techniques are described below.

Revegetation will begin as soon as feasible after completion of each construction phase. Seeding and planting will be done in a timely manner and in the appropriate season to facilitate germination and establishment of seeded species.

Prior to construction, final revegetation methods will be developed for each disturbance level in consultation with ODOE, ODA, ODFW, and the Morrow County Weed Department and will be incorporated as an amendment to this Plan upon ODOE approval.

4.1 Roles and Responsibilities

A construction contractor qualified to perform restoration and revegetation will be responsible for implementing the measures in the National Pollutant Discharge Elimination System (NPDES) 1200-C permit, as well as the revegetation activities discussed herein during and immediately after construction. A qualified botanist or revegetation specialist will be responsible for monitoring and reporting on revegetation success. Remedial revegetation actions, if needed during the operation phase, will be performed by a qualified contractor. The Applicant will be responsible for ensuring that all contractors perform work in accordance with permit requirements and all agreed upon methods for revegetation.

The goal of this plan is to increase the probability of revegetation success, reduce early weed establishment, reduce erosion and dust pollution, and protect topsoil for future agricultural use in permanent impact areas, and ensure no loss of habitat quality for temporary disturbances to wildlife habitat. To ensure this goal is met, the Applicant will ensure that the contractor selected for revegetation will be a qualified restoration and seeding contractor with demonstrated experience in the Columbia Plateau. Options for contracting and managing this work include:

- Having the construction contractor subcontract the revegetation work out to a qualified restoration and seeding contractor. The contract will stipulate the Applicant's right to dictate the timing, methods, and management of seeding.
- Contracting directly with the qualified restoration and seeding contractor, with the power to contractually enforce seed timing and methods.

- Having the environmental contractor contract with the qualified restoration and seeding contractor, with the power to contractually enforce seed timing and methods.

The restoration and seeding contractor's qualifications and scope of work will be provided as a submittal to ODOE prior to construction. Additionally, a crosswalk of the final version of this Plan will be prepared for use by the restoration contractor prior to initiation of revegetation to facilitate Plan implementation. A kick-off meeting with the Applicant, their environmental contractor, restoration contractor, and ODOE will be held at least 14 days prior to initiation of restoration activities. A copy of the Plan crosswalk will be provided to ODOE staff prior to the kick-off meeting date. Staff from either the Applicant or their environmental contractor will field-verify seeding methods and timing requirements are followed appropriately, and will document any variances and the justifications for those variances. Monitoring and follow-up will be provided as described in Section 6.0 to ensure oversight and increase the probability of revegetation success.

4.2 Soil Reclamation

Soil scientists use a soil penetrometer to field measure subsurface compaction in soil. This tool measures resistance (pressure) to the advance of a cone-tipped rod with a T-handle, vertically through the soil column. The metric intends to measure soil compaction that can inhibit the ability of plants to penetrate the soil. An operator pushes the penetrometer rod with a cone base into the ground with consistent force. A pressure gauge records pressure in pounds per square inch, equaling levels of resistance at differing soil layers. Resistance is measured at 3-inch intervals until the meter goes above 300 psi, which is a level of soil compaction most roots cannot penetrate. For this test compaction would be measured at 3, 6, 9, and 12 inches if the soils allowed. Baseline soil compaction measurements will be taken prior to construction. Baseline soil compaction sample locations and baseline compaction results will be submitted to ODOE prior to construction.

1. Baseline and post-construction soil compaction measurements and testing must be done in conditions favorable to soil testing (e.g. non-saturated or frozen soils).
2. Baseline soil compaction measurements will be documented and established by using the above protocol, or other protocol as approved by ODOE, to establish baseline soil conditions within temporary impact areas.
3. Recordation of the baseline soil plots must be represented on a map based on final Facility design.
4. Prior to construction completion at the Facility site and prior to the initiation of revegetation activities, soil compaction testing following the above protocols must be completed.
5. If soil measurements demonstrate that the soils within the work areas are more than 10 percent compacted than the baseline plot, then remediation activities must be completed prior to initiation of revegetation activities. See Section 6.4 below, the Facility NPDES 1200-C permit, and applicable site certificate conditions.

In addition, in areas where soil is removed during construction, the following measures will be taken where appropriate:

- During construction, excavated soils will be stockpiled by soil horizon, so that they can be replaced in proper order with the topsoil on the surface, preventing mixing of topsoil and subsoils and maintaining soil productivity. The conserved soil will be put back in place as topsoil prior to revegetation activities. The conserved soil will be put back in place as topsoil prior to revegetation activities.
- Soil preparation will involve standard, commonly used methods (i.e. tracking, decompaction, and tilling), and will consider all relevant site-specific factors, including slope, size of area, and erosion potential.
- Topsoil and other soils from noxious weed infested areas will not be moved outside of the infested areas and will be returned to their previous location during reclamation activities to eliminate the transport of weed seeds, roots, or rhizomes.
- Soils from weed-infested areas will be treated with a non-persistent, pre-emergent herbicide prior to initiation of revegetation efforts, depending on site-specific conditions.
- Prior to final regrade and revegetation efforts, any weeds that have grown during periods of construction dormancy should be removed mechanically or treated with an herbicide in consultation with the Morrow County Weed Department.
- The construction contractor will use appropriate erosion and sediment control practices (i.e., unseeded hydromulch, tackifier, weed-free erosion control blankets, weed-free or locally sourced straw mulch) to maintain topsoil during construction in both temporary and permanent impact areas.

4.3 Site Preparation

As noted above, existing vegetation root systems (e.g., crop stubble, fallow vegetation) will be left intact during construction to the maximum extent practicable. Areas where the slope and gradient are within the solar panel and racking tolerances will receive minimal grading, with grading in those areas limited to the roads, inverter, and energy storage footprints only. In areas where soil is removed during construction, the Applicant will demonstrate adequate soil stabilization to prevent erosion and dust pollution. The following measures will be taken where appropriate:

- Site preparation will involve standard, commonly used methods, and will take into account all relevant site-specific factors, including slope, size of area, and erosion potential.
- Areas of severe machine or vehicle tracking that would hinder seeding success and are unnecessary for soil stabilization will be regraded.
- In the spring, fall or winter of the year prior to when construction would occur, areas of high erosion risk (e.g., slopes, areas with low vegetative cover) should be seeded with a non-invasive, non-persistent cover crop such as triticale to demonstrate soil stabilization.

- Prior to seeding and/or planting of revegetation areas, soils will be prepared to facilitate revegetation success.
- If soils are not suitable, soil amendments may be required. Any imported topsoil, if required, will be demonstrated to be suitable for vegetative success.
- Where applicable, soils will be mechanically scarified (e.g., tilling or ripping the soil) to an appropriate depth to reduce the potential effects of compaction, to maintain soil productivity, and reduce the potential for erosion on compacted soils.
- In general, the soil needs to be prepared into a firm, fine-textured seedbed that is relatively free of debris before seeding or planting. Shallow tilling with a disc, followed by a harrow or drag if necessary, can typically achieve this. If replaced soil is too soft, then seeds may be buried too deep to properly germinate; a roller or culti-packer should be used to pack down the soil.
- In non-cropland temporary disturbance areas, site complexity will be considered during soil preparation. For instance, it may be desirable to purposely create an uneven, patchy site that allows for depressions and other microsites that result in small variations in aspect and moisture holding to promote complexity.
- Seeded areas will be temporarily stabilized to facilitate establishment. This can be accomplished by application of seedless, certified weed-free hydromulch containing a tackifier. Alternate methods such may be proposed by the revegetation contractor but will require prior written approval by ODOE and must provide demonstrated success in sites with similar wind and soil conditions.
- The Applicant or a designated construction contractor will use mulching and other appropriate practices, as required by the anticipated NPDES 1200-C permit, to control erosion and sediment during construction and revegetation work.

4.4 Revegetation of Permanent Impact Areas

During construction, the Applicant will implement site stabilization measures, including seeding of all disturbed areas according to the Applicant's anticipated NPDES 1200-C permit. Approximately 6 months prior to commercial operation of each phase of construction, the Applicant will meet with ODFW, ODOE, and Morrow County Weed Department personnel to review the actual extent and conditions of impacted areas and confirm the revegetation methods to be implemented.

After the site has been prepared for installation of facility components (i.e., grading is complete), but prior to installation, all areas with less than 70 percent vegetative cover should be seeded with a non-invasive, non-persistent cover crop (e.g., triticale). Establishment of a cover crop at this stage of construction will stabilize soils and suppress noxious weed infestations to reduce erosion and facilitate revegetation of desired plant species.

Following the completion of each construction phase, permanent impact areas will be reseeded with a mix of native or non-invasive, non-native grasses and forbs as appropriate based on

disturbance level and actual site conditions (see Section 4.4). All seeds will be obtained from a reputable supplier in compliance with the Oregon Seed Law (OAR 603-056). ~~while t~~The final seed mix for areas within the solar array fence line area will include lower growing grasses and pollinator-friendly forbs compatible with desired vegetation conditions under the solar arrays (i.e., species whose mature height would not interfere with or shade the solar array).

4.5 Restoration of Temporary Disturbance Areas

~~4.1.1~~4.5.1 ~~Revegetation of Temporarily Disturbed~~ Agricultural Lands

Temporarily disturbed agricultural lands will be reseeded with the appropriate crop or maintained as fallow in consultation with the landowner or farm operator. The Applicant will also consult with the landowner or farm operator to determine seed mix, application methods, and rates for seed and fertilizer. Success of cropland revegetation will have been achieved when production of the revegetated area is comparable to that of adjacent, non-disturbed croplands of the same type.

Dryland croplands will be reseeded to match the timing of the crop rotation on adjacent cropland in order to facilitate easy harvest and re-establish the appropriate crop rotation on that land. Dryland cropland that will be seeded in the year that construction is complete can be temporarily hydromulched or otherwise stabilized until seeding can occur in the fall; dryland cropland that will be fallow for a year (i.e., fallow rather than reseeded the year construction is complete) will be planted with a cover crop (dependent on timing of construction closeout) or have continued stabilization with hydromulch or other best management practices (BMPs) through the fallow year.

Soil compaction as a result of construction activity is a concern for restoring agricultural soils to their pre-construction productivity. Within temporary disturbance areas, the Applicant will excavate and store soils by soil horizon, so that soils are replaced and restored appropriately, including replacing topsoil. During post-construction restoration of temporary impacts to agricultural areas, the Applicant will loosen agricultural soil by mechanical scarification (tilling or ripping the soil) to an appropriate depth to reduce the potential effects of compaction. Soil amendment, by addition of organic matter (compost), may also be necessary to alleviate compaction.

Success determination will involve consultation with the landowner or farm operator, and the Applicant will report to ODOE on the success of cropland restoration efforts. Noxious weed control is necessary for successful revegetation of croplands and will be implemented per the methods described in the Draft Noxious Weed Control Plan (Exhibit P, Attachment P-3).

~~4.1.2~~4.5.2 ~~Revegetation of Other~~Wildlife Habitat

During construction, the Applicant will implement site stabilization measures, including seeding of temporarily disturbed areas according to the Applicant's anticipated NPDES 1200-C permit. Approximately 6 months prior to commercial operation of each phase of construction, the Applicant will meet with ODFW, ODOE, and Morrow County Weed ~~Control Authority~~Department personnel to

review the actual extent and conditions of temporarily impacted areas, confirm the revegetation methods to be implemented, and to revisit reference sites as necessary.

Following each construction phase, all areas, with the exception of temporarily disturbed agricultural lands, will be reseeded with a mix of native or non-invasive, ~~non-persistent~~ non-native grasses and forbs (see Section 4.6~~3.2~~). All seeds will be obtained from a reputable supplier in compliance with the Oregon Seed Law (~~Oregon Administrative Rule~~OAR 603-056). The methods used and timing of planting will be appropriate to the seed mixes, weather conditions, and site conditions (including area size, slope, and erosion potential) based upon consultation with ODOE, ODFW, ODA, and the Morrow County Weed Department.

The seed mixes may include species selected to enhance soil health, such as nitrogen-fixing species, if determined to be appropriate based on coordination with ODOE, ODA, and ODFW. Including these species in the seed mix would help the other plant species thrive and increase long-term survival of desired species. Additionally, the seed mixes include species intended to provide broader ecosystem benefits, such as pollinator species, that will benefit the surrounding landscape. The seed mix for temporarily disturbed areas outside of the solar array fence line area will include taller native species of grasses and pollinator-friendly forbs to increase overall site biodiversity and increase benefits to wildlife and pollinators~~,~~. ~~while the seed mix for areas within the solar array fence line area will include lower growing grasses and pollinator-friendly forbs compatible with desired vegetation conditions under the solar arrays (i.e., species whose mature height would not interfere with or shade the solar array).~~ Using native, or non-invasive non-native pollinator-friendly, plants as ground cover under solar panels can also help recharge groundwater, reduce erosion, and improve soil carbon sequestration (Neale and Atre 2020).

~~The seeding methods and timing of planting will be appropriate to the seed mixes (see Section 4.3.2), weather conditions (e.g., precipitation, wind speed, temperature, etc.), and site conditions (including area size, slope, and erosion potential) based upon consultation with ODFW, the Morrow County Weed Control Supervisor, and the seed supplier. Seeding between late-fall and late-winter/early-spring is typically recommended; however, the Applicant will consult with ODFW, Morrow County Weed Control, and/or the seed supplier to determine the optimal timing for seed application based on climatic conditions of the particular year when construction and revegetation efforts are implemented. Three common seed application methods that may be used are broadcast seeding, drill seeding, and hydroseeding; each of these are discussed further below. Other seeding methods may be proposed for review and approval prior to revegetation efforts.~~

4.6 Seeding Methods

The seeding methods and timing of planting will be appropriate to the seed mixes (see Section 4.6), weather conditions (e.g., precipitation, wind speed, temperature, etc.), and site conditions (including area size, slope, and erosion potential) based upon consultation with ODOE, ODA, ODFW, the Morrow County Weed Department, and the seed supplier. Seeding between late-fall and late-winter/early-spring is typically recommended; however, the Applicant will consult with ODOE, ODFW, ODA, Morrow County Weed Department, and/or the seed supplier to determine the optimal

timing for seed application based on climatic conditions of the particular year when construction and revegetation efforts are implemented.

The three common seed application methods that ~~that~~ may be used for revegetation are broadcast seeding, drill seeding, and hydroseeding; each of these are discussed further below. Other seeding methods may be proposed for review and approval prior to revegetation efforts.

~~4.1.2.1~~4.6.1.1 *Broadcast Seeding*

Broadcast seeding is the application of seed directly to the ground surface. This method may be chosen for areas with shallow and rocky soils, and the type of broadcast spreader would depend on the size of the area to be seeded and the terrain.

In this method, the seed mix would be broadcast using at least the application rates specified by the seed supplier for broadcast seeding. When feasible, due to the seasonality of when planting can occur, the entire area will be seeded after grading is complete but before placement of Facility components, providing more flexibility in seed application. In those instances where seeding occurs prior to installation of components, follow-up seeding will occur in areas temporarily disturbed by installation and any areas that are deficient in vegetation from the first round of seeding. Immediately following seed application, hydromulch or certified weed-free straw would be applied. Broadcast seeding will not be employed if winds exceed 5 miles per hour. If certified weed-free straw is unavailable, the Applicant or a designated construction contractor will identify a local source of straw. The local source of the straw will be approved by the county weed master and ODFW prior to purchase. This straw will either be crimped into the ground or applied with a tackifier.

~~4.1.2.2~~4.6.1.2 *Drill Seeding*

Drill seeding can be used for larger areas with deeper soils and moderate to gentle terrain to accommodate mechanical equipment. This method provides the advantage of planting the seed at a uniform depth and may provide better soil to seed contact. Using a range seed drill, seeds will be sown according to the application rates recommended by the seed supplier. Drill seeding will be difficult after Facility components have been installed so it will primarily be used if seeding occurs after grading is complete but before components are installed or in areas that were temporarily disturbed during construction that do not have any permanent infrastructure (e.g., temporary access roads, laydown areas).

~~4.1.2.3~~4.6.1.3 *Hydroseeding*

Hydroseeding is most applicable for areas drill or broadcast seeding machinery cannot access, this usually includes steeper sloped or narrow terrain, but can be used in all terrains. Soil bed preparation is also crucial for growth success and frequently includes tracking perpendicular to the slope to create micro conditions for seed. Flat grading and compaction are not recommended. Seeding rates increase by 30 to 50 percent of broadcast seeding rates or single applications per consultation with the seed supplier and ODFW. Prior to hydroseeding the tackifier and fertilizer, if included, will be reviewed and approved in consultation with ~~ODFW~~ODOE.

~~4.2~~4.7 Seed Mixes

Two seed mixes are proposed for revegetation efforts: one for revegetation of temporarily disturbed areas outside the solar array fence line ~~area~~, and one for revegetation of permanent impact areas within the solar array fence line ~~area~~. Tables 2 and 3 present example seed mixes that would be considered for revegetation. However, the number of seed mixes and composition of the final seed mixes will be determined in consultation with ODOE and ODFW and will be based on pre-construction conditions and the availability of seed at the time of procurement.

Grassland Seed Mix #1 would be appropriate for revegetation of temporarily disturbed areas outside the solar array fence line area, with the exception of areas that would be returned to agricultural production following construction (as noted in Section 4.5.1~~2~~). The example seed mix is presented in Table 2 and contains a mixture of native grasses and native, pollinator-friendly forbs. This seed mix includes a mixture of deep-rooted grasses and flowering plants as these types of species can capture and filter stormwater, build topsoil, and provide food sources and for native insects (Davis 2021). Forbs included in this seed mix were also chosen based on their bloom period. Including plants that flower throughout the growing season provides a continuous source of nectar and pollen and can attract a variety of pollinators (NRCS 2011).

Table 2. Example Grassland Seed Mix #1

Growth Habit	Common Name	*Scientific Name*	Percent of Mix
Grasses	Bluebunch wheatgrass[1]	*Pseudoroegneria spicata*	35
	Sandberg's bluegrass[2]	*Poa secunda* ssp. *secunda*	15
	Bottlebrush squirreltail	*Elymus elymoides*	10
	Needle-and-thread grass[3]	*Hesperostipa comata*	10
Forbs	Curlycup gumweed	*Grindelia squarrosa*	5
	Hoary aster	*Dieteria* (*Machaeranthera*) *canescens*	5
	Lupine	*Lupinus leucophyllus, L. sericeus, L. sulphureus*	5
	Munro's globemallow[4]	*Sphaeralcea munroana*	5
	Western blue flax	*Linum lewisii*	5
	Yarrow	*Achillea millefolium*	5

1. An alternative to bluebunch wheatgrass is Snake River wheatgrass (*Elymus wawawaiensis*; also sold as "Secar" bluebunch wheatgrass).
2. An alternative to Sandberg's bluegrass is big bluegrass (*Poa secunda* subsp. *juncifolia*; also sold as *P. ampla*).
3, Alternatives to needle-and-thread grass include the native bunchgrass Indian ricegrass (*Achnatherum* [*Oryzopsis*] *hymenoides*) or the non-native bunchgrasses crested wheatgrass (*Agropyron cristatum*) and sheep/hard fescue (*Festuca ovina/F. trachyphylla*).
4. An alternative to Munro's globemallow is blanketflower (*Gaillardia aristata*)

A second grassland seed mix, Grassland Seed Mix #2, is suggested for post-construction revegetation within the solar array fence line area, including areas that previously consisted of agricultural lands. The example seed mix presented in Table 3 contains a mixture of low-growing native and non-native grasses and native and non-native pollinator friendly forbs which would be

compatible with desired vegetation conditions under the solar arrays (i.e., species whose mature height would not interfere with or shade the solar array). Similar to Grassland Seed Mix #1, this seed mix includes a mixture of deep-rooted grasses and flowering plants that flower throughout the growing season.

Table 3. Example Grassland Seed Mix #2

Growth Habit	Common Name	*Scientific Name*	Percent of Mix
Grasses	Sandberg's bluegrass	*Poa secunda* ssp. *secunda*	35
	Bottlebrush squirreltail, common squirreltail	*Elymus elymoides* ssp. *elymoides*	15
	Desert fescue[1]	*Vulpia microstachys*	10
	Thurber's needlegrass	*Achnatherum thurberianum*	10
Forbs	Pacific lupine[2]	*Lupinus lepidus*	5
	Bigseed bisuitroot[3]	*Lomatium macrocarpum*	5
	Erigeron/fleabane	*Erigeron filifolius, E. linearis,* or *E. pumilus*	5
	Oregon sunshine	*Eriophyllum lanatum*	5
	Snow buckwheat	*Eriogonum niveum*	5
	Wollypod milkvetch	*Astragalus purshii*	5

1. Alternatives to desert fescue are sixweeks fescue (*Vulpia octoflora*) or sheep/hard fescue (*Festuca ovina/F. trachyphylla*).
2 Alternatives to Pacific lupine are American vetch (*Vicia americana*) or clover (*Trifolium macrocephalum, T. pratense, T. repens*).
3. An alternative to bigseed biscuitroot is longleaf phlox (*Phlox longifolia*).

5.0 Revegetation Documentation

Records will be kept of revegetation efforts in all temporary and permanent impact areas~~, both for agricultural lands and other habitat~~. Records will include:

- Date construction phase was completed;
- Acreage of each disturbance level;
- Description and photos of the affected area;
- Date revegetation was initiated;
- Description of the revegetation effort, including methods and timing;
- Supporting figures representing the location, acres affected, and pre-disturbance condition of the revegetation area; and
- Confirmation from the landowner that temporary disturbances in cropland have been satisfactorily restored.

The Applicant will meet with ODOE at least 14 days prior to initiation of revegetation efforts. The Applicant will update ODOE with these records ~~periodically~~ monthly as revegetation work occurs, and will provide ODOE with copies of these records along with submission of the monitoring report that is required by the Site Certificate.

6.0 Monitoring

6.1 ~~Revegetation Monitoring~~Monitoring of Permanent Impact Areas

~~As noted in Section 3.0, a~~In accordance with the Applicant's anticipated NPDES 1200-C permit all areas within the solar array fence line area must be revegetated to stabilize soils for the purposes of erosion and dust pollution control.~~are considered a permanent impact and will be mitigated as such in the HMP (Exhibit P, Attachment P-2).~~ Pursuant to OAR 345-022-0022, construction and operation of the Facility must not result in significant adverse impacts to soils, including but not limited to, erosion. Pursuant to MCZO 3.010.K.3.f.(3), construction or maintenance activities shall not result in the unabated introduction or spread of noxious weeds and other undesirable weed species. Therefore, ~~no~~ monitoring is required ~~for revegetation of this area~~to demonstrate compliance with the above site stabilization and weed control requirements. ~~However, t~~The Applicant will conduct ~~periodic~~ monitoring within ~~this area~~ permanent impact areas to assess the ~~following~~following ~~site conditions~~:

- Dominant s~~S~~pecies composition;
- Relative ~~and percent~~ cover of ~~-~~ desirable and undesirable ~~native~~ forbs and grasses ~~and grasses~~;
- Percent cover of bare soil;
- Degree of erosion;
- ~~Percent cover of~~Presence noxious weeds; and
- ~~-~~Qualitative assessment of overall vigor of vegetation within revegetated areas.
-

Monitoring methods will be determined in consultation with ODOE prior to construction and will be incorporated as an amendment to this plan upon ODOE approval. Monitoring will be conducted by a qualified botanist or revegetation specialist and will begin within 60 days of the completion of the initial site restoration effort. Monitoring will be conducted at least once per season during the first year following construction. After the first complete year of monitoring, the Applicant will consult with ODOE to determine if the monitoring cycle can be reduced based on revegetation progress. After five years of monitoring, the Applicant will design a long-term monitoring plan in consultation with ODOE.

6.1.1 Success Criteria

Success criteria outlined below will demonstrate compliance with the soil protection standard (OAR 345-022-0022); ~~and~~ NPDES 1200-C permit requirements; and the requirements of MCZO 3.010.K.3.f.(4):

Establish uniform (i.e., evenly distributed, without large bare areas) perennial, non-invasive vegetation that provides 70 percent or more cover on all exposed areas.

-

Requirements of the soil protection standard and MCZO 3.010.K.3.f.(4) apply to the construction and operation of the Facility. Therefore, the Applicant shall maintain compliance with the revegetation success criteria for all areas within the solar array fence line for the life of the Facility. In each monitoring report, the Applicant will include an assessment of whether the area within the solar array fence line is meeting or trending toward meeting the revegetation success criteria. Final determination of whether the Applicant is in compliance with the revegetation obligations will be made by ODOE. Remedial actions and/or additional monitoring for areas may be required in areas that have been determined by ODOE not to have met the success criteria.

6.1.2 Reporting

Monitoring reports will be prepared and submitted to ODOE once per season during the first year following construction. After the first year of monitoring is complete, the reporting cycle will be modified to align with the new monitoring cycle determined in consultation with ODOE.

Each monitoring report will include:

- The first monitoring report will include a detailed description and timeline of site restoration methods that were implemented including species, amounts, and locations of the seed applications and dates restoration work was performed;
- GIS maps of revegetation areas and disturbance levels;
- Monitoring methods;
- Local climatic data (i.e., precipitation, temperature) for the monitoring month and year and percent deviation from the historical average;
- The results of the monitoring efforts;
- The investigator's assessment of whether the revegetated areas are trending toward meeting the success criteria;
- Assessments of factors impacting the ability of the revegetated area to trend towards meeting the success criteria; and
- Recommendations of remedial actions, if any.
-

~~6.1~~6.2 Monitoring of Tempora~~rily~~ry Disturbance ~~Disturbed Revegetated~~ Areas

Following implementation of revegetation efforts, the Applicant will monitor the temporarily disturbed areas that have been revegetated as described in this section, unless the landowner has converted the area to land uses that preclude meeting revegetation success criteria. Monitoring will be conducted by a qualified botanist or revegetation specialist and will begin within 60 days of the completion of the initial site restoration effort. Monitoring will be conducted at least once per season during the first year following construction. After the first complete year of monitoring, the Applicant will consult with ODOE to determine if the monitoring cycle can be reduced based on revegetation progress. After five years of monitoring, the Applicant will design a long-term monitoring plan in consultation with ODOE. ~~Monitoring will be conducted by a qualified botanist or revegetation specialist; this monitoring will be done annually for 5 years, starting in the first growing season after seeding.~~ Monitoring methods will be determined in consultation with ODOE and ODFW prior to construction and will be incorporated as an amendment to this plan upon ODOE approval.

~~Following annual monitoring, a monitoring report will be prepared and will include:~~

- ~~The results of annual monitoring;~~
- ~~The investigator's assessment of whether the revegetated areas are trending toward meeting the success criteria;~~
- ~~Assessments of factors impacting the ability of the revegetated area to trend towards meeting the success criteria; and~~
- ~~Recommendations of remedial actions, if any.~~

~~The Applicant will report the investigator's findings and recommendations regarding wildlife habitat recovery and revegetation success in the Facility's annual report required per Oregon Administrative Rules 345-026-0080. Based on the fifth annual assessment, a long-term monitoring plan will be developed in coordination with ODOE and ODFW.~~ This may include remedial actions and/or additional monitoring for areas that have been determined by ODOE, in consultation with ODFW, not to have met the success criteria.

~~6.1.1~~6.2.1 *Reference and Monitoring Sites*

To determine if the revegetation of temporarily disturbed areas are meeting success criteria. (see Section 6.1.~~1.~~1~~2~~), paired monitoring and reference sites will be established in each of the habitat subtypes that will be temporarily disturbed by construction (with the exception of agricultural land). Reference sites are intended to represent target conditions for the revegetation effort. Vegetation within monitoring sites in revegetation areas will be compared with those in the associated reference sites to measure success of the revegetation activities. During each assessment, revegetated areas will be compared to reference sites based on the success criteria defined in Section 6.2~~1.1~~.1~~2~~.

Per ODFW recommendations on other projects, a minimum of one monitoring site will be located within habitats where temporary disturbances will be less than 5 acres in size. Therefore, one monitoring site and one reference site will be established within each habitat category of temporarily disturbed Eastside Grasslands habitat subtype for a total of three monitoring sites and three reference sites. Preliminary locations of monitoring and reference sites are provided on Figure 1. No monitoring site is proposed for the less than 0.1 acre of temporary impact anticipated to the Intermittent or Ephemeral Streams habitat subtype, although this area will be revegetated if not avoided during final design. Monitoring and reference sites within each habitat subtype and category were selected using existing habitat mapping. Additional monitoring locations were also chosen within areas of temporarily disturbed Category 4 and 5 Eastside Grasslands habitat subtype as alternative locations in case one of the selected monitoring or reference site locations is deemed unacceptable during the first revegetation monitoring effort. No alternative monitoring or reference site locations were chosen for temporarily disturbed Category 2 Eastside Grasslands habitat subtype because all 0.4 acres of temporary impacts to this habitat subtype and category are located in one area.

~~*6.1.2*~~*6.2.2 Success Criteria*

In each monitoring report, the Applicant will include an assessment of whether the temporarily disturbed revegetated areas are meeting or trending toward meeting the success criteria. Revegetation areas would be deemed successfully revegetated when the success criteria outlined below are met. Success criteria were based on pre-disturbance conditions observed during habitat mapping conducted for the Facility (Exhibit P, Attachment P-1). Final determination of whether the Applicant has met the revegetation obligations will be made by ODOE, in consultation with ODFW.

Temporarily disturbed areas will be deemed successfully revegetated when the habitat quality at a monitoring site is equal to or surpasses the habitat quality at the associated reference site, as follows:

- **Native Forbs:** Cover of native and desirable (i.e., species included in seed mixes and/or native species that have naturally colonized) forbs ~~should~~ will be at least 75 percent of the reference site within 5 years. ~~Diversity~~ Richness of native and desirable forbs ~~should~~ will be at least equal to the ~~diversity~~ richness of native forbs measured on the reference site within 5 years.
- **Native and Desirable Grasses:** Cover and ~~richiness~~richness of native and desirable (i.e., species included in seed mixes and/or native species that have naturally colonized) grass species ~~is~~ will be at least 85 percent ~~similar to~~of the reference site within 5 years.
- **Noxious Weeds:** Presence and cover of noxious weeds is ~~equal to~~75 percent or less than that of the reference site.

6.2.3 Reporting

Monitoring reports will be prepared and submitted to ODOE once per season during the first year following construction. Each report will be delivered within the same season that the monitoring was conducted. After the first year of monitoring is complete, the reporting cycle will be modified to align with the new monitoring cycle determined in consultation with ODOE.

Each monitoring report will include:

- The first monitoring report will include a detailed description and timeline of site restoration methods that were implemented including species, amounts, and locations of the seed applications and dates restoration work was performed;
- GIS maps of revegetation areas and disturbance levels;
- Monitoring methods;
- Local climatic data (i.e., precipitation, temperature) for the monitoring month and year and percent deviation from the historical average;
- The results of the monitoring efforts;
- Photos of sample plots and representative overview photos of restoration areas;
- The investigator's assessment of whether the revegetated areas are trending toward meeting the success criteria;
- Assessments of factors impacting the ability of the revegetated area to trend towards meeting the success criteria; and
- Recommendations of remedial actions, if any.

6.3 Remedial Action in Revegetation Areas

After each revegetation monitoring visit in either temporary or permanent disturbance areas, the Applicant's qualified investigator will report to the Applicant regarding the revegetation progress of each revegetation area. If applicable, the investigator will make recommendations to the Applicant for reseeding, weed control, or other remedial measures for areas that are not showing progress toward achieving revegetation success. The investigator will provide a description of factors that may be contributing to the lack of revegetation success. The Applicant will include the investigator's recommendations for remedial actions and the measures taken in the next monitoring report. ODOE may require reseeding or other remedial measures in cases where success criteria have not been met.

If a revegetation area is damaged by wildfire during the first 5 years following initial seeding, the Applicant will amend this plan, subject to ODOE approval, to restore the damaged area. The Applicant will continue to monitor and report on revegetation progress during the remainder of the 5-year period. The Applicant will report to ODOE and ODFW the area impacted by the fire (with a map or figure) within 72 hours of discovery.

6.4 Soil Reclamation Monitoring

Soil measurements conducted per Section 4.2 shall be evaluated to determine whether soils within disturbance areas are more than 10 percent compacted than the baseline plot. If results show soils are more than 10 percent compacted than the baseline plot then remediation activities must be completed before revegetation activities can begin. Prior initiation of revegetation, the Applicant will provide the results of soil compaction testing to ODOE. ODOE will authorize revegetation to begin when soils are 10 percent or less compacted than the baseline plot.

~~6.2 Monitoring of Revegetated Land within Solar Array Fence Line Area~~

~~As noted in Section 3.0, all areas within the solar array fence line area are considered a permanent impact and will be mitigated as such in the HMP (Exhibit P, Attachment P-2). Therefore, no monitoring is required for revegetation of this area. However, the Applicant will conduct periodic monitoring within this area to assess the following site conditions:~~

- ~~Species composition and percent cover of native forbs and grasses;~~
- ~~Percent cover of bare soil;~~
- ~~Degree of erosion;~~
- ~~Percent cover of noxious weeds; and~~
- ~~Qualitative assessment of overall vigor of vegetation within revegetated areas.~~

~~6.3 Remedial Action~~

~~After each monitoring visit, the Applicant's qualified investigator will report to the Applicant regarding the revegetation progress of each revegetation area. If applicable, the investigator will make recommendations to the Applicant for reseeding, weed control, or other remedial measures for areas that are not showing progress toward achieving revegetation success. The investigator will provide a description of factors that may be contributing to the lack of revegetation success. The Applicant will include the investigator's recommendations for remedial actions and the measures taken in that year's monitoring report. ODOE may require reseeding or other remedial measures in cases where success criteria have not been met.~~

~~If a revegetation area is damaged by wildfire during the first 5 years following initial seeding, the Applicant will work to restore the damaged area. The Applicant will continue to report on revegetation progress during the remainder of the 5-year period. The Applicant will report to ODOE and ODFW the area impacted by the fire (with a map or figure).~~

7.0 Plan Amendment

This Plan may be amended from time to time by agreement of the Applicant and the Oregon Energy Facility Siting Council (EFSC). Such amendments may be made without amendment of the site certificate. EFSC authorizes ODOE to agree to amendments to this plan. ODOE shall notify EFSC of

all amendments, and EFSC retains the authority to approve, reject, or modify any amendment of this plan agreed to by ODOE..

8.0 References

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Figures

Attachment H: Draft Habitat Mitigation Plan

Sunstone Solar Project

Draft Habitat Mitigation Plan

Prepared for

PINEGATE RENEWABLES
THE POWER OF TOMORROW™

Sunstone Solar, LLC

Prepared by

TETRA TECH

May 2024

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1.0 Introduction

Sunstone Solar LLC, a subsidiary of Pine Gate Renewables, LLC (Applicant), proposes to construct and operate the Sunstone Solar Project (Facility), a solar energy generation facility and related or supporting facilities in Morrow County, Oregon. The Facility site boundary encompasses approximately 10,960 acres and is located entirely on private land. The Facility will connect with the existing Umatilla Electric Cooperative (UEC) 230-kilovolt Blue Ridge Line.

This Draft Habitat Mitigation Plan (HMP) describes how the Applicant will mitigate for the unavoidable wildlife habitat impacts of the Facility and therefore, in conjunction with Exhibit P of the Application for Site Certificate (ASC), demonstrates how the Applicant will construct and operate the Facility consistent with the Oregon Department of Fish and Wildlife (ODFW) Fish and Wildlife Habitat Mitigation Policy, Oregon Administrative Rule (OAR) 635-415-0025. The Applicant has conducted habitat categorization surveys and other biological studies that inform habitat categorization in accordance with the ODFW Fish and Wildlife Habitat Mitigation Policy, and has avoided and minimized impacts to wildlife and habitat as described in Exhibit P of the ASC. The actual acres of impacts and the associated mitigation needs will be determined based on the final design by phase and included in an updated HMP prior to construction of any Facility phase. If impacts to all wildlife habitats (i.e., habitat categories 2 through 5) are avoided during final design, no habitat mitigation would be needed.

2.0 Temporary and Permanent Impacts

Construction and operation of the Facility will result in both permanent and temporary impacts to wildlife and their habitats, although these impacts have been minimized considerably as described in Exhibit P of the ASC. Due to the multi-year construction schedule of the Facility, both permanent and temporary impacts to fish and wildlife habitat will occur in phases over this time period.

Permanent impact areas are those that will be converted from the existing condition to a different condition for the life of the Facility. The entire solar array area fence line is considered permanently impacted and includes all solar components. Although it is considered permanently impacted, vegetation within the solar array area fence line will be retained and/or planted following construction and as a result there will be residual (and in some cases improved) value of these areas to wildlife.

Temporary impact areas include temporary impacts from the underground collector lines and transmission lines outside the solar array area fence line, as well as temporary impacts around the outside of the perimeter fencing. Restoration of the temporary impact areas will occur following construction, as will revegetation within portions of the solar array area fence line not occupied by permanent infrastructure. The duration of temporary impacts to habitat will vary by habitat subtype. For example, the recovery period for temporarily disturbed agricultural areas could be as short as 1 to 3 years and grasslands generally recover within 3 to 7 years. The Applicant will

restore temporary impact areas consistent with the Draft Revegetation Plan; ~~.~~therefore, temporary impacts will be mitigated through successful implementation of the Draft Revegetation Plan (Attachment P-4 to Exhibit P).

Table 1 lists the acres that will be permanently or temporarily impacted by the Facility based on the current design for all phases, organized by habitat category and subtype. These habitats are described in Exhibit P of the ASC and in the biological survey reports attached to Exhibit P (Exhibit P, Attachment P-1).

Table 1. Temporary and Permanent Impacts by Habitat Category and Habitat Subtype

Habitat Category	Habitat Subtype	Permanent Acres Impacted	Temporary Acres Impacted
2	Eastside Grasslands	<0.1	0.4
Total Category 2		**<0.1**	**0.4**
4	Intermittent or Ephemeral Streams	-	<0.1
	Eastside Grasslands	17.9	2.7
Total Category 4		**17.9**	**2.7**
	Eastside Grasslands	18.5	2.2
Total Category 5		**18.5**	**2.2**
6	Orchards, Vineyards, Wheat Fields, Other Row Crops	9,397.4	51.3
	Urban and Mixed Environs	7.7	1.2
Total Category 6		**9,405.1**	**52.6**
Grand Total		**9,441.5**	**57.8**

Note:
Totals in this table may not sum correctly due to rounding; "-" means no impact while <0.1 means greater than zero but less than 0.05 acres impact.

3.0 Methods for Calculating Mitigation

Table 2 shows the methods for calculating mitigation required for permanent impacts. No mitigation is proposed for temporary impacts beyond the restoration of habitat. No mitigation is required for impacts to Category 6 areas.

Prior to construction of any phase of the Facility, the Applicant will provide an estimate, in tabular format, of the acres of permanent impacts and mitigation ratios shown in Table 2 to provide an updated estimate of mitigation needs for that phase.

Table 2. Mitigation Calculation

Habitat Category	Permanent Impacts (acres)[1]	Mitigation Ratio[2]	Mitigation Need	Mitigation Description
Category 4	17.9	1:1	17.9	The mitigation goal for Category 4 habitat is to provide no net loss in quantity or quality. Mitigation can be in-kind or out-of-kind, in-proximity or off-proximity mitigation.
Category 5	18.5	0.5:1	9.3	The mitigation goal for Category 5 habitat is to provide net benefit in habitat quantity or quality. The mitigation strategy is actions that improve habitat conditions.
Grand Total	-	-	**27.2**	--

1. Acres of permanent impact requiring mitigation, which excludes habitat types and categories with less than a 0.05 acre mitigation need as well as Category 6 areas.
2. Acres mitigation per acres impacted.

4.0 Mitigation

The Applicant proposes to contribute funding to supplement ongoing conservation work being conducted by The Nature Conservancy (TNC) in Morrow County to meet the mitigation needs of the Facility. This funding will allow additional conservation actions to occur that would not otherwise be conducted and would therefore benefit wildlife in the area. Supplementing existing conservation efforts will provide a greater benefit to wildlife across the landscape than creating a new easement not connected to an existing conservation area with known wildlife use. ~~The Applicant discussed this approach in a March 23, 2023, meeting with ODFW and the Oregon Department of Energy (ODOE) in which ODFW agreed that identifying an existing conservation effort to supplement was preferable to developing a "postage stamp"-style conservation easement given the relatively small anticipated mitigation need for the Facility.~~

~~ODFW confirmed with the Applicant on April 20, 2023, that ODFW is supportive of payment to provide mitigation actions for the Facility on lands that are already in a conservation easement. ODFW noted that because the goal for Category 5 impacts is to mitigate for those impacts through actions that contribute to essential or important habitat, a nearby TNC property would be a great fit because it provides habitat for sensitive species, including the state endangered Washington ground squirrel (*Urocitellus washingtoni*; WAGS), and could benefit from habitat enhancements such as herbicide application to control invasive annual grasses. For impacted Category 4 habitat, ODFW recommended an additional action (e.g., seeding/planting) to achieve no net loss, dependent on the needs of the chosen mitigation site. This additional action is reflected in the description of potential mitigation actions in Section 4.2 below.~~

~~The Applicant met with TNC staff on December 4, 2023, to discuss mitigation opportunities on land managed by the TNC in the vicinity of the Facility based on the anticipated Facility impacts~~

~~described above in Section 2.0.~~ TNC identified the Lindsay Prairie Preserve, located less than 2 miles west of the Facility, as a potentially suitable site for Facility mitigation. The Lindsay Prairie Preserve is a 376-acre site owned by TNC since 1987 that is protected for restoration and preservation of native vegetation and wildlife. The preserve is a mix of grasslands and sagebrush communities that supports a large and consistent population of WAGS (Appendix A). In August 2018, a wildfire burned approximately 111 acres of the preserve, removing nearly all the sagebrush (*Artemisia tridentata*) and bitterbrush (*Purshia tridentata*) shrubs from the affected area. Thus, the site would benefit from habitat enhancements focused on restoring habitat that burned in 2018.

4.1 Site Description

According to TNC and as detailed in Appendix A, the habitat within the Lindsay Prairie Preserve is considered Category 1 per the ODFW Fish and Wildlife Habitat Mitigation Policy due to the presence of WAGS. If WAGS were not present at the site, the habitat alone would be considered Category 2 native perennial grassland. As noted in Appendix A, TNC collected vegetation data in 2021 in two macroplots within the 27-acre area proposed as mitigation for the Facility; at that time, cheatgrass (*Bromus tectorum*) was in less than 50 percent of the 1-meter plots, while perennial grasses, such as bluebunch wheatgrass (*Pseudoroegneria spicata*), was in greater than 85 percent of plots and Sandberg bluegrass (*Poa secunda*) was in greater than 98 percent of plots. The dominant grass observed was Sandberg bluegrass, with a diverse forb community also present, including the following species: milkvetch species (*Astragalus purshii* and *Astragalus lentiginous*), woolly plantain (*Plantago patagonica*), lomatium species (*Lomatium macrocarpum* and *Lomatium triternatum*), pussytoes (*Antennaria dimorpha*), phlox (*Phlox longifolia*), flax (*Linum lewisii*), slender hawksbeard (*Crepius atribarba*), and shaggy fleabane (*Erigeron pumilis*). Non-native or introduced forb species were present at a much lower percent frequency compared to native forb species (Appendix A). These data were collected 3 years after the wildfire in 2018 demonstrating a plant community resilient to disturbances such as wildfire, a unique trait in the local area.

4.2 Habitat Enhancements

As described in Section 3.0 above, approximately 18 acres of habitat mitigation are needed for Facility impacts to Category 4 habitat (goal of no net loss) and 9 acres of habitat mitigation are needed for Facility impacts to Category 5 habitat (goal of net benefit). Typically, mitigation for impacts to Category 5 habitat includes less uplift or enhancement effort than mitigation for Category 4 habitat, given that Category 5 habitat does not have a no net loss goal. However, due to the few total number of acres needed for Facility mitigation, TNC requested that all the mitigation acreage be considered Category 4 for the purposes of performing habitat enhancements to simplify the logistics of mitigation implementation. Therefore, the proposed mitigation habitat enhancements include treatment of the entire 27-acre area at a level consistent with Category 4 mitigation goals, as described below.

Mitigation proposed to be conducted at the Lindsay Prairie Preserve includes funding of chemical purchase and application for annual grass treatment and planting shrub plugs on approximately 27 acres as follows:

- Treatment 1 (Year 1): fall aerial application of imazapic (i.e., Plateau) and indaziflam (i.e., Rejuvra) to reduce competition from invasive annual grasses.
- Treatment 2 (Year 1): winter planting of sagebrush and bitterbrush plugs at 300 shrubs per acre for a total of 8,100 plugs. Exact species ratios will be determined prior to mitigation implementation.
    - In TNC's experience performing restoration at the Naval Weapons Systems Training Facility - Boardman and at the Boardman Conservation Area, the average survival of sagebrush plugs is about 50 percent and the establishment of bitterbrush is extremely challenging with a survival rate significantly lower than sagebrush. Therefore, TNC proposed two times the ideal number of shrubs per acre to account for this anticipated survival rate.
- Treatment 3 (Year 3, 4, or 5~~, if indicated~~): follow-up aerial application of Plateau and Rejuvra to continue a reduction in competition of invasive annual grasses to allow shrubs to become established.

Mitigation for both Category 4 and Category 5 habitat can be in-kind or out-of-kind, and in-proximity or off-proximity mitigation as defined by the ODFW Habitat Mitigation Policy. This proposed mitigation would provide in-kind and in-proximity mitigation considering the Facility would impact grassland habitat and this mitigation would provide uplift to grassland habitat, and considering the mitigation site's close proximity to the Facility. By mitigating both Category 4 and 5 habitat impacts with treatments sufficient to meet the ODFW mitigation goal for Category 4 habitat and including shrub plantings in addition to herbicide application to address the local need for post-fire shrub recovery at the Lindsay Prairie Preserve, the Applicant is going above and beyond the minimum mitigation need for Facility impacts under the ODFW Habitat Mitigation Policy.

5.0 Monitoring

The treatment area would be monitored for 5 to 6 years to document pre- and post-treatment conditions. This monitoring would be designed to document changes in species diversity and composition. Monitoring would be funded by the Applicant and conducted by the TNC or its contractors and the results of monitoring would be reported to ODFW and ODOE following each monitoring effort.

To document pre- and post-treatment conditions, baseline monitoring would be conducted during the growing season in the area to be treated in Year 0, followed by post-treatment monitoring during the growing season in Years 1 through 5, and possibly 6 (depending on the timing of the third treatment). Monitoring would occur for at least one-year post-application of the third treatment. TNC has established long-term vegetation monitoring macroplots (see Appendix A) on the Lindsay Prairie Preserve where frequency data are collected. Two of these plots are within the proposed 27-acre mitigation area (i.e., treatment area) and could be utilized for a portion of the monitoring protocol to determine the efficacy of the herbicide treatments. Prior to construction, the

Applicant will provide ODOE and ODFW with a copy of the monitoring protocol, which will be developed in coordination with TNC and subject to ODOE approval. Following ODOE approval, this plan will be amended to incorporate the monitoring protocol.

The mitigation treatments would be considered successful ~~and the Facility's mitigation obligations met~~ when all treatments have been performed and documented in accordance with the methods described in this HMP.

After initial monitoring of treatments is complete in Year 5 or 6, the Applicant will continue to monitor the site every 5 years thereafter in years divisible by five for the life of the Facility to confirm the site is being maintained at the same habitat category or better as compared to the baseline condition of the mitigation area. This reporting will serve to demonstrate the Facility's mitigation needs are being met throughout the life of the Facility. If the habitat quality of the mitigation area shows evidence of decline the Applicant will investigate the cause of the decline and consult with ODOE and ODFW to develop appropriate adaptive management measures to restore baseline habitat quality.

6.0 Legal Instrument

Prior to construction, the Applicant will provide a map of the mitigation area to ODOE along with a copy of the legal agreement between TNC and the Applicant that describes the scope of mitigation work and the legally enforceable mechanism to ensure implementation of mitigation consistent with the ODFW Habitat Mitigation Policy. The legal instrument will include assurance of durability for the life of the Facility to ensure the mitigation property will remain habitat if TNC ceases to own or manage the land prior to decommissioning of the Facility. The legal instrument will also contain an assurance that the land covered under the agreement will not be used to satisfy any other mitigation obligations other than those pertaining to this Facility. The final mitigation acreage, location, and treatments will be based on final Facility habitat impacts and mitigation site conditions at the time of implementation and be sufficient to satisfy the ODFW Habitat Mitigation Policy Goals for impacts to Category 4 and 5 habitat. This HMP will be updated, in coordination with ODOE, to reflect any changes in mitigation prior to construction of any Facility phase as described in Section 7.0, below, and consistent with the legal agreement between the TNC and the Applicant at that time.

7.0 Amendment of the HMP

The HMP may be amended from time to time by agreement of the Applicant and the Oregon Energy Facility Siting Council (EFSC). Such amendments may be made without amendment of the site certificate. EFSC authorizes ODOE to agree to amendments to this plan. ODOE shall notify EFSC of all amendments, and EFSC retains the authority to approve, reject, or modify any amendment of this plan agreed to by ODOE.

Appendix A: The Nature Conservancy Recommendation for Sunstone Solar Project Mitigation Plan (Confidential)

This appendix contains confidential and privileged information and is therefore not included in this document. It is provided under separate cover.

Attachment I: Construction Wildlife Monitoring Plan

Attachment H: Construction Wildlife Monitoring Plan

Sunstone Solar Project
Construction Wildlife Monitoring Plan

This plan identifies the minimization measures that will be implemented during facility construction to avoid, minimize, and mitigate potential adverse impacts to state sensitive species with a potential to occur within the site.

> Note: several measures that would minimize potential impacts to wildlife species, including noxious weed control, vegetation management and habitat mitigation, are not included in this plan because they are covered in other conditions of the site certificate.

The measures included in this plan may be amended from time to time by agreement of the certificate holder and EFSC. Such amendments may be made without an amendment of the Site Certificate. The Council authorizes ODOE to agree to amendments to this plan and to mitigation actions that may be required under this plan. ODOE shall notify EFSC of all amendments and mitigation actions, and the Council retains the authority to approve, reject or modify any amendment of this plan or mitigation action agreed to by ODOE.

1. During facility construction, 20 mile per hour speed limit signs shall be posted within the perimeter fence line; onsite contractors and personnel shall adhere to the 20 miles per hour speed limit on all facility access roads (excluding public roads).

2. Prior to and during facility construction, the certificate holder shall require all onsite contractors and personnel to complete site specific worker environmental training. This training shall include information regarding the sensitive biological resources including potentially occurring listed and sensitive species, individual responsibilities associated with the facility, and the consequences of non-compliance. Written material will be provided to employees at orientation and participants will sign an attendance sheet documenting their participation.

3. If construction will occur between March 1 and August 15 the certificate holder shall:
   a. Complete raptor nest occupancy surveys at least once per month between March 1 and May 31 to identify active nests. Surveys shall be based on a protocol approved by the Department in consultation with ODFW; and,
   b. Submit to the Department a construction plan (schedule) that demonstrates construction activities will not occur within the buffer zones established in 4) during the sensitive nesting and breeding season.

4. During construction, the certificate holder shall flag and avoid, or develop constraints mapping to ensure avoidance, of ground-disturbing activities within the buffer of any active nest site. Active nest sites shall be determined based on the preconstruction raptor nest surveys, as applicable, depending on the duration of construction.

Special Status Species	Buffer Size (Radius Around Nest Site):	Sensitive Nesting and Breeding Season
American kestrel	500 feet	March 1 to June 15

Ferruginous hawk	0.5 mile	March 15 to August 15
Golden eagle	0.5 – 1 mile	February 1 to August 15
Peregrine falcon	0.25 mile	January 1 to July 1
Red-tailed hawk	0.10 mile	March 1 to August 15
Swainson's hawk	0.25 mile	April 1 to August 15
Western burrowing owl	0.25 mile	April 1 to August 15
Other hawks and owls	0.25 mile	March 1 to August 15

Attachment J: Wildlife Monitoring Plan

Sunstone Solar Project
Draft Wildlife Monitoring Plan

Prepared for

Sunstone Solar, LLC

Prepared by

Tetra Tech, Inc.

May 2024

Revised by Department June 2024

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Table of Contents

1.0 Introduction

Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Applicant), proposes to construct and operate the Sunstone Solar Project (Facility), a photovoltaic solar energy generation facility and related or supporting facilities in Morrow County, Oregon. The proposed Facility will generate up to 1,200 megawatts (MW) of nominal and average generating capacity using solar panels wired in series and in parallel to form arrays, which in turn are connected to electrical infrastructure. Additionally, the Facility will also include a 1,200-MW distributed battery energy storage system for the purpose of stabilizing the solar resource. The Applicant proposes to permit a range of photovoltaic and related or associated technology within a site boundary that allows for micrositing flexibility in consideration of the perpetual evolution of technology and maximization of space efficiency, thereby allowing developmental flexibility to address varying market requirements. These facilities and the anticipated phasing of construction are all described in greater detail in Exhibit B of the Application for Site Certificate (ASC).

This Draft Wildlife Monitoring Plan (WMP) describes wildlife monitoring the Applicant will conduct during operation of the Facility. This WMP has the following components:

1. Raptor nest surveys
2. Washington ground squirrel (WAGS; *Urocitellus washingtoni)* monitoring
3. Wildlife Reporting and Handling System (WRHS)
4. Data reporting

This WMP will be updated, as necessary, in coordination with the Oregon Department of Energy (ODOE) and the Oregon Department of Fish and Wildlife (ODFW) and will be updated as needed to reflect the final layout of the Facility.

2.0 Raptor Nest Surveys

The objectives of raptor nest surveys are: (1) to count raptor nests on the ground or above ground at the Facility; and (2) to determine whether there are noticeable changes in nesting activity ~~or nesting success~~ in the local populations of raptor species, with particular focus on Swainson's hawks (*Buteo swainsoni*), the only state sensitive raptor species documented nesting during baseline surveys.

The Applicant will conduct long-term ground-based monitoring of nests identified during the baseline raptor nest surveys, as well as any other nests identified subsequently. The ground-based surveys will be used to evaluate nest success by gathering data on ~~active nests, on nests with young, and on young fledged~~nest occupancy. The Applicant will employ qualified personnel to perform raptor nest surveys.

2.1 Initial Monitoring

The first monitoring season will be in the first full raptor nesting season after the commercial operating date. During the first monitoring season, the surveyor will conduct one ground survey for raptor nests in late May or early June and additional surveys as described in this section. The ground surveys will be conducted within the site boundary to determine nest~~ing success~~occupancy.

All nests discovered during the anticipated pre-construction surveys and any nests discovered during post-construction surveys, whether active or inactive, will be given identification numbers. Global Positioning System (GPS) coordinates will be recorded for each nest. Locations of inactive nests will be recorded because they could become occupied during future years.

~~Determining nest occupancy may require one or two visits to each nest. For occupied nests, the Applicant will determine nesting success by a minimum of one ground visit to determine species, number of young, and young fledged. "Nesting success" means that the young have successfully fledged (reach advanced stage of development in which the young are capable of independent movements). Nests that cannot be monitored due to the landowner denying access will be checked from a distance where feasible.~~

After the first monitoring season, the surveyor will analyze this one year of data compared to the baseline data. The Applicant will provide a summary of the first-year results in the monitoring report described in Section 5.0.

2.2 Long-Term Monitoring

The surveyor will conduct raptor nest surveys at 5-year intervals for the life of the Facility.[1] The surveyor will conduct ~~a~~ long-term raptor nest surveys following the methods described in Section 2.3 ~~in the raptor nesting season~~ every 5 years after the first monitoring season in years divisible by 5. This may result in a greater than 5-year period between the initial monitoring season and the first long-term monitoring season (e.g., if the initial monitoring season is 2028, the first long-term monitoring season would be 2035 rather than 2033). During each long-term monitoring event biologists will visit all previously identified nest locations in addition to searching the survey area for new nest sites.

In conducting long-term surveys, the surveyor will follow the same survey protocols as the initial survey (Section 2.3), unless the ~~surveyor~~ Applicant proposes alternative protocols that are approved by ODOE. In developing an alternative protocol, the ~~surveyor~~ Applicant will consult with ODFW and ODOE and will take into consideration other raptor nest monitoring conducted in adjacent or overlapping areas.

The ~~surveyor~~ Applicant will analyze the data to identify any trends in the number of raptor breeding attempts the Facility supports and the success of those attempts. The ~~surveyor~~ Applicant will submit a report after each year of long-term raptor nest surveys.

[1] As used in this plan, "life of the Facility" means continuously until the Facility is restored and the site certificate is terminated in accordance with OAR 345-027-0110.

2.3 Monitoring Protocol

Qualifications of surveyors: Surveys and nest monitoring will be conducted by professional, qualified biologists with a relevant academic background and sufficient field experience pertaining to avian biology and species identification.

Survey period: Occupancy surveys will be conducted between March 1 and May 31. The survey period may be extended in consultation with ODFW and ODOE.

Survey area: The survey area will be limited to leased parcels within the Site Boundary, where surveyor access is granted. Surveys will be performed from public roads and project roads, or from participating landowner parcels only, as site conditions safely permit (e.g. snow, mud).

Survey protocol: Biologists will conduct a ground-based search for raptor nest activity using binoculars and/or spotting scopes to search potential nest sites. Previously identified nests will be surveyed to determine the occupancy status of nests. New nests that are discovered will also be surveyed, and visited in future monitoring years. A log will be kept to track nest occupancy status on all nests. ArcGIS Online or similar GIS program will be used to locate and track the nests.

Data collection: Data collected during the survey will include, at a minimum, the location, occupancy status, occupying species, activity observed, and condition of each nest.

Nest Location: Nest/Burrow Identification Number: Existing IDs will be used where possible in addition to corresponding GPS waypoint numbers.

Occupying Species: Using four-letter American Ornithologists' Union codes (e.g., SWHA = Swainson's hawk).

Raptor Activity:

- Adult Present: Proximity of the adult to the nest (e.g., on nest, nearby, or unknown).
- Eggs or Young: Number of eggs or young observed.
- Nest Substrate: Structure in which nest was located (e.g., broadleaf tree, cut bank, transmission pole, etc.).
- Nest Height: Height relative to the structure it is on (e.g., on top of transmission pole, 3/4 of height of tree).

Nest Condition: To assess nest condition the following criteria will be used:

- No Longer Present: For nests that are no longer present.
- Unknown: The nest cannot be found, was not surveyed, or the nest is present, but because of its location a determination cannot be made.
- Excellent: Defined cup or nest bowl with a well-maintained rim; adult or young present.
- Good: Nest bowl intact and rim defined; minor repair needed for nest to be used; margins of nest in loose configuration, minor slumping occurring.
- Fair: Nest bowl intact and nest not dilapidated; but needs significant repair in order to be used; material is slumping or sliding.
- Poor: Loose structure of nest bowl still present; nest walls and side falling out; nest is in need of major repair to be used.
- Remnant: Nest bowl not defined; scant material remaining and not usable unless fully rebuilt.

Determination of active nests: Nest occupancy status will be determined using the definitions below.

Active: Defined by the presence of one or more eggs, dependent young, or adults on the nest in the past 10 days during the breeding season, including the period when adults are displaying courtship behaviors and are building or adding to the nest in preparation for egg-laying.

Potentially Active: There is not observable activity during the visit, but active status cannot be confirmed.

Inactive: The inactive status will only be determined if the nest is observed for at least one hour each time over the course of two consecutive visits separated by at least one day.

3.0 Washington Ground Squirrel Monitoring

No WAGS were detected during baseline surveys, but any new colonies that are detected incidentally during other surveys, such as raptor nest monitoring, will be documented and the extent of those colonies delineated and included in future WAGS monitoring and reporting activities.

If any incidental WAGS are detected, the Applicant will employ qualified personnel to monitor these locations every 5 years thereafter in years divisible by five for the life of the Facility (i.e., on the same monitoring schedule as the raptor nest surveys). The survey area will include the colonies (i.e., groups of active burrows) and a buffer of 785 feet in suitable habitat, if accessible. The surveyors will walk linear transects spaced 165 to 230 feet (50 to 70 meters) apart two times between February 15 and May 31. Surveys of each location will be spaced at least 2 weeks apart. Surveyors will record locations of activity centers and colony boundaries using a sub-meter accuracy GPS unit; approximate number of burrows; and representative photographs of burrows and scat. Surveyors will describe habitat characteristics at each location and note any noticeable land use or habitat changes that may have occurred since detection.

After each survey, the Applicant will report the results to ODFW and ODOE and will include maps of the areas surveyed and detection locations. WAGS surveys will not be conducted if there are barriers to WAGS dispersal (i.e., active agriculture fields, highways, perennial waterbodies).

4.0 Wildlife Reporting and Handling System

The Applicant will document fatalities found during routine maintenance activities and any other incidentally detected fatalities. However, systematic post-construction fatality monitoring studies are not likely to produce significant findings or provide meaningful data on impacts based on the attributes of this Facility (especially relative to the costs that they incur to implement) as described below, and therefore no systematic post-construction fatality monitoring study is proposed for the Facility nor is one needed to meet the standards under Oregon Administrative Rule (OAR) 345-022-0060. In a December 2023 meeting with the Applicant and ODOE, ODFW stated they are not requesting a post-construction fatality monitoring study for the Facility. If evidence of significant fatality events is detected by operations and maintenance (O&M) staff, the Applicant will

coordinate with ODOE and ODFW regarding the need for systematic post-construction fatality monitoring and adaptive management.

Although mortality at the Facility due to collision with infrastructure is possible, as it is with most human development (e.g., buildings), the available literature on avian mortality at utility-scale photovoltaic solar energy sites suggests that mortality at these facilities is comparatively low (Walston et al. 2016, Loss et al. 2014, Kosciuch et al. 2020, Smith et al. 2021). In Oregon, results of a fatality study at a 56-MW photovoltaic facility near Prineville detected only three bird fatalities, only two of which were native birds (i.e., a horned lark [*Eremophila alpestris*] and a dark-eyed junco [*Junco hyemalis*]), during 1 year of standardized searches (ODOE 2020). These results suggest that large fatality events are unlikely at photovoltaic solar facilities in the region but that low numbers of fatalities of common ground-dwelling bird species could be detected at the Facility (ODOE 2020), and may be similar to background mortality levels. Post-construction fatality monitoring studies conducted at utility-scale photovoltaic solar facilities to date have reported lower fatality rates compared to other human development types, with fatalities in general primarily composed of resident ground-nesting birds.

In contrast to wind energy development, impacts to wildlife from photovoltaic solar development are primarily associated with habitat loss rather than direct mortality from collisions. The Facility is located almost entirely on wheat fields, and impacts to wildlife habitat will be minimal, restricted primarily to small tracts of disturbed grasslands. This habitat will be mitigated in accordance with ODFW's Habitat Mitigation Policy (OAR 635-415-0025), as described in the Facility's Exhibit P and Habitat Mitigation Plan (Attachment P-2 to Exhibit P). The Applicant will adhere to standard best management practices including following Avian Powerline Interaction Committee guidelines for minimizing avian collisions and electrocutions (APLIC 2006, 2012), primarily burying the medium voltage collector line system, and implementing down-shield lighting for permanent lighting at the substations and O&M buildings, and identifying a licensed local wildlife rehabilitator capable of responding to the Facility in the event of injured wildlife. Based on coordination with ODFW, the Applicant will additionally install flight diverters on the overhead collector line that crosses Sand Hollow. The Applicant will use wildlife-friendly fencing that does not include a top strand. Thus, the Facility has already minimized the risk of avian collision fatalities, based on known risk factors such as lighting (Gehring et al. 2009; Kerlinger et al. 2010; USFWS 2012, 2013).

Additionally, post-construction fatality monitoring is not necessary for the Applicant to meet the standards under OAR 345-022-0060 (i.e., that the design, construction and operation of the facility, taking into account mitigation, are consistent with the general fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025, ODFW's Fish and Wildlife Habitat Mitigation Policy) because the mitigation goals and standards relate to fish and wildlife habitat quality and quantity rather than fatalities of fish and wildlife individuals. OAR 635-415-0025 goals and standards for impacts to Category 2, 3, 4, and 5 habitat (i.e., the habitat categories addressed in the Facility's Habitat Mitigation Plan) include avoidance and, where impacts are unavoidable, mitigation to achieve the goal of no net loss of either habitat quantity or quality (Category 2, 3 and 4 habitat) and/or a net benefit in habitat quantity or quality (Category 2 and 5 habitat). Fatality monitoring, in itself, does not improve or maintain habitat quantity or quality, nor would the results of monitoring

affect the habitat mitigation ratios or the size of the mitigation need described in the Facility's Habitat Mitigation Plan attached to Exhibit P. Therefore, a systematic post-construction fatality monitoring study is not necessary for the Energy Facility Siting Council (EFSC) to determine that the Facility is consistent with OAR 635-415-0025

Although standardized fatality searches will not be implemented, all incidentally detected fatalities will be reported in the WRHS. The WRHS is a program for O&M staff to report wildlife (including bird and bat) casualties found during operation of the Facility. O&M staff will be trained in the methods needed to carry out this program. This monitoring program includes the initial response, handling, and reporting of bird and bat carcasses discovered incidental to maintenance operations ("incidental finds"). Approximately 10 permanent O&M staff are anticipated to be on-site for Facility operations and be responsible for WRHS program implementation. If a battery energy storage system is installed, additional workers will be on-site, but they will likely be contract employees and will not be included in WRHS program implementation. As part of routine O&M activities, O&M staff will visit each inverter pad approximately every 6 months to visually inspect equipment. If evidence of significant fatality events is detected by O&M staff, the Applicant will coordinate with ODOE and ODFW regarding the need for systematic post-construction fatality monitoring.

All carcasses discovered by O&M staff will be photographed and recorded. If O&M staff find a carcass at the Facility, they will notify qualified personnel who will identify the carcass. If the qualified personnel determines that a carcass is a state or federally threatened or endangered or otherwise protected species, agency reporting procedures and timelines specified in Section 5.0 shall be followed. Information recorded for each carcass and reported to ODFW and ODOE will include the location, date of discovery, species if known, as well as any evidence that might assist in determination of cause of death, such as evidence of electrocution, vehicular strike, wire strike, predation, or disease. Based on coordination with ODFW, feather spots[2] will be documented if found as well, consistent with industry standards; however, feather spots will not necessarily be attributed to a Facility-caused fatality (personal communication with J. Thompson, ODFW, December 13, 2023). Fatalities documented by O&M staff will be reported to ODOE and ODFW annually, as described in Section 5.0.

Prior to construction, the Applicant will develop and implement a protocol for handling injured birds. Any injured native birds found at the Facility may be carefully captured by trained qualified personnel and transported to a qualified rehabilitation specialist approved by ODOE. Alternatively, the Applicant may contact a qualified rehabilitation specialist approved by ODOE to respond to injured wildlife. Blue Mountain Wildlife (https://bluemountainwildlife.org/, 541.278.0215), located in Pendleton, Oregon, has confirmed the ability to respond to injured native wildlife, especially migratory birds, at the Facility (Lynn Tompkins, personal communication, April 11, 2023). The Applicant will pay costs, if any, charged for time and expenses related to care and rehabilitation of

[2] Feather spots are defined as at least 5 tail feathers, or 2 primary feathers, or a total of at least 10 feathers with no attached bone or tissue, within 5 meters of each other (CEC and CDFG 2007).

injured native birds found on the site, unless the cause of injury is clearly demonstrated to be unrelated to Facility operations.

5.0 Data Reporting

The Applicant will report wildlife monitoring methods, data, and data analysis to ODOE for each calendar year in which wildlife monitoring occurs. Monitoring data include raptor nest survey data, WAGS monitoring data (if applicable), and WRHS data. The Applicant may include the reporting of wildlife monitoring data and analysis in the annual report required under OAR 345-026-0080 or submit this information as a separate document at the same time the annual report is submitted. In addition, the Applicant will provide to ODOE data or records generated in carrying out this WMP upon request by ODOE.

The Applicant will notify the U.S. Fish and Wildlife Service and ODFW if any federal or state endangered or threatened species are killed or injured at the Facility within 24 hours of species identification.

6.0 Plan Amendment

This WMP may be amended from time to time by agreement of the Applicant and EFSC. Such amendments may be made without amendment of the site certificate. EFSC authorizes ODOE to agree to amendments to this WMP. ODOE shall notify EFSC of all amendments, and EFSC retains the authority to approve, reject, or modify any amendment of this plan agreed to by ODOE.

7.0 References

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Attachment K: Inadvertent Discovery Plan

Inadvertent Discovery Plan

Sunstone Solar Project

Morrow County, Oregon

December 2023

Author:
Lara Rooke, MA, RPA

Prepared for

PINE GATE RENEWABLES | GETTING SOLAR DONE.

130 Roberts Street
Asheville, NC 28801

Prepared by

TETRA TECH

1.0 INTRODUCTION

Pine Gate Renewables (PGR) proposes to construct and operate the Sunstone Solar Project (Facility), a solar energy generation facility with related or supporting facilities including an energy storage system on private lands in Morrow County, Oregon. PGR seeks a Site Certificate through the Oregon Department of Energy (ODOE), Oregon Energy Facility Siting Council (EFSC or Council) for the Facility. The Facility will include an up to 1,200-megawatt (MW) solar project. The proposed solar facility siting area (Facility site boundary) will include approximately 10,960 acres of privately owned agricultural land with areas of sage brush near the drainages and along Sand Hollow Canyon.

To meet the requirements for site certification, PGR must develop an Inadvertent Discovery Plan (IDP) for monitoring construction activities and responding to the discovery of archaeological resources or buried human remains.

2.0 CULTURAL RESOURCES IN THE PROJECT AREA

The entirety of the Facility site boundary and a 2-mile viewshed was surveyed for cultural resources, including pedestrian surveys along with subsurface shovel probing within the Facility site boundary. A total of seven archaeological sites, one archaeological site with standing structures, and three isolated finds were identified in the Facility site boundary. All have been recommended as not eligible for listing on the National Register of Historic Places (NRHP). In addition, two Historic Properties of Religious or Cultural Significance to Indian Tribes (HPRCSITs), Sand Hollow Battleground and Sisupa, are identified in the Oregon State Historic Preservation Office's (SHPO) archaeological database as overlapping a portion of the Facility site boundary. The HPRCSITs are eligible for listing on the NRHP.

Due to the presence of two culturally important resource areas to the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) within the Facility site boundary and its viewshed, the CTUIR has recommended monitoring to protect potential HPRCSIT-associated subsurface resources. The CTUIR has recommended that monitoring occur in the following areas:

- Within the HPRSCIT boundaries and a 100-foot surrounding buffer area, monitoring should occur for all ground disturbing activities, except driving posts for the solar modules; and
- Monitoring should occur within the Facility site boundary for all excavation work related to the proposed 3-foot-deep collector cable system.

Prior to construction, PGR will develop a Monitoring Plan that incorporates this IDP and includes necessary staff, agency, and tribal contact information once determined. This plan should include monitoring protocols and staffing roles and incorporate input from the CTUIR.

3.0 PROCEDURES FOR THE DISCOVERY OF ARCHAEOLOGICAL RESOURCES

If any staff, contractors, or subcontractors, including archaeological and/or tribal monitors, believe that they have encountered cultural or archaeological remains of any kind, all work at and adjacent to the discovery shall immediately cease. The area of work stoppage will be adequate to provide for the security, protection, and integrity of the archaeological discovery. A cultural resource discovery may be pre-contact period or historic period in age and consist of (but not limited to):

- Areas of charcoal or charcoal-stained soil and stones;
- Stone tools or waste flakes (i.e., an arrowhead or stone chips);
- Bone, burned rock, or shell, whether or not seen in association with stone tools or chips;
- Clusters of tin cans, ceramics, flat glass, or bottles; and
- Concentrations of brick, railway tracks, or logging or agricultural equipment.

In the event unrecorded archaeological resources are identified during the construction or operation of the Sunstone Solar Project, work within 100 feet of the find shall be halted and directed away from the discovery until a Qualified Archaeologist[1] assesses the resource and its significance for inclusion on the NRHP. This assessment will include coordination with the CTUIR. (A wider avoidance area will be required for human remains; see below.) The archaeologist, in coordination with ODOE, the SHPO, Facility personnel, CTUIR, and the landowner, shall make the necessary plans for treatment of the finds and for the evaluation and mitigation of impacts if the finds are found to be eligible for listing on the NRHP.

A Qualified Archaeologist will determine if the resources are archaeological and greater than 50 years old. If the archaeologist believes that the discovery is a cultural resource, he or she in coordination with the PGR Construction Manager will establish a 100-foot avoidance buffer to protect the discovery site where construction activities will be suspended until treatment of the discovery can be determined. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site or avoidance area. Any newly discovered archaeological resource will be considered eligible to the NRHP until determined otherwise. Work in the immediate area will not resume until treatment of the discovery has been completed.

If archaeological artifacts are observed during construction, the Qualified Archaeologist will ensure proper documentation and assessment of any discovered cultural resources. All precontact and historic cultural material discovered during project construction will be recorded by the archaeologist in SHPO's online archaeological site form database. Site overviews, features, and artifacts will be photographed; stratigraphic profiles and soil/sediment descriptions will be prepared for subsurface exposure. Discovery locations will be documented on scaled site plans and site location maps.

If the Qualified Archaeologist in consultation with the SHPO and CTUIR determines that the discovery is an NRHP-eligible cultural resource, they will consult to determine appropriate treatment to be presented and agreed upon in a Memorandum of Agreement (MOA) or other appropriate documentation. Mitigation measures will be developed in consultation with PGR, ODOE, SHPO, CTUIR, and the landowner, and could include avoidance through redesign, conducting data recovery, and/or relocating materials. Treatment measures performed may include protecting in place or data recovery

[1] *Qualified Archaeologist* - means a person with qualifications meeting the federal secretary of the interior's standards for a Professional Archaeologist . An individual who has: (A) A post-graduate degree in archaeology, anthropology, history, classics or other germane discipline with a specialization in archaeology, or a documented equivalency of such a degree; (B) Twelve weeks of supervised experience in basic archaeological field research, including both survey and excavation and four weeks of laboratory analysis or curating; and (C) Has designed and executed an archaeological study, as evidenced by a Master of Arts or Master of Science thesis, or report equivalent in scope and quality, dealing with archaeological field research.

such as mapping, photography, limited probing, and sample collection, or other activity deemed appropriate through an MOA or other appropriate documentation.

If human remains are inadvertently discovered, ODOE, SHPO, the Legislative Commission on Indian Services (LCIS), and CTUIR will decide when construction may continue at the discovery location. Where cultural resources are encountered during construction, but additional project effects to the resources are not anticipated, Facility construction may continue while documentation and assessment of the cultural resources proceed. If continued construction is likely to cause additional impacts to such resources, Facility activities within a radius of 100 feet of the discovery will cease until the Qualified Archaeologist has documented the site, evaluated its significance in consultation with CTUIR, and assessed potential effects to the site.

Discovery Procedures: What to do if you find something

1) **Immediately Discontinue All Ground Disturbing Activity. Do Not Touch Or Move The Objects, and Maintain Confidentiality of the Site. Do Not Take Photos.** Removing bone fragments, artifacts, and other items from any archaeological site, without proper authorization, is against the law. Violators could be charged in state or federal court resulting in a fine or imprisonment.
2) Do not draw any attention to the area with obvious flagging or markers. Maintain confidentiality concerning the discovery of the cultural resource, and do not discuss with anyone other than the contact people listed above. Secure and protect area of inadvertent discovery with 100 foot buffer—work may continue outside of this buffer.
3) Notify PGR Project Manager and ODOE (see Attachment A).
4) Construction Manager will need to contact a Qualified Archaeologist to assess the find.
5) If archaeologist determines the find is an archaeological site or object, contact SHPO. If it is determined to *not* be archaeological, you may continue work.

4.0 PROCEDURES FOR THE DISCOVERY OF HUMAN REMAINS

If human remains and/or associated grave goods are inadvertently encountered during Project activities, the Oregon State legislature protocol for inadvertent discovery of human remains will be followed (Oregon State Legislature 2023). All activity that may cause further disturbance to the remains shall cease and the area secured and protected from further disturbance. A 200-foot avoidance buffer will be utilized for human remains and associated grave goods until appropriate treatment is completed. The presence of skeletal remains will be immediately reported to the County Medical Examiner, Oregon State Police, SHPO, and LCIS. The remains will not be touched, moved, or further disturbed. The County Medical Examiner or LCIS State Physical Anthropologist will assume jurisdiction over the human skeletal remains and determine whether those remains are forensic or non-forensic. If the remains are non-forensic, then they will report that finding to SHPO and the State Physical Anthropologist with the LCIS, who will then take jurisdiction over the remains and will notify CTUIR.

Although excavation work in the immediate area of a human remains find will not resume until assessment has been completed, excavation work may continue in other parts of the Facility that have been surveyed for cultural resources. Due to the sensitive nature of such a find, human remains should never be left unattended. No work will resume in the area of a human remains discovery until written authorization has been received from the LCIS and SHPO.

Discovery Procedures: What to do if you find something

1) **Immediately Discontinue All Ground Disturbing Activity. Do Not Touch Or Move The Objects, and Maintain Confidentiality of the Site. Do Not Take Photos.** Removing bone fragments, artifacts, and other items from any archaeological site, without proper authorization, is against the law. Violators could be charged in state or federal court resulting in a fine or imprisonment.
2) Do not draw any attention to the area with obvious flagging or markers. Maintain confidentiality concerning the inadvertent discovery, and do not discuss with anyone other than the contact people listed above. Secure and protect area of inadvertent discovery with 60-meter/200-foot buffer, then work may continue outside of this buffer with caution.
3) Cover remains from view and protect them from damage or exposure, restrict access, and leave in place until directed otherwise. Do not take photographs. Do not speak to the media.
4) Notify (refer to Attachment A for contact information):
    - PGR Project Manager
    - ODOE
    - Oregon State Police **DO NOT CALL 911**
    - SHPO
    - LCIS State Physical Anthropologist
    - CTUIR and other appropriate Native American Tribes determined by LCIS
5) If the site is determined not to be a crime scene by the Oregon State Police, do not move anything! The remains will continue to be secured in place along with any associated funerary objects, and protected from weather, water runoff, and shielded from view.
6) Do not resume any work in the buffered area until a plan is developed and carried out between ODOE, SHPO, LCIS, and appropriate Native American Tribes and you are directed that work may proceed.

5.0 CONFIDENTIALITY

The Facility and employees shall make their best efforts, in accordance with federal and state law, to ensure that its personnel and contractors keep the discovery confidential. The media, or any third-party member or members of the public are not to be contacted or have information regarding the discovery, and any public or media inquiry is to be reported to ODOE. Prior to any release, the responsible agencies and Tribes shall concur on the amount of information, if any, to be released to the public.

To protect fragile, vulnerable, or threatened sites, the National Historic Preservation Act, as amended (Section 304 [16 U.S.C. 470s-3]), and Oregon State law (Oregon Revised Statute 192.501(11)) establishes that the location of archaeological sites, both on land and underwater, shall be confidential.

6.0 REFERENCES

Oregon State Legislature

2023 Electronic document accessed December 21, 2023, https://www.oregonlegislature.gov/cis/Pages/archaeology.aspx

ATTACHMENT A: CONTACTS

1. Pine Gate Renewables

Project Manager	To be determined prior to construction

2. Cultural Resource Contacts

Qualified Archaeologist	Lara Rooke, Tetra Tech (425) 217 7625 (Cell)
Oregon SHPO State Archaeologist	John Pouley (503) 480-9164
State Physical Anthropologist, LCIS	Dr. Elissa Bullion (971) 707-1372 or (503) 986-1067

3. Agency Contacts

ODOE	Christopher Clark (503) 871-7254
Oregon State Police	Craig Heuberger (503) 731-0079 or (503) 731-3030 (dispatch)
Morrow County Medical Examiner	(541) 676-5421

4. Tribal Contacts

CTUIR	Teara Farrow Ferman (Human Remains) (541) 429-7230 or (541) 377-2959 (cell) Ashley Morton (Archaeological Resources) (541) 429-7214

Attachment L: Draft Construction Wildfire Mitigation Plan

Sunstone Solar Project

Draft Construction Wildfire Mitigation Plan

Sunstone Solar Project
June 2023
Amended by Department July 2024

Prepared for

Sunstone Solar, LLC

Prepared by

Tetra Tech, Inc.

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List of Tables

Acronyms and Abbreviations

APLIC	Avian Power Line Interaction Committee
Applicant	Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC
BMP	best management practice
CFR	Code of Federal Regulations
CWPP	Community Wildfire Protection Plan
EMP	Emergency Management Plan
Facility	Sunstone Solar Project
Li-ion	lithium-ion
MW	megawatt
O&M	operations and maintenance
OAR	Oregon Administrative Rules
Plan	Wildfire Mitigation Plan
RACE	Rescue, Alarm, Contain, Extinguish
SCADA	supervisory, control, and data acquisition
UL	Underwriters Laboratories

1.0 Introduction

Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Applicant), proposes to construct the Sunstone Solar Project (Facility), a solar photovoltaic energy generation facility with up to 1,200 megawatts (MW) of nominal electric generating capacity. In addition to solar arrays, the proposed Facility would include up to 7.2 gigawatt hours of distributed battery storage capacity, an interconnection substation, up to seven collector substations, an operations and maintenance building, and other structures including roads, perimeter fencing, and gates. The Facility is proposed to be sited within an approximately 10,960-acre (17 square mile) site boundary in Morrow County. All land within the proposed site boundary is privately owned and zoned for Exclusive Farm Use.

This Wildfire Mitigation Plan (Plan) is attached to Exhibit V – Wildfire Prevention and Risk Mitigation that was prepared to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010(1)(v), including providing evidence that the Facility complies with the approval standard in OAR 345-022-0115.

2.0 Wildfire Risk Minimization Procedures

OAR 345-022-0115(1)(b)(D) Identify procedures to minimize risks to public health and safety, the health and safety of responders, and damages to resources protected by Council standards in the event that a wildfire occurs at the facility site, regardless of ignition source;

In addition to the measures described ~~above~~in this plan, the risk of a wildfire affecting the public safety, first responders, or Oregon Energy Facility Siting Council–protected resources would be minimized by the procedures listed in Table 1~~3~~.

Certificate holder will contact local fire districts, as well as local emergency management agencies to request and incorporate any input into final Construction WMP, as appropriate, about the location and types of temporary fire breaks needed in the event of a fire on or off site. The final WMP shall designate:

- Estimated response times for on-site staff and local emergency service providers (to the extent emergency service information is available),
- Protocols for staff or emergency providers to erect or create fire breaks in the event of a fire (to the extent emergency service information is available),
- Identify and provide maps of priority areas where fire breaks would be prioritized to protect fires spreading off site or impacting the facility site.

During construction, the certificate holder or its contractor will work directly with local emergency responders, if available, to compile and maintain a current list of adjacent landowners/property owners with contact information. The final Wildfire Mitigation Plan will identify the best

notification procedures of adjacent landowners/property owners to provide to local and regional emergency services for emergency notifications, in the event of an ignition or fire at the facility.

Table 1: Procedures to Minimize Wildfire Risk

~~**Table 3. Procedures to Minimize Wildfire Risk**~~

Topic	Procedures
Public health and safety	The public will be excluded from the solar array, substation, and battery energy storage system facilities by fencing. Ground-mounted inverters and junction boxes will be surrounded by bollards to minimize inadvertent vehicle/farm equipment collisions with electrical equipment.
First Responders	The Applicant will offer annual training to local first responders. Training will cover the firefighting responses to electrical fires. Response to fires in the facility should focus on controlling spread to adjacent lands. Operational staff will be trained in the use of fire extinguishers for responding to incipient stage fires on site.
Resource Protection	Resources covered by Energy Facility Siting Council standards near the site boundary include agricultural land, shrub steppe habitat, and cultural resources. The existing county roads will form a fire break between fields that will discourage the spread of wildfire between fields into wildlife habitat or cultural resources. According to Exhibit S, within the analysis area there are four cultural resources that are listed or likely eligible for listing on the National Register of Historic Places. The four cultural resources include two historic sites, ES-KB-03 and ES-KB-07, and two Historic Properties of Religious or Cultural Significance to Indian Tribes, Sand Hollow Battle Ground and Sisupa. ES-KB-03 is a Dutch barn that was constructed in the late 19th to early 20th century.

~~2.0~~3.0 Wildfire Risk Assessment

This Plan has been prepared to meet the approval standard under OAR 345-022-0115(1)(b), which requires:

> *OAR 345-022-0115(1)(b)(A) Identify areas within the site boundary that are subject to a heightened risk of wildfire, using current data from reputable sources, and discuss data and methods used in the analysis;*

Prior to construction of the facility provide a summary update of wildfire risk at the site as designated under OAR 345-022-0115, if significantly different from Final Order on ASC.

~~Data from the Oregon Community Wildfire Protection Plan (CWPP) Planning Tool were used for the analyses in this Plan (ODF and USFS 2018). The statewide wildfire risk map was developed and will be updated and maintained per requirements under Senate Bill 762 and associated administrative rules. The Oregon Explorer's CWPP data are from the 2018 Pacific Northwest Quantitative Wildfire Risk Assessment (Gilbertson-Day et al. 2018). The CWPP Planning Tool provides a clearinghouse of~~

~~fire behavior and fire effects data to aid decision makers in charge of reducing wildfire risk in their communities. These data were analyzed within the site boundary and within the wildfire analysis area (i.e., a 0.5-mile buffer of the site boundary).~~

~~Based on the data provided in Exhibit V, the site boundary has low to moderate overall wildfire risk as it contains primarily cultivated crop land cover and is relatively flat topography. Of the approximately 13 percent of the site boundary that has modeled fire risk, approximately 12 percent of the site boundary is low fire risk. A majority (87 percent) of the site boundary contains no highly valued resources or assets (such as critical infrastructure, developed recreation, housing unit density) mapped in the area, or simulated wildfires did not burn the area due to low historical occurrence/absence of burnable fuel, and therefore have no overall fire risk rating (see Exhibit V, Table V-10; Gilbertson-Day et al. 2018, ODF and USFS 2018). Areas of low overall wildfire risk are primarily in the west in areas of agriculture and pastures (see Exhibit V, Figure V-6). Areas of high and moderate wildfire risk are centered around the gentle sloping features, shrub or grassland vegetation, and infrastructure along Grieb Lane, Doherty Road, Melville Lane, and Lexington-Echo Highway near the middle of the site boundary as well as along Bombing Range Road in the northwestern portion of the wildfire analysis area (a 0.5-mile buffer around the site boundary). The areas of moderate to high wildfire risk outside of the site boundary but within the analysis area include the same roads such as Bombing Range Road and Lexington-Echo Highway, as well as the southeast corner of the Boardman Bombing Range in the northwestern corner of the analysis area.~~

~~Areas of heightened risk from wildfire are described using the CWPP Hazard to Potential Structures (see Exhibit V, Figure V-5). The hazard to potential structures layer shows impact levels to structures within 150 meters of a burnable fuel type, as if structures were present, and if a wildfire occurs. This data layer is based on modeled vegetation and not on building construction materials. This data layer ranges from a very low hazard to potential structures, where the fuel in the area is largely non-burnable or very sparse and there is a low potential for loss of a structure or your home, to a very high hazard to potential structures, where if a fire ignites nearby, there is a high potential for loss of a residence or a structure (Gilbertson-Day et al. 2018).~~

~~The areas of heightened risk and hazard to potential structures within the site boundary are primarily very low (37 percent) and low (44 percent) (see Table V-9 in Exhibit V). There are areas of moderate to high hazard to potential structures concentrated in the northeast and southeast portions of the site boundary and extending into the wildfire analysis area along Doherty Road in the north, near Sand Hollow Road to the south, and south of Melville Lane in the southeast. There are also moderate and high hazards to potential structures along Bombing Range Road in the west. Similar to the site boundary, the areas of heightened risk and hazard to potential structures within the analysis area are primarily very low (37 percent) and low (42 percent). Areas of moderate to high hazard to potential structures that are outside of the site boundary but within the wildfire analysis area are along Doherty Road in the north, near Sand Hollow Road to the south, and south of Melville Lane in the southeast. Northwest of the site boundary but within the wildfire analysis area includes a very high hazard to potential structures west of Bombing Range Road that appears to be a residential and agricultural property.~~

~~Existing infrastructure also represents areas of heightened risk. The existing infrastructure within the site boundary includes pipelines, distribution lines, residential structures, agricultural structures, and other electrical grid infrastructure. There is a substation near the intersection of Grieb Lane and Lexington-Echo Highway. In the southeast, the existing infrastructure within the site boundary includes distribution lines, residences, and agricultural structure along Melville Road. There is a pipeline crossing the northwest portion of the site boundary, and a distribution line and a residence along Lexington-Echo Highway. The existing infrastructure within the western portion of the site boundary includes distribution lines, residences, and agricultural structure along Bombing Range Road. The existing infrastructure within the eastern portion includes residences along Doherty Road to the east. The distribution line along Bombing Range Road borders the northwest edge of the site boundary and continues within the wildfire analysis area into the southwest.~~

~~Outside of the site boundary but within the wildfire analysis area, existing infrastructure includes agricultural properties, wind turbines to the west and south, and irrigated agriculture to the north and east. The roads throughout the wildfire analysis area would act as firebreaks including Lexington-Echo Highway, Grieb Lane, Grieb-Wood Road, Bombing Range Road, Doherty Road, and Melville Road.~~

~~3.0~~4.0 Inspection and Management

OAR 345-022-0115(1)(b)(B) Describe the procedures, standards, and time frames that the applicant will use to inspect facility components and manage vegetation in the areas identified under subsection (a) of this section;

~~3.1 Facility Inspections~~

~~Facility components will be inspected quarterly. The supervisory, control, and data acquisition (SCADA) system collects operating and performance data from the Facility as a whole and allows remote operation. The Applicant will monitor the Facility components, such as the substation and solar arrays, 24 hours a day, 7 days a week including shutdown capabilities. These operational monitoring and maintenance measures are also discussed in Section 4.0.~~

~~The battery energy storage system may consist of either zinc-based batteries or lithium-ion (Li-ion) batteries and will be stored in completely contained, leak-proof modules. The modules will be stored on a concrete pad to capture any leaks that may occur. Operations and maintenance (O&M) employees will conduct inspections of the battery energy storage systems according to the manufacturer's recommendations, which are assumed to be monthly inspections.~~

~~The zinc-based batteries under consideration for this Facility are non-flammable and tolerate wide temperature ranges. As a result, the manufacturer affirms that they are not anticipated to present a fire hazard and do not require on-site fire suppression systems. Section 2.7.1 of Exhibit B summarizes the information pertinent to fire prevention and control for a Li-ion battery energy storage system, if selected.~~

~~3.1~~4.1 Vegetation Management

The Certificate Holder and contractor(s) will maintain vegetation within the Site Boundary and will also maintain a defensible space clearance along Facility features. Defensible space will be free of combustible vegetation or other materials. Roads and parking areas will be maintained to be free of vegetation tall enough to contact the undercarriage of the vehicle.

The following best management practices to minimize fire risk from vehicle travel and fueling activities would be implemented at the site during construction:

- The movement of vehicles will be planned and managed to minimize fire risk.
- The contractor(s) will be responsible for identifying and marking paths for all off-road vehicle travel. All off-road vehicle travel will be required to stay on the identified paths. No off-road vehicle travel will be permitted while working alone. Travel off road or parking in vegetated areas will be restricted during fire season.
- Areas with grass that are as tall or taller than the exhaust system of a vehicle must be wetted before vehicles travel through it.
- Workers will be instructed to shut off the engine of any vehicle that gets stuck, and periodically inspect the area adjacent to the exhaust system for evidence of ignition of vegetation. Stuck vehicles will be pulled out rather than "rocked" free and the area will be inspected again after the vehicle has been moved.
- All combustion engines (including but not limited to off road vehicles, chainsaws, and generators) will be equipped with a spark arrester that meets U.S. Forest Service Standard 5100-1.
- The contractor(s) will designate a location for field fueling operations at the temporary construction yards. Any fueling of generators, pumps, etc. shall take place at this location only.
- Fuel containers, if used, shall remain in a vehicle or equipment trailer, parked at a designated location alongside a county right-of-way. No fuel containers shall be in the vehicles that exit the right-of-way except the five-gallon container that is required for the water truck pump.
- Smoking shall only be allowed in designated smoking areas at the Facility.

~~Vegetation within areas temporarily disturbed during construction of the Facility, as well as revegetation of areas within the solar array fence line area, will be revegetated as outlined in the Revegetation Plan (see Exhibit P, Attachment P-4). As noted in the Revegetation Plan, areas within the solar array fence line area will be revegetated with a mixture of low-growing grasses and forbs which would be compatible with desired vegetation conditions under the solar arrays (i.e., species whose mature height would not interfere with or shade the solar array). In addition, vegetation within the solar array fence line area will be managed as needed to reduce fuels for fire. This would include mowing vegetation under solar panels periodically, if required. The Applicant will also maintain a 5-foot noncombustible, defensible space clearance along the fenced perimeter of the site boundary.~~

~~A physical vegetation survey assessment of the fenced area will be completed at least twice a year to monitor for vegetation clearances, maintain fire breaks, as applicable, and monitor for wildfire hazards. One of the vegetation survey assessments will occur in May or June, prior to the start of the dry season, a time when wildfire risk begins to become heightened. The survey will be conducted by the Site Operations Manager and will be used to assess the frequency of any upcoming vegetation maintenance required and identify areas that may need additional attention. The survey will be used to create a Vegetation Maintenance Work Plan. The work plan will be a living document that will be updated in order to meet the objectives of this Plan. Observations in the vegetation survey will include:~~

- ~~Location of observations~~
- ~~Species~~
- ~~Estimated growth rate~~
- ~~Abundance~~
- ~~Clearance / Setbacks~~
- ~~Risk of fire hazard~~

~~Additional vegetation surveys may be required throughout the season based on seasonally heightened fire risk. The Vegetation Maintenance Work Plan will be followed during operation of the Facility to ensure that vegetation does not grow in a manner that blocks or reduces solar radiation reaching the solar panels and reduce the risk of starting a fire. Vegetation control will employ best management practices (BMPs) and techniques that are most appropriate for the local environment. BMPs may include physical vegetation control such as mowing. Noxious weeds within the site boundary will be controlled in accordance with the Noxious Weed Control Plan (see Exhibit P, Attachment P-4). Efforts will be made to minimize the use of herbicides and only herbicides approved for use by the U.S. Environmental Protection Agency and Oregon Department of Agriculture will be used. Herbicides used for vegetation management of the site will be selected and used in a manner that fully complies with all applicable laws and regulations.~~

~~Vegetation within the fence line and below the solar arrays will be maintained to a height of 18 inches and provide a minimum of 24-inch clear distance to any exposed electrical cables. Exposed electrical wires should be running under the solar panels at the midpoint or higher than the center of the panel. The areas immediately around the O&M buildings, substations, and battery energy storage system will be graveled, with no vegetation present.~~

~~Ongoing vegetation management to ensure that vegetation does not grow in these graveled areas is outlined in Table 1.~~

Table 1. Vegetation Management Procedures by Facility Component

Vegetation Management	Procedure	Standard	Time Frame
Solar Inverter	Herbicide application on gravel pad around inverter to prevent vegetation growth.	Institute of Electrical and Electronics Engineers (IEEE) 80[1] National Electrical Code (NEC) 70[2]	Yearly, depending on vegetation condition.
Substation	Herbicide application on substation gravel pad. Highly compacted gravel foundations of substation are not suitable for vegetation.	IEEE 80[1] NEC 70[2]	Yearly, depending on vegetation condition.
Battery energy storage system	Herbicide application on gravel pad surrounding the battery energy storage system. Highly compacted gravel foundations of the battery energy storage system are not suitable for vegetation.	IEEE 80[1] NEC 70[2]	Yearly, depending on vegetation condition.
Overhead electrical lines	Mow vegetation to achieve clearance requirements between conductor and ground.	North American Electric Reliability Corporation (NERC)[3]	Yearly, depending on vegetation condition.

1. IEEE (2015)
2. NFPA (2023)
3. NERC (2009)

4.05.0 Preventative and Minimization Actions for Wildfire Risk

OAR 345-022-0115(1)(b)(C) Identify preventative actions and programs that the applicant will carry out to minimize the risk of facility components causing wildfire, including procedures that will be used to adjust operations during periods of heightened wildfire risk;

4.15.1 Preventative Actions

The Applicant will minimize risk of construction causing wildfire by implementing a number of systems and procedures. These will include requirements to conduct welding or metal cutting only in areas cleared of vegetation, and maintaining emergency firefighting equipment on-site. Employees will keep vehicles on roads and off dry grassland when feasible during the dry months of the year, unless such activities are required for emergency purposes, in which case fire precautions will be observed. Fire extinguishers and shovels will be kept in all vehicles. On-site employees will also receive training on fire prevention and response and have on-site fire extinguishers to respond to small fires. In the event of a large fire, emergency responders will be dispatched.

The Applicant will minimize risk of Facility components causing wildfire through preventative actions. In the design of the Facility, the Applicant will implement the design considerations and best practices outlined in Table 2 to minimize electrical fire risk from facility components.

Table 2. Design Considerations for Fire Safety by Facility Component

Consideration	Inverter	Substation	Battery Energy Storage System	Overhead Lines
Electrical connections by qualified electricians	X	X	X	X
Inspections for mechanical integrity prior to energizations	X	X	X	X
Lighting protection	X	X	X	X
Corrosion protection	X	X	X	X
Strain relief of connecting cabling	X	X	X	X
Protection against moisture	X	X	X	X
Grounding systems	X	X	X	X
Safety setback from structures	X[1]	X[1]	X[1]	X[2]
Technology specific design standards	X[3]	X[4]	X[5]	X[3]

1. Graveled inside structure's perimeter fence with additional 3-foot gravel setback outside of structure's perimeter fence
2. Vertical and horizontal clearances from structures depends on voltage of conductor.
3. NFPA 70 (.NFPA 2023).
4. IEEE 979 (IEEE 2012).
5. NFPA 1, Chapter 52 (NFPA 2021).

During Facility operations, the areas within the site boundary that are subject to a heightened risk of wildfire include the solar array areas. The solar array areas will have low-growing vegetation maintained below the solar arrays during the operational period of the Facility. Measures for reducing the risk of fire ignition and reducing the risk of equipment damage were a wildfire to occur are discussed further in Section 3.0, including the Facility's vegetation management program (see Section 3.2), and through the emergency response procedures that will be described in the Emergency Management Plan (EMP). The EMP will be developed for the Facility and is outlined below in Section 4.2.5. The collector substation area, transformer pads, and the permanent, fenced parking and storage area will have reduced risk for fire due to the fact that these areas will have a gravel base with no vegetation within a 10-foot perimeter to reduce fire risk.

The Facility components will meet National Electrical Code and Institute of Electrical and Electronics Engineers standards and will not pose a significant fire risk. The solar array will have shielded electrical cabling, as required by applicable code, to prevent electrical fires. In addition, the collector system and substation will have redundant surge arrestors to deactivate the Facility during unusual operational events that could start fires. The collector substation and the switchyard will have also sufficient spacing between equipment to prevent the spread of fire.

Unless already paved, access roads will be graveled. Facility roads will be sufficiently sized for emergency vehicle access in accordance with 2019 Oregon Fire Code requirements, including Section 503 and Appendix D - Fire Apparatus Access Roads. Specifically, roads will primarily be 10 feet wide in the solar array area with roads up to 20 feet wide near the substation, with an internal turning radius of 28 feet and less than 10 percent grade, or a similar profile depending on siting, to provide access to emergency vehicles. The areas immediately around the O&M buildings, substations, and battery energy storage system will be graveled, with no vegetation present. See Exhibit U for additional discussion of Project fire prevention measures and coordination with local emergency responders.

~~Smoke/fire detectors will be placed around the site that will be tied to the SCADA system and will contact local firefighting services. This communication system allows each solar string, battery energy storage system, and substation to be monitored by a SCADA system, accessed through both the SCADA control room in the substations or remotely. This system monitors these components for variables such as meteorological conditions, critical operating parameters, and power output. The solar array is controlled and monitored via the SCADA system, and can be controlled remotely. SCADA software is tuned specifically to the needs of each project by the solar module manufacturer or a third-party SCADA vendor. This system will be monitored 24/7 by a remote operations center.~~

~~The Applicant proposes to construct either a direct current–coupled distributed battery energy storage system (located throughout the solar array fence line area at the inverter and transformer sites) or alternating current–coupled battery energy storage system (concentrated in a single location within the solar array fence line area). The system as a whole will use a series of self-contained containers located within the solar array fence line area. The containers may have their own additional fencing, to be determined prior to construction. Each container will be placed on a concrete foundation. Regardless of the battery technology selected, the containers are estimated to require up to 0.2 to 0.4 acre each with a total of 14,946 containers. Each container is rated for outdoor environments and holds the batteries and a battery management system.~~

~~The Facility will use either Li-ion batteries or zinc batteries to store up to 1,200 MW alternating current of power over a 6-hour discharge duration (7,200 megawatt-hours alternating current) (Exhibit C, Figure C-2).~~

~~The zinc-based batteries under consideration for this Facility are non-flammable and tolerate wide temperature ranges. As a result, the manufacturer affirms that they are not anticipated to present a fire hazard and do not require on-site fire suppression systems. Additionally, zinc batteries will have fans and a heating unit for climate control.~~

~~The following paragraphs summarize the information pertinent to fire prevention and control for a Li-ion battery energy storage system, if selected. The chemicals used in Li-ion batteries are generally nontoxic but do present a flammability hazard. Li-ion systems would also include a fire prevention system and cooling units placed either on top of the containers or along the side. Li-ion batteries are susceptible to overheating and typically require cooling systems dedicated to each battery energy storage system enclosure, especially at the utility scale (Jeevarajan et al. 2022). The~~

~~gas released by an overheating Li-ion cell is mainly carbon dioxide but may also include carbon monoxide, methane, ethylene, and propylene (Jeevarajan et al. 2022).~~

~~The Applicant will implement the following fire prevention and control methods to minimize fire and safety risks for the Li-ion batteries proposed for the battery energy storage system:~~

- ~~The batteries will be stored in completely contained, leak-proof modules.~~
- ~~Ample working space will be provided around the battery energy storage system for maintenance and safety purposes.~~
- ~~Off-site, 24-hour monitoring of the battery energy storage system will be implemented and will include shutdown capabilities.~~
- ~~Transportation of Li-ion batteries is subject to 49 Code of Federal Regulations (CFR) 173.185 – Department of Transportation Pipeline and Hazardous Material Administration. This regulation contains requirements for prevention of a dangerous evolution of heat; prevention of short circuits; prevention of damage to the terminals; and prevention of batteries coming into contact with other batteries or conductive materials. Adherence to the requirements and regulations, personnel training, safe interim storage, and segregation from other potential waste streams will minimize any public hazard related to transport, use, or disposal of batteries.~~
- ~~Design of the battery energy storage system will be in accordance with applicable Underwriters Laboratories (UL; specifically, 1642, 1741, 1973, 9540A), National Electric Code, and National Fire Protection Association (specifically 855) standards, which require rigorous industry testing and certification related to fire safety and/or other regulatory requirements applicable to battery storage at the time of construction.~~
- ~~Additionally, the Applicant will employ the following design practices, as applicable to the available technology and design at time of construction:~~
    - ~~Use of Li-ion phosphate battery chemistry that does not release oxygen when it decomposes due to temperature;~~
    - ~~Employment of an advanced and proven battery management system;~~
    - ~~Qualification testing of battery systems in accordance with UL 9540A (UL Solutions 2023);~~
    - ~~Employment of Fike fire control panels with 24-hour battery backup at every battery container;~~
    - ~~Installation of fire sensors, smoke and hydrogen detectors, alarms, emergency ventilation systems, cooling systems, and aerosol fire suppression/extinguishing systems in every battery container;~~
    - ~~Installation of doors that are equipped with a contact that will shut down the battery container if opened;~~

- ~~Installation of fire extinguishing and thermal insulation sheets between each individual battery cell;~~
- ~~Implementation of locks and fencing to prevent entry of unauthorized personnel;~~
- ~~Installation of remote power disconnect switches; and~~
- ~~Clear and visible signs to identify remote power disconnect switches.~~

~~4.2~~5.2 Preventative Programs

The Applicant will implement the following programs to minimize fire risk during ~~operations~~ construction of the Facility, as applicable.

~~4.2.1~~5.2.1 *Occupational Safety and Health Act–Compliant Fire Prevention Plan*

To assure safe and healthful working conditions under the Occupational Safety and Health Act of 1970, all workers, contracting employees, and other personnel performing official duties at the Facility will conduct work under a Fire Prevention Plan that meets applicable portions of 29 CFR 1910.39, 29 CFR 1910.155, and 29 CFR 1910, subpart L. The plan will ensure that:

- Workers are trained in fire prevention, good housekeeping, and use of a fire extinguisher.
- Necessary equipment is available to fight incipient stage fires. Fire beyond incipient stage shall be managed using local fire response organizations.
- Provide necessary safety equipment for handling and storing combustible and flammable material.
- Ensure equipment is maintained to prevent and control sources of ignition.
- Do not allow smoking or open flames in an area where combustible materials are located.
- Implement a Hot Work Procedure program.

~~*4.2.2 Electrical Safety Program*~~

~~All operational workers will be trained in electrical safety and the specific hazards of the Facility. This training will address:~~

- ~~Minimum experience requirements to work on different types of electrical components;~~
- ~~Electrical equipment testing and troubleshooting;~~
- ~~Switching system;~~
- ~~Provisions for entering high voltage areas (e.g., substation);~~
- ~~Minimum approach distances; and~~
- ~~Required personal protective equipment.~~

~~4.2.3 Lock Out/Tag Out Program~~

~~During maintenance activities, electrical equipment will be de-energized and physically locked or tagged in the de-energized positions to inadvertent events that could result in arc flash.~~

~~4.2.4~~5.2.2 Fire Weather Monitoring and Hot Work

Burn probability, expected flame length, and overall risk may increase d~~d~~uring periods of the fire season. Personnel on site will monitor Fire Weather Watches and Red Flag Warnings. A fire w~~w~~eather watch indicates the potential for weather conducive to large fore spread in the next 12 to 72 hours. A Red Flag Warning is issued when current weather conditions are conducive to large fire growth in the next 24 hours. Personnel monitoring these conditions ~~may~~ shall halt work in ~~certain~~ high risk locations, designated in this plan, ~~or~~and employ additional mitigation measures designated in this plan. Mitigation measures during a Red Flag Warning include, but are not limited to, communicating to on-site staff of the Red Flag Warning, communicating with local fire protection agency personnel of on-going conditions, driving or parking on roads to avoid sparking a fire in grass or brush, and -halting construction activities that may increase fire risk such as hot work. All hot work (any cutting, welding, or other activity that creates spark or open flame) must be conducted on roads or on non-combustible surfaces, and fire suppression equipment will be immediately available during hot work activities. Following the completion of hot work, the Certificate Holder or contractor(s) must maintain a fire watch for 60 minutes to monitor for potential ignition.

~~4.2.5~~5.2.3 Emergency Management Plan

The EMP will be prepared prior to construction by the Applicant and construction contractor and will contain policies and procedures for preparing for and responding to a range of potential emergencies, including fires. Implementation of the EMP will ensure risks to public health and safety and risks to emergency responders are minimized. Any potential fires inside the solar array will be controlled by trained staff who will be able to access the Facility around the clock. These measures will help keep external fires out or internal fires in. The EMP will cover response procedures that consider the dry nature of the region and address risks on a seasonal basis. The plan will also specify communication channels the Applicant intends to pursue with local fire protection agency personnel, for example, ~~annual~~ a construction kickoff meeting~~s~~ to discuss emergency planning, and invitations to observe any emergency drill conducted at the Facility. ~~At the beginning of Facility operations, a copy of the site plan indicating the arrangement of the Facility structures and access points will be provided to the local fire district.~~

In addition to the emergency responses to be stipulated in the EMP, personnel will be trained on the RACE (Rescue, Alarm,, Contain, Extinguish) procedure to implement in the event of a fire start. The RACE procedure includes:

- **Rescue** anyone in danger (if safe to do so);

- **Alarm** – call the control room, who will then determine if 911 should be alerted;
- **Contain** the fire (if safe to do so); and
- **Extinguish** the incipient fire stage (if safe to do so).

Vehicles on-site will ~~Personnel on-site will~~ carry fire suppression equipment during the fire season ~~in their vehicles~~. This equipment shall include, at a minimum:

- Fire Extinguisher: Dry chemical, 2.5 or 2.8 pound, 1A-10B: C U/L rating, properly mounted or secured;
- Shovel;
- Collapsible Pail or Backpack Pump: 5-gallon capacity; and
- Drip Can.

Another safety mitigation measure is to have available on site during construction is a water truck, water buffalo, or tank with minimum 500 gallon capacity.

Personnel will receive training on use of suppression equipment. All personnel shall also be equipped with communication equipment capable of reaching the control room from all locations within the amended site boundary.

~~5.01.0 Wildfire Risk Minimization Procedures~~

> ~~*OAR 345-022-0115(1)(b)(D) Identify procedures to minimize risks to public health and safety, the health and safety of responders, and damages to resources protected by Council standards in the event that a wildfire occurs at the facility site, regardless of ignition source;*~~

~~In addition to the measures described above, the risk of a wildfire affecting the public safety, first responders, or Oregon Energy Facility Siting Council -protected resources would be minimized by the procedures listed in Table 3.~~

~~Table 3. Procedures to Minimize Wildfire Risk~~

~~Topic~~	~~Procedures~~
~~Public health and safety~~	~~The public will be excluded from the solar array, substation, and battery energy storage system facilities by fencing. Ground-mounted inverters and junction boxes will be surrounded by bollards to minimize inadvertent vehicle/farm equipment collisions with electrical equipment.~~
~~First Responders~~	~~The Applicant will offer annual training to local first responders. Training will cover the firefighting responses to electrical fires. Response to fires in the facility should focus on controlling spread to adjacent lands. Operational staff will be trained in the use of fire extinguishers for responding to incipient stage fires on site.~~

~~Topic~~	~~Procedures~~
~~Resource Protection~~	~~Resources covered by Energy Facility Siting Council standards near the site boundary include agricultural land, shrub-steppe habitat, and cultural resources. The existing county roads will form a fire break between fields that will discourage the spread of wildfire between fields into wildlife habitat or cultural resources. According to Exhibit S, within the analysis area there are four cultural resources that are listed or likely eligible for listing on the National Register of Historic Places. The four cultural resources include two historic sites, ES-KB-03 and ES-KB-07, and two Historic Properties of Religious or Cultural Significance to Indian Tribes, Sand Hollow Battle Ground and Sisupa. ES-KB-03 is a Dutch barn that was constructed in the late 19th to early 20th century.~~

6.0 Plan Updates and Modifications

OAR 345-022-0115(1)(b)(E) Describe methods the applicant will use to ensure that updates of the plan incorporate best practices and emerging technologies to minimize and mitigate wildfire risk.

~~This Plan will be updated by the Applicant every 5 years. Updates to this Plan will account for changes in local fire protection agency personnel and changes in best practices for minimizing and mitigating fire risk. It is recommended to consult with Morrow County, the local fire department, and the Morrow County Emergency Manager.~~

~~After each 5-year review, a copy of the updated plans will be provided to the Oregon Department of Energy with the annual compliance report required under OAR 345-026-008(2). If after the 5-year review of the Plan a determination is made that no updates are required, an explanation of this determination will be provided in the annual compliance report.~~

~~Every 5 years, the Applicant will review wildfire risk and update this Plan for the site boundary. Evaluation of wildfire risk will be consistent with the requirements of OAR 345-022-0115(1) using current data from reputable sources.~~

~~The Applicant may consider revisions to this Plan at its sole discretion to incorporate future best practices or emerging technology depending on whether the new technology is cost effective and suitable for the site conditions.~~ The Applicant will track the industry groups and applicable design standards outlined in Table 2~~4~~ to identify future technologies or best practices that could be implemented at the Facility.

Table 2: Resources for Future Best Practices

~~**Table 2. Resources for Future Best Practices**~~

Reference	Description	Method
American Clean Power (ACP)	Industry group that establishes best practices for renewable energy projects	The Applicant is a member of ACP and participates in best practice development[1].

Reference	Description	Method
North American Electric Reliability Corporation (NERC)	National Energy Reliability Corporation develops electrical standards for large energy facilities.	The Applicant will follow NERC Standard FAC-003-0 for its vegetation management program of transmission lines[2], or updates to this standard as approved by NERC.
Oregon Specialty Building Codes (OSBC)	Building codes applicable to inhabitable spaces, including the O&M building and the substation enclosure.	Remodeling to the O&M and enclosure structure that requires permits will follow any updates to the OSBC at that time.
APLIC	Avian protection methods for electrical facility reduce fires related to bird/mammal nests on electrical equipment	The Applicant is a member of APLIC[3]. An operational wildlife monitoring program will inspect for wildlife nesting on facilities that could cause fire, and take actions following applicable laws (e.g., Migratory Bird Treaty Act).

1. Link to ACP Standards & Practices: https://cleanpower.org/resources/types/standards-and-practices/.
2. NERC FAC-003-0: https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-003-0.pdf.
3. Link to APLIC member organization: https://www.aplic.org/member_websites.php.

7.0 References

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Attachment M: Draft Operational Wildfire Mitigation Plan

Sunstone Solar Project

Draft Operational Wildfire Mitigation Plan

Sunstone Solar Project
June 2023
Amended by Department July 2024

Prepared for

Sunstone Solar, LLC

Prepared by

Tetra Tech, Inc.

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Table of Contents

List of Tables

Acronyms and Abbreviations

APLIC	Avian Power Line Interaction Committee
Applicant	Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC
BMP	best management practice
CFR	Code of Federal Regulations
CWPP	Community Wildfire Protection Plan
EMP	Emergency Management Plan
Facility	Sunstone Solar Project
Li-ion	lithium-ion
MW	megawatt
O&M	operations and maintenance
OAR	Oregon Administrative Rules
Plan	Wildfire Mitigation Plan
RACE	Rescue, Alarm, Contain, Extinguish
SCADA	supervisory, control, and data acquisition
UL	Underwriters Laboratories

1.0 Introduction

Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Applicant), proposes to construct the Sunstone Solar Project (Facility), a solar photovoltaic energy generation facility with up to 1,200 megawatts (MW) of nominal electric generating capacity. In addition to solar arrays, the proposed Facility would include up to 7.2 gigawatt hours of distributed battery storage capacity, an interconnection substation, up to seven collector substations, an operations and maintenance building, and other structures including roads, perimeter fencing, and gates. The Facility is proposed to be sited within an approximately 10,960-acre (17 square mile) site boundary in Morrow County. All land within the proposed site boundary is privately owned and zoned for Exclusive Farm Use.

This Wildfire Mitigation Plan (Plan) is attached to Exhibit V – Wildfire Prevention and Risk Mitigation that was prepared to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010(1)(v), including providing evidence that the Facility complies with the approval standard in OAR 345-022-0115.

2.0 Wildfire Risk Minimization Procedures

OAR 345-022-0115(1)(b)(D) Identify procedures to minimize risks to public health and safety, the health and safety of responders, and damages to resources protected by Council standards in the event that a wildfire occurs at the facility site, regardless of ignition source;

In addition to the measures described above, the risk of a wildfire affecting the public safety, first responders, or Oregon Energy Facility Siting Council–protected resources would be minimized by the procedures listed in Table 1~~3~~.

Certificate holder will contact local fire districts, as well as local emergency management agencies to request and incorporate any input into final WMP, as appropriate, about the location and types of temporary fire breaks needed in the event of a fire on or off site. The final WMP shall designate:

- Estimated response times for on-site staff and local emergency service providers, (to the extent emergency service information is available),
- Protocols for staff or emergency providers to erect or create fire breaks in the event of a fire, (to the extent emergency service information is available),
- Identify and provide maps of priority areas where fire breaks would be prioritized to protect fires spreading off site or impacting the facility site.

During operation, the certificate holder or its contractor will work directly with local emergency responders, if available, to compile and maintain a current list of adjacent landowners/property owners with contact information. The final Wildfire Mitigation Plan will identify the best notification procedures of adjacent landowners/property owners to provide to local and regional emergency services for emergency notifications, in the event of an ignition or fire at the facility.

Table 1: Procedures to Minimize Wildfire Risk

~~Table 3. Procedures to Minimize Wildfire Risk~~

Topic	Procedures
Public health and safety	The public will be excluded from the solar array, substation, and battery energy storage system facilities by fencing. Ground-mounted inverters and junction boxes will be surrounded by bollards to minimize inadvertent vehicle/farm equipment collisions with electrical equipment.
First Responders	The Applicant will offer annual training to local first responders. Training will cover the firefighting responses to electrical fires. Response to fires in the facility should focus on controlling spread to adjacent lands. Operational staff will be trained in the use of fire extinguishers for responding to incipient stage fires on site.
Resource Protection	Resources covered by Energy Facility Siting Council standards near the site boundary include agricultural land, shrub steppe habitat, and cultural resources. The existing county roads will form a fire break between fields that will discourage the spread of wildfire between fields into wildlife habitat or cultural resources. According to Exhibit S, within the analysis area there are four cultural resources that are listed or likely eligible for listing on the National Register of Historic Places. The four cultural resources include two historic sites, ES-KB-03 and ES-KB-07, and two Historic Properties of Religious or Cultural Significance to Indian Tribes, Sand Hollow Battle Ground and Sisupa. ES-KB-03 is a Dutch barn that was constructed in the late 19th to early 20th century.

~~2.0~~3.0 Wildfire Risk Assessment Update

This Plan has been prepared to meet the approval standard under OAR 345-022-0115(1)(b), which requires:

> *OAR 345-022-0115(1)(b)(A) Identify areas within the site boundary that are subject to a heightened risk of wildfire, using current data from reputable sources, and discuss data and methods used in the analysis;*

Prior to operation of the facility provide a summary update of wildfire risk at the site as designated under OAR 345-022-0115.

~~Data from the Oregon Community Wildfire Protection Plan (CWPP) Planning Tool were used for the analyses in this Plan (ODF and USFS 2018). The statewide wildfire risk map was developed and will be updated and maintained per requirements under Senate Bill 762 and associated administrative rules. The Oregon Explorer's CWPP data are from the 2018 Pacific Northwest Quantitative Wildfire Risk Assessment (Gilbertson-Day et al. 2018). The CWPP Planning Tool provides a clearinghouse of fire behavior and fire effects data to aid decision makers in charge of reducing wildfire risk in their communities. These data were analyzed within the site boundary and within the wildfire analysis area (i.e., a 0.5-mile buffer of the site boundary).~~

~~Based on the data provided in Exhibit V, the site boundary has low to moderate overall wildfire risk as it contains primarily cultivated crop land cover and is relatively flat topography. Of the approximately 13 percent of the site boundary that has modeled fire risk, approximately 12 percent~~

~~of the site boundary is low fire risk. A majority (87 percent) of the site boundary contains no highly valued resources or assets (such as critical infrastructure, developed recreation, housing unit density) mapped in the area, or simulated wildfires did not burn the area due to low historical occurrence/absence of burnable fuel, and therefore have no overall fire risk rating (see Exhibit V, Table V-10; Gilbertson-Day et al. 2018, ODF and USFS 2018). Areas of low overall wildfire risk are primarily in the west in areas of agriculture and pastures (see Exhibit V, Figure V-6). Areas of high and moderate wildfire risk are centered around the gentle sloping features, shrub or grassland vegetation, and infrastructure along Grieb Lane, Doherty Road, Melville Lane, and Lexington-Echo Highway near the middle of the site boundary as well as along Bombing Range Road in the northwestern portion of the wildfire analysis area (a 0.5-mile buffer around the site boundary). The areas of moderate to high wildfire risk outside of the site boundary but within the analysis area include the same roads such as Bombing Range Road and Lexington-Echo Highway, as well as the southeast corner of the Boardman Bombing Range in the northwestern corner of the analysis area.~~

~~Areas of heightened risk from wildfire are described using the CWPP Hazard to Potential Structures (see Exhibit V, Figure V-5). The hazard to potential structures layer shows impact levels to structures within 150 meters of a burnable fuel type, as if structures were present, and if a wildfire occurs. This data layer is based on modeled vegetation and not on building construction materials. This data layer ranges from a very low hazard to potential structures, where the fuel in the area is largely non-burnable or very sparse and there is a low potential for loss of a structure or your home, to a very high hazard to potential structures, where if a fire ignites nearby, there is a high potential for loss of a residence or a structure (Gilbertson-Day et al. 2018).~~

~~The areas of heightened risk and hazard to potential structures within the site boundary are primarily very low (37 percent) and low (44 percent) (see Table V-9 in Exhibit V). There are areas of moderate to high hazard to potential structures concentrated in the northeast and southeast portions of the site boundary and extending into the wildfire analysis area along Doherty Road in the north, near Sand Hollow Road to the south, and south of Melville Lane in the southeast. There are also moderate and high hazards to potential structures along Bombing Range Road in the west. Similar to the site boundary, the areas of heightened risk and hazard to potential structures within the analysis area are primarily very low (37 percent) and low (42 percent). Areas of moderate to high hazard to potential structures that are outside of the site boundary but within the wildfire analysis area are along Doherty Road in the north, near Sand Hollow Road to the south, and south of Melville Lane in the southeast. Northwest of the site boundary but within the wildfire analysis area includes a very high hazard to potential structures west of Bombing Range Road that appears to be a residential and agricultural property.~~

~~Existing infrastructure also represents areas of heightened risk. The existing infrastructure within the site boundary includes pipelines, distribution lines, residential structures, agricultural structures, and other electrical grid infrastructure. There is a substation near the intersection of Grieb Lane and Lexington-Echo Highway. In the southeast, the existing infrastructure within the site boundary includes distribution lines, residences, and agricultural structure along Melville Road. There is a pipeline crossing the northwest portion of the site boundary, and a distribution line and a~~

~~residence along Lexington-Echo Highway. The existing infrastructure within the western portion of the site boundary includes distribution lines, residences, and agricultural structure along Bombing Range Road. The existing infrastructure within the eastern portion includes residences along Doherty Road to the east. The distribution line along Bombing Range Road borders the northwest edge of the site boundary and continues within the wildfire analysis area into the southwest.~~

~~Outside of the site boundary but within the wildfire analysis area, existing infrastructure includes agricultural properties, wind turbines to the west and south, and irrigated agriculture to the north and east. The roads throughout the wildfire analysis area would act as firebreaks including Lexington-Echo Highway, Grieb Lane, Grieb-Wood Road, Bombing Range Road, Doherty Road, and Melville Road.~~

~~3.0~~4.0 Inspection and Management

OAR 345-022-0115(1)(b)(B) Describe the procedures, standards, and time frames that the applicant will use to inspect facility components and manage vegetation in the areas identified under subsection (a) of this section;

~~3.1~~4.1 Facility Inspections

Facility components will be inspected quarterly. The supervisory, control, and data acquisition (SCADA) system collects operating and performance data from the Facility as a whole and allows remote operation. The Applicant will monitor the Facility components, such as the substation and solar arrays, 24 hours a day, 7 days a week including shutdown capabilities. These operational monitoring and maintenance measures are also discussed in Section 4.0.

The battery energy storage system may consist of either zinc-based batteries or lithium-ion (Li-ion) batteries and will be stored in completely contained, leak-proof modules. The modules will be stored on a concrete pad to capture any leaks that may occur. Operations and maintenance (O&M) employees will conduct inspections of the battery energy storage systems according to the manufacturer's recommendations, which are assumed to be monthly inspections.

The zinc-based batteries under consideration for this Facility are non-flammable and tolerate wide temperature ranges. As a result, the manufacturer affirms that they are not anticipated to present a fire hazard and do not require on-site fire suppression systems. Section 2.7.1 of Exhibit B summarizes the information pertinent to fire prevention and control for a Li-ion battery energy storage system, if selected.

Table 2 below provides draft operational inspections for electrical facility components from similar types of facilities. As part of finalizing the final operational WMP, the applicant may update this table as applicable to facility equipment, standards, and inspections.

Table 2: Draft Operational Inspections for Electrical Components

Inspection	Procedure	Standard	Time frame
Solar Inverter	Visual inspection of inverter and surrounding area.	SPCC Plan[1] Manufacturer's maintenance recommendations	Monthly SPCC Bi-annual Preventative Maintenance
Substation	Visual inspection of MPT, Avian Power Line Interaction Committee (APLIC) measures, and surrounding area.	Manufacturer's maintenance recommendations APLIC[2]	Monthly Yearly (APLIC)
BESS	Visual inspection of BESS, PCS, and surrounding areas	SPCC Plan Manufacturer's maintenance recommendations	Monthly
Overhead electrical lines	Visual inspection of components, grounding, APLIC measures, vertical clearance distance between conductor and vegetation.	National Energy reliability Corporation (NERC)[3] APLIC	Bi-annual

1. The Operational Spill Prevention, Control, and Countermeasure Plan for the facility will require these components to be inspected monthly for spills. During these inspections, Operational Staff will also visually inspect the component and surrounding area.
2. Applicant will develop an inspection checklist and program of electrical equipment based on manufacturer's recommendations for individual components.
3. Vegetation maintenance standard FAC-003-0 .

~~3.2~~4.2 Vegetation Management

Vegetation within areas temporarily disturbed during construction of the Facility, as well as revegetation of areas within the solar array fence line area, will be revegetated as outlined in the Revegetation Plan (see Exhibit P, Attachment P-4). As noted in the Revegetation Plan, areas within the solar array fence line area will be revegetated with a mixture of low-growing grasses and forbs which would be compatible with desired vegetation conditions under the solar arrays (i.e., species whose mature height would not interfere with or shade the solar array). In addition, vegetation within the solar array fence line area will be managed as needed to reduce fuels for fire. This would include mowing vegetation under solar panels periodically, if required. The Applicant will also maintain a 5-foot noncombustible, defensible space clearance along the fenced perimeter of the site boundary. Defensible space will be free of combustible vegetation or other materials. Roads and parking areas will be maintained to be free of vegetation tall enough to contact the undercarriage of the vehicle.

A physical vegetation survey assessment of the fenced area will be completed at least twice a year to monitor for vegetation clearances, maintain fire breaks, as applicable, and monitor for wildfire hazards. One of the vegetation survey assessments will occur in May or June, prior to the start of the dry season, a time when wildfire risk begins to become heightened. The survey will be conducted

by the Site Operations Manager and will be used to assess the frequency of any upcoming vegetation maintenance required and identify areas that may need additional attention. The Site Operations Manager will visually assess and document vegetation height, abundance, and areas where vegetation should not be present such as crushed rock bed around collector substations. The vegetation survey assessment will determine that clearances and fire breaks (vegetative clearance areas and areas determined to remain clear to act as permanent fire breaks or areas where temporary fire breaks may be deployed in the event of a fire) are satisfactory, and if not, the mitigation procedures will be implemented (e.g., vegetation management) to ensure clearances and fire breaks are satisfactory ~~and identify areas that may need additional attention.~~ The vegetation survey will document:~~The survey will be used to create a Vegetation Maintenance Work Plan. The work plan will be a living document that will be updated in order to meet the objectives of this Plan. Observations in the vegetation survey will include~~:

- Location of observations
- Species
- Estimated growth rate
- Abundance
- Clearance / Setbacks
- Risk of fire hazard

Additional vegetation surveys may be required throughout the season based on seasonally heightened fire risk. ~~The~~ Vegetation Maintenance ~~Work Plan~~procedures and BMPs will be followed during operation of the Facility to ensure that vegetation does not grow in a manner that blocks or reduces solar radiation reaching the solar panels and reduce the risk of starting a fire. Vegetation control will employ best management practices (BMPs) and techniques that are most appropriate for the local environment. BMPs may include physical vegetation control such as mowing. Noxious weeds within the site boundary will be controlled in accordance with the Noxious Weed Control Plan (see Exhibit P, Attachment P-4). Efforts will be made to minimize the use of herbicides and only herbicides approved for use by the U.S. Environmental Protection Agency and Oregon Department of Agriculture will be used. Herbicides used for vegetation management of the site will be selected and used in a manner that fully complies with all applicable laws and regulations.

Vegetation within the fence line and below the solar arrays will be maintained to a height of 18 inches and provide a minimum of 24-inch clear distance to any exposed electrical cables. Exposed electrical wires should be running under the solar panels at the midpoint or higher than the center of the panel. The areas immediately around the O&M buildings, substations, and battery energy storage system will be graveled, with no vegetation present.

Ongoing vegetation management to ensure that vegetation does not grow in these graveled areas is outlined in Table 3~~1~~.

Table 3. Vegetation Management Procedures by Facility Component

Vegetation Management	Procedure	Standard	Time Frame
Solar Inverter	Herbicide application on gravel pad around inverter to prevent vegetation growth.	Institute of Electrical and Electronics Engineers (IEEE) 80[1] National Electrical Code (NEC) 70[2]	Yearly, depending on vegetation condition.
Substation	Herbicide application on substation gravel pad. Highly compacted gravel foundations of substation are not suitable for vegetation.	IEEE 80[1] NEC 70[2]	Yearly, depending on vegetation condition.
Battery energy storage system	Herbicide application on gravel pad surrounding the battery energy storage system. Highly compacted gravel foundations of the battery energy storage system are not suitable for vegetation.	IEEE 80[1] NEC 70[2]	Yearly, depending on vegetation condition.
Overhead electrical lines	Mow vegetation to achieve clearance requirements between conductor and ground.	North American Electric Reliability Corporation (NERC)[3]	Yearly, depending on vegetation condition.

1. IEEE (2015)
2. NFPA (2023)
3. NERC (2009)

~~4.0~~5.0 Preventative and Minimization Actions for Wildfire Risk

OAR 345-022-0115(1)(b)(C) Identify preventative actions and programs that the applicant will carry out to minimize the risk of facility components causing wildfire, including procedures that will be used to adjust operations during periods of heightened wildfire risk;

~~4.1~~5.1 Preventative Actions and Design Features

The Applicant will minimize risk of ~~construction~~ operation of the facility causing wildfire by implementing a number of systems and procedures. During O&M activities, ~~T~~these will include requirements to conduct welding or metal cutting only in areas cleared of vegetation, and maintaining emergency firefighting equipment on-site. Employees will keep vehicles on roads and off dry grassland when feasible during the dry months of the year, unless such activities are required for emergency purposes, in which case fire precautions will be observed. Fire extinguishers and shovels will be kept in all vehicles. On-site employees will also receive training on fire prevention and response and have on-site fire extinguishers to respond to small fires. In the event of a large fire, emergency responders will be dispatched.

The Applicant will minimize risk of Facility components causing wildfire through preventative actions. In the design of the Facility, the Applicant will implement the design considerations and best practices outlined in Table 42 to minimize electrical fire risk from facility components.

Table 4. Design Considerations for Fire Safety by Facility Component

Consideration	Inverter	Substation	Battery Energy Storage System	Overhead Lines
Electrical connections by qualified electricians	X	X	X	X
Inspections for mechanical integrity prior to energizations	X	X	X	X
Lighting protection	X	X	X	X
Corrosion protection	X	X	X	X
Strain relief of connecting cabling	X	X	X	X
Protection against moisture	X	X	X	X
Grounding systems	X	X	X	X
Safety setback from structures	X[1]	X[1]	X[1]	X[2]
Technology specific design standards	X[3]	X[4]	X[5]	X[3]

1. Graveled inside structure's perimeter fence with additional 3-foot gravel setback outside of structure's perimeter fence
2. Vertical and horizontal clearances from structures depends on voltage of conductor.
3. NFPA 70 (.NFPA 2023).
4. IEEE 979 (IEEE 2012).
5. NFPA 1, Chapter 52 (NFPA 2021).

During Facility operations, the areas within the site boundary that are subject to a heightened risk of wildfire include the solar array areas. The solar array areas will have low-growing vegetation maintained below the solar arrays during the operational period of the Facility. Measures for reducing the risk of fire ignition and reducing the risk of equipment damage were a wildfire to occur are discussed further in Section 3.0, including the Facility's vegetation management program (see Section 3.2), and through the emergency response procedures that will be described in the Emergency Management Plan (EMP). The EMP will be developed for the Facility and is outlined below in Section 4.2.5. The collector substation area, transformer pads, and the permanent, fenced parking and storage area will have reduced risk for fire due to the fact that these areas will have a gravel base with no vegetation within a 10-foot perimeter to reduce fire risk.

The Facility components will meet National Electrical Code and Institute of Electrical and Electronics Engineers standards and will not pose a significant fire risk. The solar array will have shielded electrical cabling, as required by applicable code, to prevent electrical fires. In addition, the collector system and substation will have redundant surge arrestors to deactivate the Facility during unusual operational events that could start fires. The collector substation and the switchyard will have also sufficient spacing between equipment to prevent the spread of fire.

Unless already paved, access roads will be graveled. Facility roads will be sufficiently sized for emergency vehicle access in accordance with 2019 Oregon Fire Code requirements, including Section 503 and Appendix D - Fire Apparatus Access Roads. Specifically, roads will primarily be 10 feet wide in the solar array area with roads up to 20 feet wide near the substation, with an internal turning radius of 28 feet and less than 10 percent grade, or a similar profile depending on siting, to provide access to emergency vehicles. A 5-foot noncombustible, defensible space clearance along the fenced perimeter of the site boundary will be maintained. The areas immediately around the O&M buildings, substations, and battery energy storage system will be graveled, with no vegetation present. See Exhibit U for additional discussion of Project fire prevention measures and coordination with local emergency responders. Vegetation free areas such as gravel pads or base and facility perimeter and interior roads act as a permanent fire break which could minimize the spread of fires on site or impacts from an external wildfire.

Smoke/fire detectors will be placed around the site that will be tied to the SCADA system and will contact local firefighting services. This communication system allows each solar string, battery energy storage system, and substation to be monitored by a SCADA system, accessed through both the SCADA control room in the substations or remotely. This system monitors these components for variables such as meteorological conditions, critical operating parameters, and power output. The solar array is controlled and monitored via the SCADA system, and can be controlled remotely. SCADA software is tuned specifically to the needs of each project by the solar module manufacturer or a third-party SCADA vendor. This system will be monitored 24/7 by a remote operations center.

The Applicant proposes to construct either a direct current–coupled distributed battery energy storage system (located throughout the solar array fence line area at the inverter and transformer sites) or alternating current–coupled battery energy storage system (concentrated in a single location within the solar array fence line area). The system as a whole will use a series of self-contained containers located within the solar array fence line area. The containers may have their own additional fencing, to be determined prior to construction. Each container will be placed on a concrete foundation. Regardless of the battery technology selected, the containers are estimated to require up to 0.2 to 0.4 acre each with a total of 14,946 containers. Each container is rated for outdoor environments and holds the batteries and a battery management system.

The Facility will use either Li-ion batteries or zinc batteries to store up to 1,200 MW alternating current of power over a 6-hour discharge duration (7,200 megawatt-hours alternating current) (Exhibit C, Figure C-2).

The zinc-based batteries under consideration for this Facility are non-flammable and tolerate wide temperature ranges. As a result, the manufacturer affirms that they are not anticipated to present a fire hazard and do not require on-site fire suppression systems. Additionally, zinc batteries will have fans and a heating unit for climate control.

The following paragraphs summarize the information pertinent to fire prevention and control for a Li-ion battery energy storage system, if selected. The chemicals used in Li-ion batteries are generally nontoxic but do present a flammability hazard. Li-ion systems would also include a fire prevention system and cooling units placed either on top of the containers or along the side. Li-ion

batteries are susceptible to overheating and typically require cooling systems dedicated to each battery energy storage system enclosure, especially at the utility scale (Jeevarajan et al. 2022). The gas released by an overheating Li-ion cell is mainly carbon dioxide but may also include carbon monoxide, methane, ethylene, and propylene (Jeevarajan et al. 2022).

The Applicant will implement the following fire prevention and control methods to minimize fire and safety risks for the Li-ion batteries proposed for the battery energy storage system:

- The batteries will be stored in completely contained, leak-proof modules.
- Ample working space will be provided around the battery energy storage system for maintenance and safety purposes.
- Off-site, 24-hour monitoring of the battery energy storage system will be implemented and will include shutdown capabilities.
- Transportation of Li-ion batteries is subject to 49 Code of Federal Regulations (CFR) 173.185 – Department of Transportation Pipeline and Hazardous Material Administration. This regulation contains requirements for prevention of a dangerous evolution of heat; prevention of short circuits; prevention of damage to the terminals; and prevention of batteries coming into contact with other batteries or conductive materials. Adherence to the requirements and regulations, personnel training, safe interim storage, and segregation from other potential waste streams will minimize any public hazard related to transport, use, or disposal of batteries.
- Design of the battery energy storage system will be in accordance with applicable Underwriters Laboratories (UL; specifically, 1642, 1741, 1973, 9540A), National Electric Code, and National Fire Protection Association (specifically 855) standards, which require rigorous industry testing and certification related to fire safety and/or other regulatory requirements applicable to battery storage at the time of construction.
- Additionally, the Applicant will employ the following design practices, as applicable to the available technology and design at time of construction:
    - Use of Li-ion phosphate battery chemistry that does not release oxygen when it decomposes due to temperature;
    - Employment of an advanced and proven battery management system;
    - Qualification testing of battery systems in accordance with UL 9540A (UL Solutions 2023);
    - Employment of Fike fire control panels with 24-hour battery backup at every battery container;
    - Installation of fire sensors, smoke and hydrogen detectors, alarms, emergency ventilation systems, cooling systems, and aerosol fire suppression/extinguishing systems in every battery container;

- Installation of doors that are equipped with a contact that will shut down the battery container if opened;
- Installation of fire extinguishing and thermal insulation sheets between each individual battery cell;
- Implementation of locks and fencing to prevent entry of unauthorized personnel;
- Installation of remote power disconnect switches; and
- Clear and visible signs to identify remote power disconnect switches.

~~4.2~~5.2 Preventative Programs

The Applicant will implement the following programs to minimize fire risk during operations of the Facility.

~~4.2.1~~5.2.1 *Occupational Safety and Health Act–Compliant Fire Prevention Plan*

To assure safe and healthful working conditions under the Occupational Safety and Health Act of 1970, all workers, contracting employees, and other personnel performing official duties at the Facility will conduct work under a Fire Prevention Plan that meets applicable portions of 29 CFR 1910.39, 29 CFR 1910.155, and 29 CFR 1910, subpart L. The plan will ensure that:

- Workers are trained in fire prevention, good housekeeping, and use of a fire extinguisher.
- Necessary equipment is available to fight incipient stage fires. Fire beyond incipient stage shall be managed using local fire response organizations.
- Provide necessary safety equipment for handling and storing combustible and flammable material.
- Ensure equipment is maintained to prevent and control sources of ignition.
- Do not allow smoking or open flames in an area where combustible materials are located.
- Implement a Hot Work Procedure program.

~~4.2.2~~5.2.2 *Electrical Safety Program*

All operational workers will be trained in electrical safety and the specific hazards of the Facility. This training will address:

- Minimum experience requirements to work on different types of electrical components;
- Electrical equipment testing and troubleshooting;
- Switching system;
- Provisions for entering high voltage areas (e.g., substation);
- Minimum approach distances; and

- Required personal protective equipment.

~~4.2.3~~5.2.3 Lock Out/Tag Out Program

During maintenance activities, electrical equipment will be de-energized and physically locked or tagged in the de-energized positions to inadvertent events that could result in arc flash.

~~4.2.4~~5.2.4 Fire Weather Monitoring and Hot Work

Burn probability, expected flame length, and overall risk may increase during periods of the fire season. Personnel on site will monitor Fire Weather Watches and Red Flag Warnings. A fire weather watch indicates the potential for weather conducive to large fore spread in the next 12 to 72 hours. A Red Flag Warning is issued when current weather conditions are conducive to large fire growth in the next 24 hours. Personnel monitoring these conditions ~~may~~ shall halt work in ~~certain~~ high risk locations, as designated in this plan, and ~~or~~ employ additional mitigation measures designated in this plan. Mitigation measures during a Red Flag Warning include, but are not limited to, communicating to on-site staff of the Red Flag Warning, communicating with local fire protection agency personnel of on-going conditions, driving or parking on roads to avoid sparking a fire in grass or brush, and halting construction activities that may increase fire risk such as hot work. All hot work (any cutting, welding, or other activity that creates spark or open flame) must be conducted on roads or on non-combustible surfaces, and fire suppression equipment will be immediately available during hot work activities. Following the completion of hot work, the Certificate Holder or contractor(s) must maintain a fire watch for 60 minutes to monitor for potential ignition.

~~4.2.5~~5.2.5 Emergency Management Plan

~~The EMP will be prepared prior to construction by the Applicant and construction contractor and will contain policies and procedures for preparing for and responding to a range of potential emergencies, including fires. Implementation of the EMP will ensure risks to public health and safety and risks to emergency responders are minimized. Any potential fires inside the solar array will be controlled by trained staff who will be able to access the Facility around the clock. These measures will help keep external fires out or internal fires in. The EMP~~Emergency Mangement will cover response procedures that consider the dry nature of the region and address risks on a seasonal basis. The ~~plan~~ final -WMP will ~~also~~ specify communication channels the Applicant intends to pursue with local fire protection agency personnel, for example, annual meetings to discuss emergency planning, and invitations to observe any emergency drill conducted at the Facility.

At the beginning of Facility operations, a copy of the site plan indicating the arrangement of the Facility structures, ~~and~~ access points, and fire breaks will be provided to the local fire district.

~~In addition to the emergency responses to be stipulated in the EMP, p~~Personnel will be trained on the RACE (Rescue, Alarm,, Contain, Extinguish) procedure to implement in the event of a fire start. The RACE procedure includes:

- **Rescue** anyone in danger (if safe to do so);
- **Alarm** – call the control room, who will then determine if 911 should be alerted;
- **Contain** the fire (if safe to do so); and
- **Extinguish** the incipient fire stage (if safe to do so).

~~Personnel~~ Vehicles on-site will carry fire suppression equipment during the fire season ~~in their vehicles~~. This equipment shall include, at a minimum:

- Fire Extinguisher: Dry chemical, 2.5 or 2.8 pound, 1A-10B: C U/L rating, properly mounted or secured;
- Shovel;
- Collapsible Pail or Backpack Pump: 5-gallon capacity; and
- Drip Can.

~~Another safety mitigation measure to have available on site during operational activities d~~During times of heightened wildfire risk, ~~is~~ a water truck, water buffalo, or tank with minimum 500 gallon capacity will be stationed at the site during operations and maintenance activities.

Personnel will receive training on use of suppression equipment. All personnel shall also be equipped with communication equipment capable of reaching the control room from all locations within the amended site boundary.

~~5.01.0 Wildfire Risk Minimization Procedures~~

> ~~*OAR 345-022-0115(1)(b)(D) Identify procedures to minimize risks to public health and safety, the health and safety of responders, and damages to resources protected by Council standards in the event that a wildfire occurs at the facility site, regardless of ignition source;*~~

~~In addition to the measures described above, the risk of a wildfire affecting the public safety, first responders, or Oregon Energy Facility Siting Council–protected resources would be minimized by the procedures listed in Table 3.~~

~~Table 3. Procedures to Minimize Wildfire Risk~~

~~Topic~~	~~Procedures~~
~~Public health and safety~~	~~The public will be excluded from the solar array, substation, and battery energy storage system facilities by fencing. Ground-mounted inverters and junction boxes will be surrounded by bollards to minimize inadvertent vehicle/farm equipment collisions with electrical equipment.~~
~~First Responders~~	~~The Applicant will offer annual training to local first responders. Training will cover the firefighting responses to electrical fires. Response to fires in the facility should~~

~~Topic~~	~~Procedures~~
	~~focus on controlling spread to adjacent lands. Operational staff will be trained in the use of fire extinguishers for responding to incipient stage fires on site.~~
~~Resource Protection~~	~~Resources covered by Energy Facility Siting Council standards near the site boundary include agricultural land, shrub steppe habitat, and cultural resources. The existing county roads will form a fire break between fields that will discourage the spread of wildfire between fields into wildlife habitat or cultural resources. According to Exhibit S, within the analysis area there are four cultural resources that are listed or likely eligible for listing on the National Register of Historic Places. The four cultural resources include two historic sites, ES-KB-03 and ES-KB-07, and two Historic Properties of Religious or Cultural Significance to Indian Tribes, Sand Hollow Battle Ground and Sisupa. ES-KB-03 is a Dutch barn that was constructed in the late 19th to early 20th century.~~

6.0 Plan Updates and Modifications

OAR 345-022-0115(1)(b)(E) Describe methods the applicant will use to ensure that updates of the plan incorporate best practices and emerging technologies to minimize and mitigate wildfire risk.

This Plan will be updated by the Applicant every 5 years. Updates to this Plan will account for changes in local fire protection agency personnel and changes in best practices for minimizing and mitigating fire risk. It is recommended to consult with Morrow County, the local fire department, and the Morrow County Emergency Manager.

After each 5-year review, a copy of the updated plans will be provided to the Oregon Department of Energy with the annual compliance report required under OAR 345-026-008(2). ~~If after the 5-year review of the Plan a determination is made that no updates are required, an explanation of this determination will be provided in the annual compliance report.~~

Every 5 years, the Applicant will review wildfire risk and update this Plan for the site boundary. Evaluation of wildfire risk will be consistent with the requirements of OAR 345-022-0115(1) using current data from reputable sources.

The Applicant may consider revisions to this Plan at its sole discretion to incorporate future best practices or emerging technology depending on whether the new technology is cost effective and suitable for the site conditions. The Applicant will track the industry groups and applicable design standards outlined in Table 5~~4~~ to identify future technologies or best practices that could be implemented at the Facility.

Table 5. Resources for Future Best Practices

Reference	Description	Method
American Clean Power (ACP)	Industry group that establishes best practices for renewable energy projects	The Applicant is a member of ACP and participates in best practice development[1].
North American Electric Reliability Corporation (NERC)	National Energy Reliability Corporation develops electrical standards for large energy facilities.	The Applicant will follow NERC Standard FAC-003-0 for its vegetation management program of transmission lines[2], or updates to this standard as approved by NERC.
Oregon Specialty Building Codes (OSBC)	Building codes applicable to inhabitable spaces, including the O&M building and the substation enclosure.	Remodeling to the O&M and enclosure structure that requires permits will follow any updates to the OSBC at that time.
APLIC	Avian protection methods for electrical facility reduce fires related to bird/mammal nests on electrical equipment	The Applicant is a member of APLIC[3]. An operational wildlife monitoring program will inspect for wildlife nesting on facilities that could cause fire, and take actions following applicable laws (e.g., Migratory Bird Treaty Act).

1. Link to ACP Standards & Practices: https://cleanpower.org/resources/types/standards-and-practices/.
2. NERC FAC-003-0: https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-003-0.pdf.
3. Link to APLIC member organization: https://www.aplic.org/member_websites.php.

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Attachment N: Draft Road Use Agreement with Draft Construction Management Plan

Attachment U-8. Draft Road Use Agreement

DRAFT ROAD USE AND MAINTENANCE AGREEMENT

THIS ROAD USE AND MAINTENANCE AGREEMENT ("**Agreement**") is entered into at the date and time when the agreement has been signed by all parties as reflected in the signature blocks below. ("**Effective Date**") by and between Morrow County, whose address for purposes of this Agreement is 100 S. Court St., Heppner, Oregon, 97836 ("**County**") and Sunstone Solar, LLC ("**Developer**").

RECITALS

WHEREAS, Developer is developing a solar photovoltaic energy generation facility ("**Project**") on sites located in Morrow County, Oregon, as described in **Exhibit A**, (Overall map including structures, transmission lines, haul routes, access permits, utility permits, O&M buildings and etc.) with approximately xxx structures and an expected total nameplate capacity of approximately 1,250 megawatts ("**MW**"); and

WHEREAS, Developer intends to obtain the necessary approvals to build, operate and maintain the Project; and

WHEREAS, in connection with the construction, operation and maintenance of the Project, the Parties desire to address certain issues relating to the roads owned, operated and maintained by the County and as shown on **Exhibit B** (Map to include all structures, transmission lines, delivery routes, construction routes and other roads used during construction of projects) attached hereto (collectively, the "**Roads**"), over which it will be necessary for Developer and Developer's Representative(s) to, among other things: (i) transport heavy equipment and materials which may be in excess of local design limits of certain Roads, (ii) transport locally sourced materials, such as concrete and gravel, on the Roads; (iii) make specific modifications and improvements (both temporary and permanent) to the Roads (including various associated culverts, bridges, cattle guards, road shoulders and other fixtures) to permit such equipment and materials to pass; and (iv) place overhead and underground electrical and communication cables (collectively "**Cables**") for the Project adjacent to, along, under or across such Roads; and

WHEREAS, Developer and the County wish to set forth their understanding and agreement relating to the use of Roads during the construction of the Project; and

NOW, THEREFORE, in consideration of the mutual terms and conditions set forth in this Agreement, and for other good and valuable consideration, receipt of which is hereby acknowledged, the Parties agree as follows:

TERMS AND CONDITIONS

1. Developer will undertake the following activities in accordance with the terms of this Agreement during the period in which it is constructing the Project (the "Construction Period"). For the avoidance of doubt, the Construction Period will begin only once Developer has initiated material infield earthworks for the construction of the Project under a signed engineering, procurement, and construction agreement. The Construction Period shall not be triggered by (i)

Developer's due diligence activities on the Project's site (including, without limitation, geotechnical boring, preliminary studies, field tiling surveys, plans, entitlement-related studies, push-pull tests, and other site assessments, surveys, environmental assessments, reports, or test results) or (ii) any work performed by or on behalf of the servicing utility company.

a. Designate a company representative with authority to represent Developer. At any time the Developer Designee is changed, Developer shall notify County within 24 hours, informing County of new Designee name, physical and mailing addresses, email address, and contact phone number. As of the date of the Agreement, the company representative is xxxxxxx;

b. At least ninety (90) days prior to beginning the Construction Period, provide the County with a site plan identifying structure locations, site access points, and road crossings, to be attached as **Exhibit A**, along with the transportation route for the Project including routes for heavy haul, construction materials, supplies and other construction traffic attached as **Exhibit B**, subject to amendment and approval from Morrow County Public Works Director, County Administrator or designee of County;

c. At least ninety (90) days prior to beginning the Construction Period, provide the County with all design and engineering specifications for Road improvements required for the Project, as attached as **Exhibit C**, subject to amendment and approval from Morrow County Public Works Director, County Administrator or designee of County, which design and engineering specifications shall be consistent with standards per the Morrow County Transportation System Plan;

d. Erect permanent markers indicating the presence of permitted Cables and install tape in any trench in which Developer has placed or will place permitted Cables in a County right-of-way. All Cables shall comply with county permit requirements as specified in the permit. Cables and any other utilities shall be installed with the least intrusion and placement in County right-of-ways;

e. Notify the County Public Works Director in advance of all oversize transportation and crane crossings over, across or along any Road through the Oregon Department of Transportation permitting process;

f. Transport or cause to be transported the structure segments and other oversize loads in a reasonable effort to minimize adverse impact on the local traffic;

g. Provide reasonable advance notice to the County when it is necessary for a Road to be closed due to a crane crossing or for any other reason relating to the construction of the Project. Notwithstanding the foregoing, Developer will provide no less than forty-eight (48) hours' notice when reasonably practicable and will provide all materials necessary to close the Road; If a closure is approved by the Public Works Director, Developer will provide a timeframe of the closure, if closure is more than 20 minutes, Developer will provide public notice via variable message devices and an approved detour with map and signage on detour route;

h. Provide signage of all road closures and work zones in compliance with the Manual on Uniform Traffic Control Devices and as may be required by the County;

i. Maintain any Roads then used by Developer as necessary for Developer's use of such Roads during the Construction Period, which maintenance shall at all times be in compliance with County standards for general public use, and may include, but are not limited toblading of gravel roads, patching of paved roads, and dust abatement caused by Developer's construction related activities during the Construction Period. For purposes of clarity, this Paragraph does not require County to modify its regular repair and maintenance schedule. If Developer determines that maintenance and repair activities in addition to those regularly conducted by County are necessary for Developer's use of the Roads, then such additional maintenance and repair activities shall be performed by Developer at its sole cost and expense pursuant to this subparagraph;

j. Purchase and deliver applicable road materials for repairs to Roads that are damaged by Developer, Developer Representative, Developer contractor, subcontractor, or employee during the Construction Period and bear the reasonable costs to restore any Roads that are damaged by Developer and/or a Developer Representative during the Construction Period to the condition enjoyed immediately prior to or better than prior to such damage occurring. It is the intent of this Agreement that the Roads will remain open for public use during the Construction Period, and Developer will keep all Roads used by it in conditions approved by Morrow County Public Works Director that allow the continued public use of the Roads. If, despite using commercially reasonably efforts, Developer or Developer Representative is unable to repair damage caused by it within the commercially reasonable time frame requested by County to Public Works Director's approval, County may, at its sole discretion, repair such damage and invoice Developer for the cost for such repair. Developer will pay such cost, plus an additional fee of 20% above said cost for County administration. Developer shall reimburse County for the cost of such repairs within sixty (60) days of Developer receipt of an invoice for such costs. County and Developer agree that this Section is not intended to require County to perform the needed road repairs with reimbursement from Developer on a regular basis. It is the intent of County and Developer that Developer will maintain and repair roads during the Construction Period as described in this Agreement, and will only request County assistance if required after exercise of commercially reasonable efforts to repair damage caused by it within the time frame requested by County. Developer will provide a designated person who will be responsible to inspect County's requests for repairs and schedule those repairs within the commercially reasonable time frame requested by County of notice by the County Public Works Director or his designated representative; and

k. Cables may cross a road, in which case, these Cables will be bored under the road, buried at a minimum depth of forty-eight (48) inches below the road surface and the crossing shall be restored to its pre-construction condition within forty-eight (48) hours or otherwise mutually agreed upon; There will be no open-cut trenching in County roads or right-of-ways unless specifically authorized by the Public Works Director in writing.

l. All roads described in **Exhibit B** identified in the preconstruction inventory must be brought to the standard necessary for the use by Developer. Each road will be evaluated during

the preconstruction inventory and mutually agreed upon by the County and Developer and be added to **Exhibit C** for said improvements.

2. The County, in accordance with the terms of this Agreement, agrees that it shall:

a. Designate the County Public Works Director as the representative with authority to represent the County. As of the date of the Agreement, the County representative is: Public Works Director, 541-989-9500;

b. Timely review and approve all design and engineering specifications for Road improvements required for the Project, as attached as **Exhibit C**, which design and engineering specifications shall be consistent with standards per the Morrow County Transportation System Plan;

c. Timely review and approve Developer's Road improvements pursuant to the design and engineering specification approved by County and set forth in **Exhibit C**;

d. Timely perform routine and regular maintenance of the Roads including: grading, snow removal, striping, routine signage, and regularly scheduled maintenance and repair, as per County normal maintenance schedule, at the availability and direction of the County Public Works Director;

e. Timely review and approve all Project-related access points and road crossings, which are submitted by Developer in **Exhibit A and B**;

f. Timely review and approve plans for all Project-related utility encroachments on County rights-of-way; which are submitted by Developer in accordance with **Exhibit A and B**; and

g. Authorize the Public Works Director to agree on behalf of County to revisions to **Exhibit A, B, and C** and the final location of Road crossings, access points, and utility encroachments as revisions are submitted to the County by or on behalf of Developer.

3. Pre-Construction Inventory. No later than thirty (30) days prior to the start of the Construction Period, the Parties shall jointly perform a survey to record the condition of all Roads which will be used in the transport of equipment, supplies and personnel to the Project. During this survey, the entire length of the Roads shall be videotaped and if deemed necessary by the parties, photographs may also be taken. In addition, the County will provide Developer, if available, with copies of any plans, cross-sections and specifications relevant to the existing Roads structure. Copies of all pre-construction documentation shall be provided to each of the Parties. Developer will reimburse the County for all costs associated with the Pre-Construction Inventory at a rate of one-hundred dollars ($100.00) per hour and reimburse the County within forty-five (45) days of invoice date.

4. Post-Construction Inventory. Upon completion of construction of each phase of the Project, representatives of the County and Developer will perform a Post-Construction Inventory, the methods of which shall be similar to those of the Pre-Construction Inventory described above. The two sets of pre-construction and post-construction data will be compared and if there are any wheel lane ruts, cracking or other damage in excess of the original survey and caused by Developer during the Construction Period, the County and Developer will determine the extent of the repairs or improvements needed to return the roads to a pre-construction condition. All costs associated with the Post-Construction Inventory repairs shall be borne solely by Developer. The timeframe of completion of said repairs shall be no later than one hundred twenty (120) days after the Project begins commercial operations, and said repairs are to be scheduled as agreed to by the Parties. Developer will reimburse the County for all costs associated with the Post-Construction Inventory at a rate of one-hundred dollars ($100.00) per hour and reimburse the County within forty-five (45) days of invoice date.

5. Routing and Access Approval. As soon as practical after execution of this Agreement and as necessary throughout the Construction Period, Developer and County shall meet to discuss routing for the transportation of equipment to the Project, Project-related access points, road crossings and Cable locations and the County shall review and approve the same in accordance with Section 2.

6. Agreement Violations. If County determines that a County road or right-of-way has been used by Developer or any designee, employee, or contractor outside of those Roads authorized in **Exhibit B** during the Construction Period, the County will provide to Developer evidence detailing the usage of the road or right-of-way by Developer and allow sufficient time for Developer to determine if it used the road or right-of-way in question. If Developer and County mutually determine that Developer or any designee, employee, or contractor utilized the road or right-of-way, then County may (a) add the road or right-of-way to the list in **Exhibit B**; (b) come to a mutually agreed resolution with Developer.

7. Shared Use. County acknowledges that separate projects may be constructed within Morrow County at the same time as Developer's Project and during the Construction Period. County acknowledges that construction activities by other parties may involve the usage of the same Roads and rights-of-way identified in Exhibit B and used by Developer during the Construction Period. County agrees that Developer will only be responsible for damage (and/or any restoration) caused to County's Roads or rights-of-way by Developer and not by any usage or actions of another party.

8. Mutual Indemnification/Hold Harmless and Liability Insurance Provisions.

a. Indemnity. Each Party (the "**Indemnifying Party**") agrees to indemnify, defend and hold harmless the other Party and such other Party's mortgagees, lenders, officers, employees and agents (the "**Indemnified Party**") against any and all losses, direct or indirect damages (including consequential damages), claims, expenses, and other liabilities, including, without limitation, attorneys' fees, resulting from or arising out of (i) any negligent act or negligent failure to act on the part of the Indemnifying Party or anyone else engaged in doing work for the Indemnifying Party, or (ii) any breach of this Agreement by the Indemnifying Party. This

indemnification shall not apply to losses, damages, claims, expenses and other liabilities to the extent caused by any negligent or willful act or omission on the part of the Indemnified Party.

b. Limitations of Liability. In no event shall Developer or any of its members, officers, directors or employees or the County or any of its Boards, officers or employees be liable (in contract or in tort, involving negligence, strict liability, or otherwise) to any other Party or their contractors, suppliers, employees, members and shareholders for indirect, incidental, consequential or punitive damages resulting from the performance, non-performance or delay in performance under this Agreement.

c. Required Insurance. Developer shall upon commencement of construction of the Project and for the period of construction of the Project, maintain in full force and effect commercial general liability insurance, in the aggregate amount equal to Three Million Dollars ($3,000,000). Developer may utilize any combination of primary and/or excess insurance to satisfy this requirement and may satisfy this requirement under existing insurance policies for the Project.

9. Miscellaneous

a. Remedies and Enforcement. The Parties acknowledge that money damages would not be an adequate remedy for any breach or threatened breach of this Agreement. Each of the parties hereto covenant and agree that in the event of default of any of the terms, provisions or conditions of this Agreement by any Party (the "**Defaulting Party**"), which default is not caused by the Party seeking to enforce said provisions (the "**Non-Defaulting Party**") and after notice and reasonable opportunity to cure, which shall include notice by the Non-Defaulting Party to the Defaulting Party and a period of forty-five (45) days for the Defaulting Party to respond, has been provided to the Defaulting Party, then in such an event, the Non-Defaulting Party shall have the right to seek specific performance and/or injunctive relief to remedy or prevent any breach or threatened breach of this Agreement. The remedies of specific performance and/or injunctive relief shall be exclusive of any other remedy available at law or in equity.

b. Due Authorization. Developer hereby represents and warrants that this Agreement has been duly authorized, executed and delivered on behalf of Developer. The County hereby represents, and warrants that this Agreement has been duly authorized, executed and delivered on behalf of the County.

c. Severability. If any provision of this Agreement proves to be illegal, invalid, or unenforceable, the remainder of this Agreement will not be affected by such finding, and in lieu of each provision of this Agreement that is illegal, invalid, or unenforceable a provision shall be deemed added as may be possible to accurately reflect the intentions of the Parties and so as to make the unenforceable provision legal, valid, and enforceable.

d. Amendments. This Agreement constitutes the entire agreement and understanding of the parties and supersedes all offers, negotiations and other agreements. There are no representations or understandings of any kind not set forth herein. No amendment or modification

to this Agreement or waiver of a Party's rights hereunder shall be binding unless it shall be in writing and signed by both Parties to this Agreement.

e. Notices. All notices shall be in writing and sent (including via facsimile transmission) to the Parties hereto at the addresses set forth in the Preamble (or to such other address as either such Party shall designate in writing to the other Party at any time).

f. This Agreement may not be assigned without the written consent of the Parties, which consent shall not be unreasonably withheld. Notwithstanding the foregoing, Developer may assign this Agreement to its affiliates and may collaterally assign this Agreement to any lender in support of the Project.

g. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, with the same effect as if the signatures thereto and hereto were upon the instrument. Delivery of an executed counterpart of a signature page to this Agreement by telecopy shall be as effective as delivery of an originally signed counterpart to this Agreement.

h. Governing Law. This Agreement shall be governed by and interpreted in accordance with the laws of the State of Oregon, irrespective of any conflict of laws provisions. Both parties desire that the transactions contemplated hereby be effected and carried out in a manner that is in compliance with all laws.

i. Successor and Assigns. This Agreement shall inure to the benefit of and shall be binding upon the Parties hereto, their respective successors, assignees, and legal representatives.

j. If any Term of this Agreement is found to be void or invalid, such invalidity shall not affect the remaining Terms of this Agreement, which shall continue in full force and effect.

k. Failure of County or Developer to insist on strict performance of any of the conditions or provisions of this Agreement, or to exercise any of their rights hereunder, shall not waive such rights.

l. Whenever in this Agreement the approval or consent of either County or Developer is required or contemplated, unless otherwise specifically stated, such approval or consent shall not be made the subject of a demand for additional compensation, nor otherwise unreasonably conditioned, withheld or delayed.

m. In any litigation arising from or related to this Agreement, the parties hereto each hereby knowingly, voluntarily and intentionally waive the right each may have to a trial by jury with respect to any litigation based hereon, or arising out of, under or in connection with this Agreement.

n. Nothing in this Agreement shall be construed as limiting or removing any applicable federal, state, city, county laws, rules, ordinances, or planning requirements.

o. County agrees that any amendment and additions to **Exhibit C** can be approved by the Public Works Director and the County Administrator on behalf of the County.

[remainder of page intentionally left blank]
signatures begin on following page

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed in their respective names by their duly authorized officers.

Developer:

Sunstone Solar, LLC

By: _____
xxxxxxxxxxxxxx

County:

_____ _____
David Sykes, Chair Date

_____ _____
Jeff Wenholz, Vice-Chair Date

_____ _____
Roy Drago Jr., Commissioner Date

Approved as to Form:

By: _____
Name: _____
Title: County Attorney

EXHIBIT A

Site Plan

EXHIBIT B

Transportation Route – "Roads"

EXHIBIT C

Road Improvements

Attachment U-7. Construction Traffic Management Plan

Draft
Construction Traffic Management Plan

Sunstone Solar Energy Project
Morrow County, Oregon

Prepared for:

Pine Gate Renewables, LLC

Prepared by:

TETRA TECH

December 2023

TABLE OF CONTENTS

FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Purpose and Scope

This Draft Construction Traffic Management Plan (Draft Plan) was prepared to meet the requirements of Morrow County and to be later included in the development of a Road Use Agreement, as described in the Sunstone Solar Energy Project (Project) Exhibit U of the Application for Site Certification (ASC) submitted to the Oregon Energy Facility Siting Council (EFSC).

This Draft Plan, per Oregon Department of Transportation's (ODOT) Traffic Control Plan Manual, is a "living document", and it will continue to grow as the roadway safety needs of the project change over the course of construction. It should be noted that the outline of this document is designed to be comparable with the ODOT Traffic Control Plan Manual's minimum requirements for a TMP, which typically only apply explicitly to significant ODOT highway construction projects. This document will be updated with input from EFSC and agencies identified by EFSC prior to the start of Project construction.

1.2 Project Description

Pine Gate Renewables, LLC (Applicant) proposes to construct and operate the Project. The Project is a solar photovoltaic (PV) generation facility located in north-central Morrow County (County), Oregon. The Project is located south of Interstate 84 (I-84) near Lexington, Oregon, as shown in **Appendix A**.

The following terms are used to describe areas associated with Project development:

- **Project Lease Boundary**: The approximately 10,960-acre area that encompasses assessor parcels that the Applicant has negotiated or is pursuing land access agreements, as required, with the landowners.
- **Project Area:** The approximately 9,442-acre area that includes the solar array area and additional disturbed areas for the construction of transmission lines, substations/ switchyards, a battery energy storage system (BESS), and other project components.

1.3 Contact Information

1.3.1 Applicant

Name/Contact:

Pine Gate Renewables, LLC
c/o Logan Stephens

Mailing address:

Pine Gate Renewables, LLC
130 Roberts Street,
Asheville, NC 28801

Phone: (336) 708-5161

Email: loganstephens@pgrenewables.com

1.3.2 Preparer

Name/Contact:
Tetra Tech, Inc.
c/o Linnea Fossum

Mailing address:
1750 S Harbor Way, Suite 400
Portland, OR 97201

Phone: 503-727-8062

Email: linnea.fossum@tetratech.com

2.0 TRAFFIC CONTROL AND MANAGEMENT

2.1 Traffic Control Criteria

Project construction traffic will primarily include the delivery of construction equipment, vehicles and materials, and daily construction worker trips. The vast majority of the equipment (e.g., solar modules, inverters, tracker steel, transmission poles, substation circuit breakers, and substation steel) will be delivered to the Project in standard widths and lengths by trucks, vans, and covered flatbed trailers. Substation equipment, inverter enclosures, and cranes will be delivered to the Project site on oversize vehicles.

This Draft Plan was developed to address the County's applicable traffic control mitigation needs. Morrow County requires that traffic control devices used on county roads follow the Manual on Uniform Traffic Control Devices (MUTCD) published and updated by the Federal Highway Administration. In additional, all ODOT-maintained roads are also required to follow this standard for the use and placement of traffic control devices.

Some safety concerns were raised by the county with regards to construction related traffic making frequent stops in the road to make left turns onto project driveways. Specifically, poor weather that occurs frequently in the region causing low-visibility conditions could make the risk of rear-end collisions higher for those vehicles making left turns and any vehicles following them. Specific measures to mitigate this concern are outlined in this TMP. In addition, traffic control measures for the construction of entrance driveways along roads are discussed.

2.2 Traffic Control Measures

There are a few major roads that will be used by project traffic. These include OR-207, Bombing Range Road, and Grieb Lane. In addition, some smaller county roads will be used for specific project access driveways. These include Lower Sand Hollow Road, Grieb-Wood Road, and Alpine Lane.

Typical construction operations, such as the construction of driveways, can be managed using shoulder closures and flagger controlled single lane closures along the route and near access points. For better warning and management of slow, left-turning construction traffic, portable changeable message signs can be used. This can provide advanced warning to motorists that construction traffic is in the area, and to slow down, watch for stopped cars, and take caution in inclement weather.

2.3 Traffic Control Devices and Personnel

Temporary signage, lighting, and traffic control devices will be installed on OR-207, Bombing Range Road, and Grieb Lane, as well as throughout the minor roads and Project area. Signage may include but is not limited to appropriate signage and portable changeable message signs along access routes to indicate the presence of heavy vehicles and construction traffic.

The construction signage shall consist of standard warning signs as shown in **Figures 1** through **3**. The drawings depict the minimum construction sign layout recommended for safety and to caution motorists to the presence of construction traffic in the area. Additional signs could be used in addition to the signs specified, such as "TO BE CLOSED (insert dates)," "NO CELL PHONE USE WHILE IN VEHICLE," or "SLOW DOWN." This plan does not include consideration of non-transportation related construction signage such as hard hat area signs, etc.

Use of flaggers for traffic signalization on a daily basis is not anticipated as road and right-of-way work will be minimized to avoid changes in traffic patterns. The commuting hour construction traffic may experience slowdowns near the Project site since they are going to the same location. However, the Project site is very rural and existing traffic is below the road capacity; thus, there is no need for temporary flagging to improve operations during the commuting hour. Flaggers will be used only when necessary, on a temporary basis such as a lane or full road closure.

2.4 Managing and Directing Traffic

The following measures are proposed for managing traffic during construction:

- Prior to commencement of construction, and as directed by EFSC, the Applicant will seek input on this Draft Plan from the Oregon Department of Transportation (ODOT) and Morrow County.
- A haul route plan will be developed and incorporated in this Plan once vendors have been selected and construction schedule developed. This haul route plan will confirm source locations and routes to be used during Project construction as well as anticipated loads and haul schedule.
- Detour plans and warning signage will be provided in advance of planned traffic disturbances.
- Ingress and egress points to the Project site will be located and improved (if needed) to meet adequate capacity for existing and projected traffic volumes and to provide efficient movement of traffic, including existing and anticipated agricultural traffic.
- The Applicant will obtain necessary ODOT permits to transport regulated loads on State-managed roadways, such as trip permits for oversize and overweight loads.
- The Applicant or its contractor and EFSC staff will meet prior to final site plan approval to outline steps for minimizing construction traffic impacts, including conflicts if State-imposed roadway restrictions could affect transporter routes.
- The Applicant or its contractor will provide advance notification to adjacent landowners and farmers through mailing, informal meeting, open house or other similar methods, when construction takes place in the vicinity of their homes and farms to help minimize access disruptions. The Applicant or its contractor will specify timing of deliveries of heavy equipment and building materials to the extent feasible.

- Construction vehicles will yield to school-related vehicles (e.g., school buses) and will lower their speed when approaching a school bus or bus stop along the transportation route.
- Advanced warning and proper roadway signage will be placed on OR-207, Bombing Range Road, and Grieb Lane to warn motorists of potential Project-related vehicles entering and exiting the roadway. Access to adjacent property will be maintained during Project construction.
- When slow or oversized wide loads are being hauled, appropriate vehicle and roadside signing and warning devices will be deployed. Pilot cars will be used as ODOT dictates, depending on load size and weight.
- Carpooling among the construction workers will be encouraged to reduce traffic volume to and from the Project site.
- The Project will use appropriate signage where needed to direct the public from entering restricted areas. During construction, temporary barriers and traffic control measures will be used where applicable.
- Flaggers will be employed as necessary to direct traffic when large equipment is exiting or entering OR-207, Bombing Range Road, or Grieb Lane to minimize risk of accidents. Should the Applicant or its construction contractor receive notice during Project construction of transportation events (e.g., ODOT or Morrow County transportation projects, roadway incident, other traffic events) that give rise to a safety concern, the Project construction manager will review this Plan in coordination with the applicable agency and address additional safety measures, including flagging, as may be appropriate for the situation.
- If lane closures must occur, adequate signage for potential detours or possible delays will be posted.
- Advance notification will be provided to emergency providers and hospitals when public roads may be partially or completely closed.
- Emergency vehicles will be given the right-of-way as required by local, state, and federal requirements. If traffic accidents occur on-site or by site personnel entering or leaving the Project site, the appropriate emergency services shall be notified. Incidents that occur on-site warrant an evaluation of what happened and what, if any, additional safety signs or protocols should be in place to prevent incidents.
- Traffic control requests will be coordinated through the ODOT traffic engineer and Morrow County Public Works, abiding by seasonal County road restrictions.
- The Applicant or contractor will monitor the roads within and adjacent to the Project for stray material inadvertently dropped or dispersed on the existing roads. If discovered, the contractor will remove the material as soon as possible.
- The Applicant or contractor will be responsible for damage to County roads directly caused by the Project. The road(s) will be repaired consistent with terms of a Road Use Agreement with the County.

2.5 Coordination with Agencies

The Applicant or contractor will be responsible for coordinating shoulder, lane or road closures with the various agencies. Local law enforcement will be contacted and informed of traffic control measures being implemented along the Project transportation routes.

2.6 ODOT Traffic Control Plan Examples

Example ODOT traffic control plans are shown on **Figures 1 through 3**. Project-specific traffic control plans will be developed as part of the construction package (see **Appendix D** [*Intentionally left blank, final Traffic Control Plans to be included, if needed*]).

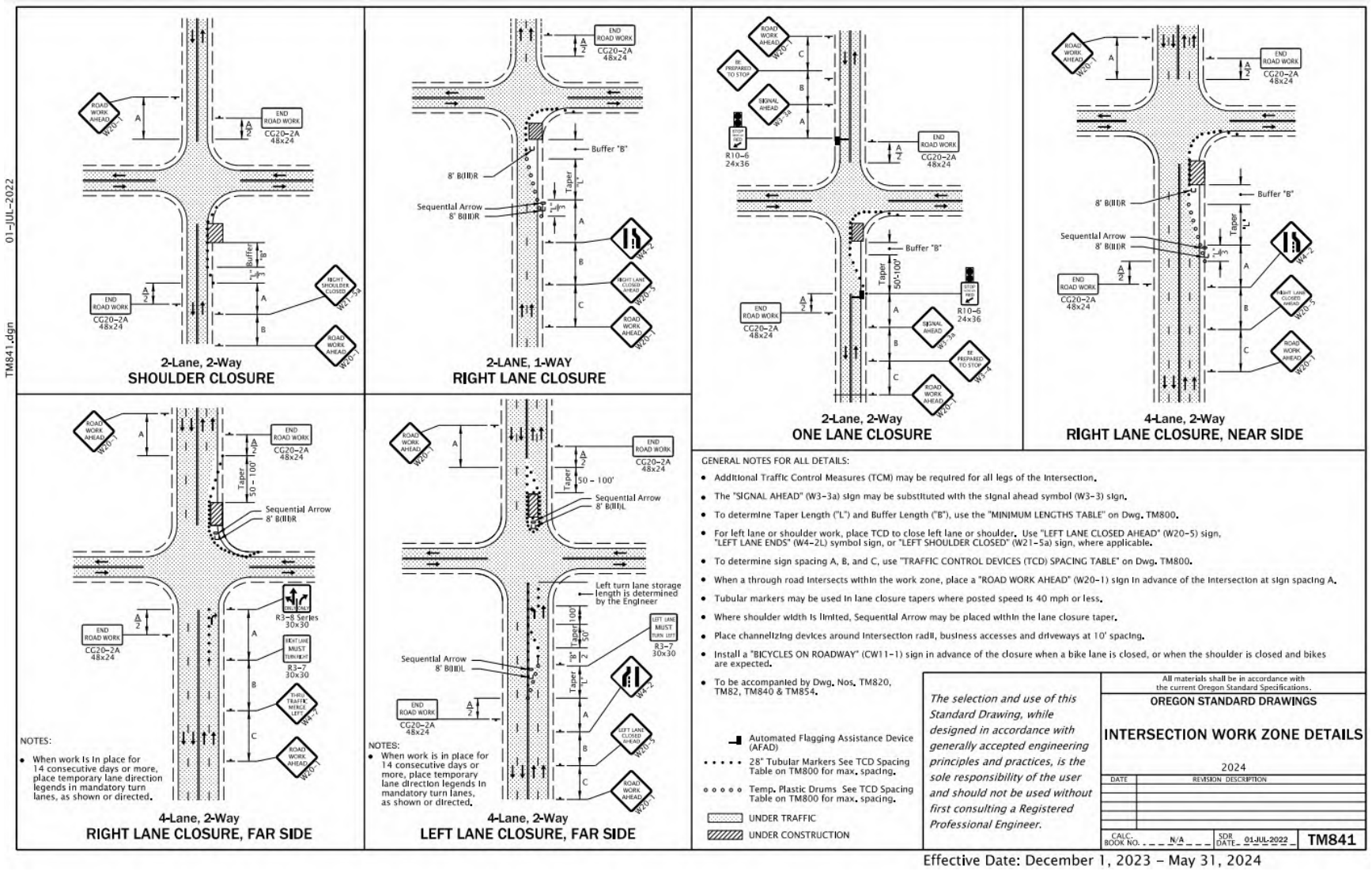

Figure 1. Example ODOT Traffic Control Plan Detail. Intersection Work Zone Details.

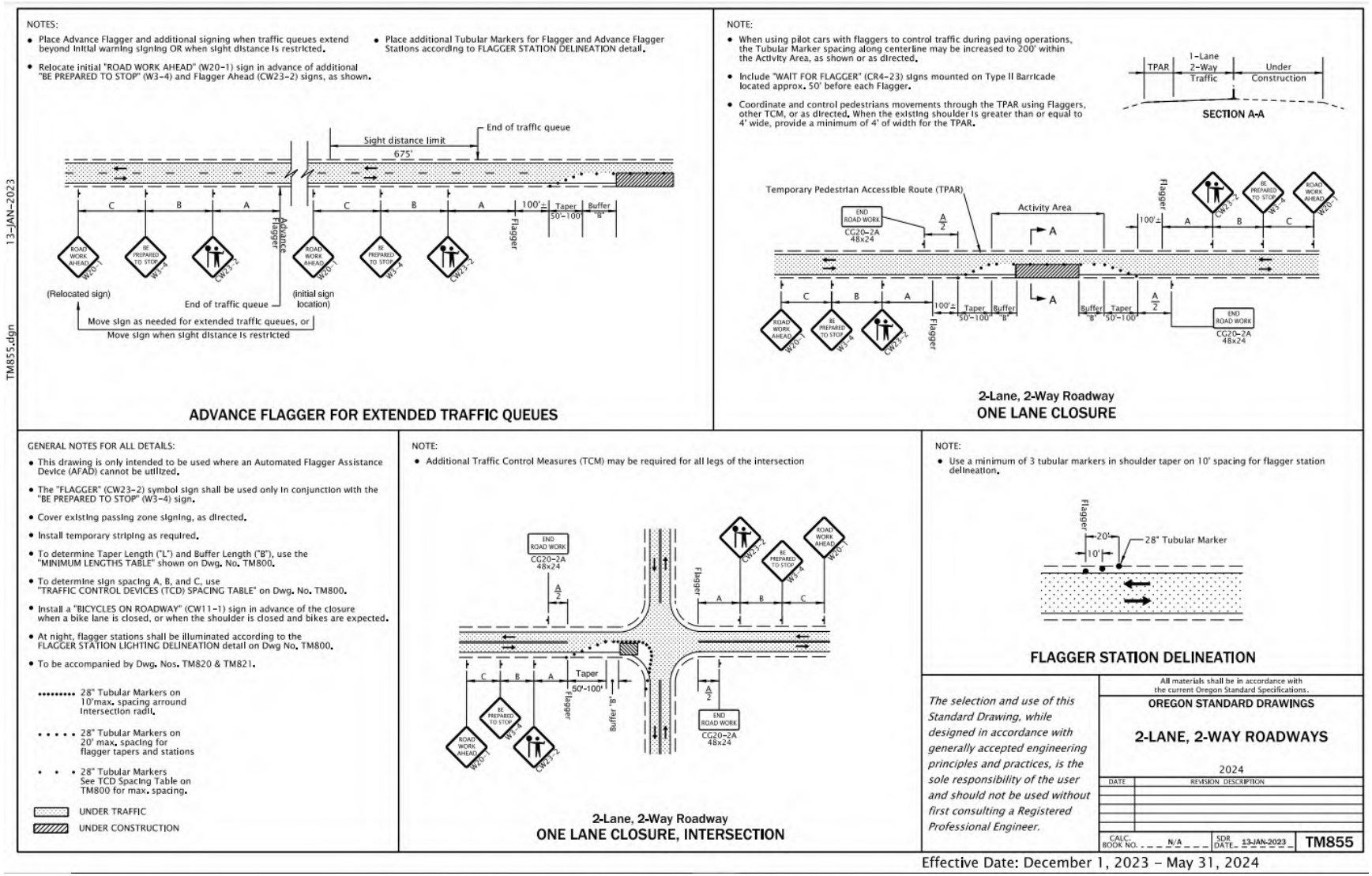

Figure 2. Example ODOT Traffic Control Plan Detail. 2-Lane, 2-Way Roadways – Flaggers.

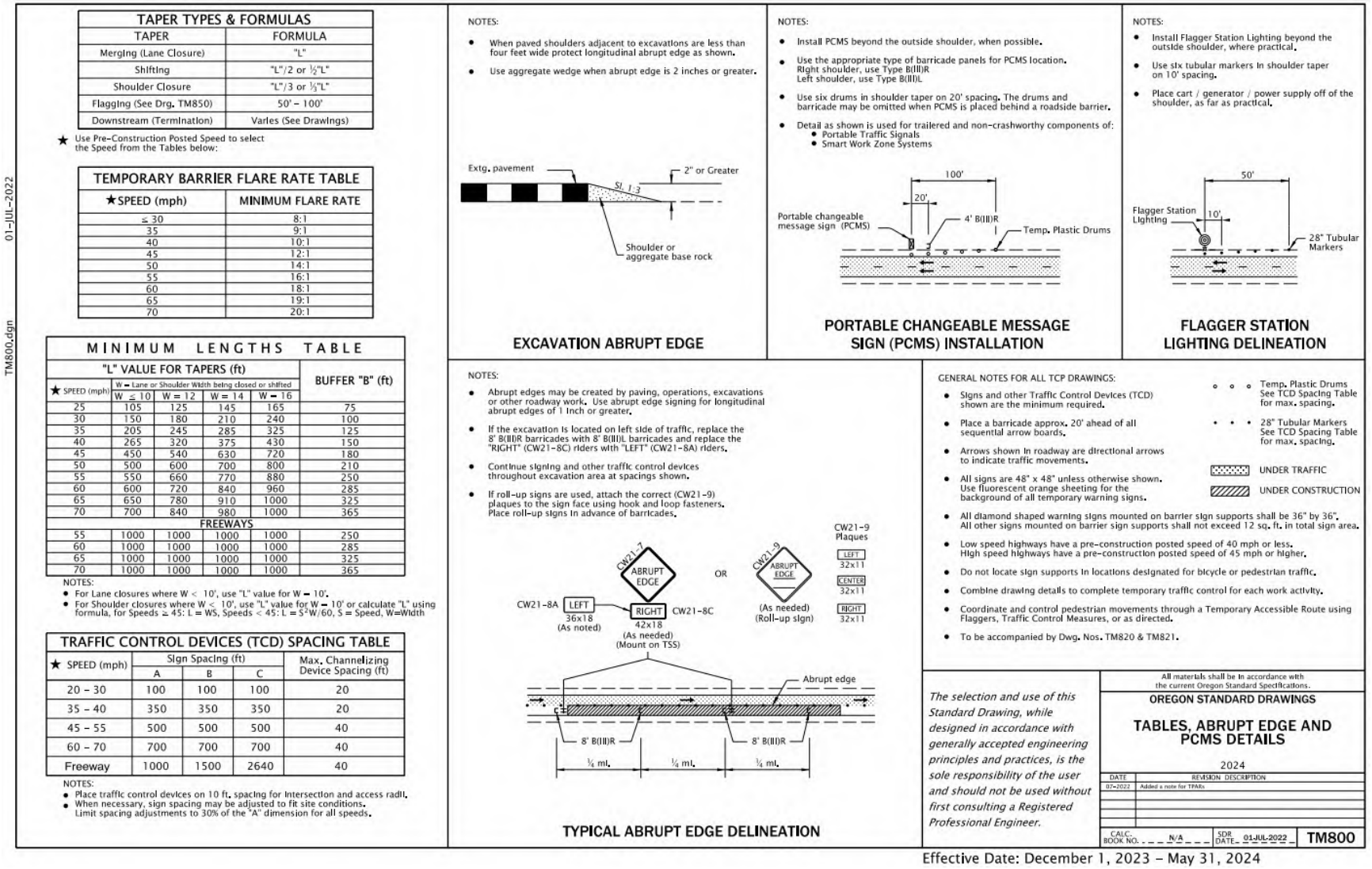

Figure 3. Example ODOT Traffic Control Plan. Tables, Abrupt Edge and PCMS Details.

3.0 COMMUNICATION AND COORDINATION

Updates to the Plan may be required to accommodate changes in the methods of construction, exceptional circumstances (e.g., interconnection to power outside of Project limits), safety, or other concerns. This Plan is not intended to be final. It is rather a starting point to understand Project construction and safety considerations. It is the responsibility of the Construction Manager or designated on-site safety personnel to address traffic concerns should they arise. This Plan may be updated in coordination with EFSC and Morrow County.

3.1 Communication Plan

The various tools described below provided a mechanism for the Applicant to communicate updates to the public and local stakeholders.

3.1.1 Media Outreach

The Applicant maintains a distribution list of local, regional, and statewide media outlets. Media outreach, including formal press releases and informal coordination with reporters, may be used to inform the public of Project construction activities.

3.1.2 Stakeholder Distribution List

The Applicant maintains a contact list for interested stakeholder groups, including but not limited to business leaders and/or representatives from regional chambers of commerce; elected officials for cities and counties in the region; public utility districts; fire district representatives; and school district representatives. The stakeholder distribution list may be used to inform stakeholders of Project construction activities.

3.2 Law Enforcement, Emergency Services, and other Agencies

3.2.1 Oregon State Patrol

Permits for oversized deliveries of equipment will be coordinated with the Oregon State Patrol as needed by the contractor.

3.2.2 Oregon Department of Transportation

Permits, designs, and coordination for working in the right-of-way and/or improvements to existing roads or intersections will be provided separately to ODOT by the contractor as necessary during Project construction.

3.2.1 Morrow County Public Works

Permits, designs, and coordination for working in the right-of-way and/or improvements to existing roads or intersections will be provided separately to Morrow County Public Works by the contractor as necessary during Project construction.

3.2.2 Private Landowners

If unforeseen circumstances require temporarily limiting access to an adjacent property, the Applicant or Contractor will notify the landowner ahead of time and ensure that the work is done as quickly as possible.

3.2.3 Emergency Services

If traffic accidents occur on site, or by site personnel entering or leaving the site the appropriate emergency services shall be notified. Emergency services will always be able to access the site.

No changes to infrastructure are anticipated that would impede access at any time during Project construction. Incidents that occur on-site warrant an evaluation of what happened and what, if any, additional safety signs or protocols should be in place to prevent incidents.

3.3 Public Outreach

The Applicant will address complaints and concerns with the public either individually with the complainant or via one or more of the outlets described in the Communication Plan, Section 3.1

4.0 CONCLUSION

State and Morrow County roads may be temporarily affected by construction-related traffic. Truck traffic carrying materials and supplies to the Project site would generally not coincide with morning and evening peak hours; rather, truck traffic would be dispersed throughout the working day. Private vehicle traffic would generally occur out of phase with the truck traffic, as the workers report earlier and leave later than most of the truck traffic. Given the early start times (7 a.m.) and late finish times (7 p.m.) common to solar farm construction, worker commuting traffic likely would overlap with peak traffic hours. Properly implemented traffic controls will minimize the impact to the community and commuting traffic. Portable changeable message signs as well as the Flagger-controlled lane and shoulder closures discussed in Section 2.3 will, if needed, minimize potential traffic disruptions and safety concerns while maintaining the flow of truck traffic.

APPENDIX A

PRELIMINARY SITE LAYOUT AND TRANSPORTATION ROUTES

[FINAL SITE LAYOUT AND TRANSPORTATION ROUTES TO BE INCLUDED HERE]

Sunstone Solar Project

Figure U-2
Primary and Alternate Construction Transportation Routes

MORROW COUNTY, OR

- Site Boundary
- Analysis Area (15-mile Buffer)
- Primary Transportation Route
- Alternate Transportation Route
- City/Town
- County Boundary
- State Boundary
- Interstate Highway
- US Highway
- State Highway
- County Highway
- Local Roads
- Existing UEC Transmission Line

TETRA TECH

PINEGATE RENEWABLES

Reference Map

Klickitat County

WASHINGTON

Benton County

Boardman

Alderdale

Hermiston

Stanfield

Echo

Umatilla County

Nolin

OREGON

Cecil

Gilliam County

Morrow County

Ione

Lexington

Heppner

See Detailed Map Extent

Detailed Map Extent

Bombing Range Road

Grieb Lane

Oregon Route 207

Doherty Road

Lower Sand Hollow Road

Melville Road

Sand Hollow Road

207

1:240,000

WGS 1984 UTM Zone 11N

0 2.5 5 10 15 20 Miles

NOT FOR CONSTRUCTION

\\Cess706gisfs1\CES\Projects\PDX\PineGateRenewables\SunstoneMaps\pASC_20230104\Exhibit_U\PGR_SunstoneSolar_Exhibit_U_11i17i_20220616.aprx

APPENDIX B

DETOUR PLAN

[FINAL DETOUR PLAN TO BE INCLUDED HERE, IF NEEDED]

APPENDIX C

HAUL ROUTE PLAN

[FINAL HAUL ROUTE PLAN TO BE INCLUDED HERE, IF NEEDED]

APPENDIX D

TRAFFIC CONTROL PLAN DRAWINGS

[FINAL TRAFFIC CONTROL PLAN DRAWINGS TO BE INCLUDED HERE, IF NEEDED]