Exhibit V

Wildfire Prevention and Risk Mitigation

Sunstone Solar Project
June 2023

Prepared for

Sunstone Solar, LLC

Prepared by

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Acronyms and Abbreviations

°F	degree Fahrenheit
Applicant	Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC
CWPP	Community Wildfire Protection Plan
Facility	Sunstone Solar Project
NB	nonburnable
NWCC	Northwest Interagency Coordination Center
OAR	Oregon Administrative Rule
PNRA	Pacific Northwest Quantitative Wildfire Risk Assessment
PSA	predictive service area
WMP	Wildfire Mitigation Plan
WUI	wildland-urban interface

1.0 Introduction

Exhibit V was prepared to meet the submittal requirements for the Sunstone Solar Project (Facility), per Oregon Administrative Rule (OAR) 345-021-0010(v), related to wildfire prevention and risk mitigation. Exhibit V demonstrates that the construction and operation of the Facility, taking into account mitigation, is not likely to result in significant adverse impacts to the provisions listed in OAR 345-022-0115.

> *OAR 345-021-0010(1)(v) Information about wildfire risk within the analysis area, providing evidence to support findings by the Council as required by OAR 345-022-0115, including but not limited to, a draft Wildfire Mitigation Plan that satisfies the requirements of OAR 345-022-0115(1)(b).*

In accordance with OAR 345-001-0010(35)(c), the analysis area for this exhibit is one-half mile from the site boundary. This exhibit demonstrates that the design, construction, and operation of the Facility, taking into account mitigation, is not likely to result in significant adverse impacts to areas subject to a heightened risk of wildfire or high-fire consequence areas addressed under OAR 345-022-0115. This exhibit provides an overview of potential wildfire risks from the Facility and outlines recommended steps to mitigate the potential risk. Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Applicant) prepared the Facility's Draft Wildfire Mitigation Plan (WMP), provided as Attachment V-1, to meet OAR 345-022-0115(1)(b).

The Morrow County Community Wildfire Protection Plan (CWPP) is a countywide effort of various agencies and local jurisdictions responsible for wildfire suppression and protection to reduce wildland fire risk to communities and the environment (Morrow County 2019). The Morrow County CWPP has been agreed upon and endorsed by a stakeholder group including the Morrow County Board of Commissioners, the District Forester of the Central Oregon District for Oregon Department of Forestry, Boardman Rural Fire Protection District, Heppner Rural Fire Department, and the Umatilla National Forest, Heppner District. Tetra Tech spoke with Tamra Mabbot, Planning Director, and Stephen Wrecsics, GIS Planning Technician, of the Morrow County Planning Department over the phone on June 20 and June 21, 2023, and they agreed that the Morrow County CWPP is an approved plan, but they were not aware if the CWPP has been approved in compliance with OAR Chapter 860, Division 300. Therefore, OAR 345-022-0115(2) could potentially apply. If the Morrow County CWPP has been approved in compliance with OAR chapter 860, division 300, the Council may issue a site certificate without making the findings under OAR 345-022-0115(1). As the Application for Site Certificate for the Facility has not been determined complete at the time of the effective date of this rule (July 29, 2022), OAR 345-022-0115(3) is not anticipated to apply either and therefore, the standard under OAR 345-022-0115(1) applies to the Facility.

2.0 Wildfire Risk

> *OAR 345-022-0115(1)(v)(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:

The Facility is a solar photovoltaic energy generation facility with up to 1,200 megawatts of nominal electric generating capacity. In addition to solar arrays, the Facility will include up to 7.2 gigawatt hours of distributed battery storage capacity, two interconnection switchyards, up to six collector substations, four operations and maintenance buildings, and other structures including roads, perimeter fencing, and gates. The Facility is proposed to be sited within an approximately 10,960-acre area (site boundary) in Morrow County. All land within the proposed site boundary is privately owned and zoned for Exclusive Farm Use. The land within the proposed site boundary is predominately cultivated crops such as dryland winter wheat. The land area for full build-out of the Facility is not expected to exceed 10,000 acres.

In this section, the Applicant provides an overview of potential wildfire risks within the 10,960-acre site boundary and the 19,795-acre wildfire analysis area. The wildfire analysis area is a 0.5-mile buffer of the site boundary.

2.1 Baseline Fire Risk

(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;

The baseline wildfire risk within the site boundary and wildfire analysis area is moderate. This is based on the relatively flat topography of the area with a few grassland and shrub vegetation communities, few existing structures and low-density infrastructure, non-irrigated cultivated crops such as dryland winter wheat as the primary land cover, and a semi-arid climate.

2.1.1 Topography

The site boundary is approximately 10 miles northeast of Lexington and 15 miles south of Boardman, Oregon. Elevations within the site boundary range from 879 to 1,440 feet above mean sea level. The northern border of Morrow County is located along the Columbia River and the southern boundary is located along the Blue Mountains. Morrow County topography varies from the Willow Creek Basin in the south that flows northwesterly direction from its source in the Blue Mountains north to the gently rolling lowland plains adjoining the Columbia River (Morrow County 1986).

The entire site boundary and wildfire analysis area have less than a 25-degree slope (Table V-1; Figure V-1). 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. Potential wildfires would travel more quickly on steeper slopes and more slowly on the flatter portions of land within the wildfire analysis area.

Table V-1. Slope

Slope (degrees)	Site Boundary	Wildfire Analysis Area
0-25	100%	100%
25-50	0	0
50-75	0	0
Total	**100% (10,960 acres)**	**100% (19,795 acres)**

2.1.2 Vegetation

As discussed in Exhibit P, the majority (92 percent) of the habitat classification within the analysis area is Category 6 habitat because the area is considered developed agricultural lands. There are sagebrush shrub-steppe and eastside grasslands that consist of about 2 percent and 6 percent of the analysis area, respectively, that run along Lexington-Echo Highway and Sand Hollow Road in the middle of the Site Boundary (Table P-4 and Figure P-2; see Exhibit P for further details). The broad fuel model groups (vegetation type) are derived from data from the Oregon CWPP Planning Tool. The fuel model data indicate that the majority of the vegetation within the site boundary is low load dry climate grass (Fuel Model 102) and agricultural fields (Fuel Model 93) (Table V-2, Figure V-2). Fuel model groups describe the fire-carrying fuel type of the surface fuels. The groups are broad categories (grass, shrub, timber, timber litter, timber understory, and slash/blowdown) of burnable fuels based on descriptions of live and dead vegetation that represent distinct fuel types, size classes, and load distributions (amounts). The primary carrier of fire for Fuel Model 102 is grass where the fuelbed is more continuous (NWCG 2021). The agricultural field (Fuel Model 93) is land maintained in a non-burnable condition (NWCG 2021). However, wheat or similar crops that are allowed to cure before harvest would be considered a different fuel model and likely would behave more similarly to a grass-based fuel model, such as Fuel Model 102. The primary carrier of fire for Fuel Model 102 is grass, which is over 50 percent of the site boundary. The primary carrier of fire for Fuel Model 122, which is nearly 2 percent of the wildfire analysis area, is grass and shrubs whose spread rate is high and flame length is moderate (NWCG 2021). Typical fire regimes in grassland and steppes of the Columbia Plateau are characterized by a fire return interval (the number of years expected between fires) of 40 to 81 years. A further discussion of Fuel Model Groups and Fuel Models that describes the composition and characteristics of fire fuels is provided below in Section 2.3.

However, due to landowner surveys regarding their agricultural practices (Attachment K-1), the wildfire risk of the Fuel Model 93 (agricultural field), which is considered nonburnable (NB), does not accurately represent the wildfire risk within the site boundary. These NB areas are mostly burnable areas, and the wildfire risk is higher. Based on the landowner surveys, they do not irrigate and they have cycles of growing dryland wheat on 50 percent of their land.

Table V-2. Fuel Models

Fuel Model Number	Site Boundary	Wildfire Analysis Area
91	2%	2%
93	46%	48%
99	0%	0%
101	1%	1%
102	51%	47%
121	0%	0%
122	1%	2%
Total	**100% (10,960 acres)**	**100% (19,795 acres)**

Fuel Model 93 is (also known as NB3) is "agricultural land maintained in a non-burnable condition; examples include irrigated annual crops, mowed or tilled orchards." However, in cases where agricultural fields are not kept in NB condition such as when "wheat or similar crops are allowed to cure before harvest; in those cases, use a fuel model other than NB3" (NWCG 2021). After further analysis, 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). Table V-3 shows the refined analysis that more accurately reflects the wildfire risk within the site boundary that takes into account the landowner's agricultural practices.

Table V-3. Reassessed Fuel Models within Site Boundary for Consideration

Fuel Model Number	Site Boundary
1	19%
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. Fuel Model 104 (moderate load dry climate grass) 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 (NWCG 2021). This represents approximately 50 percent of the landowner's lands within Fuel Model 93 from Table V-2 above.

The areas that are fallowed and only contain stubble are more accurately representing wildfire risk within the site boundary as Fuel Model 1. Fuel Model 1 (short grass) includes annual grasses, cured or nearly cured fine herbaceous fuels, and stubble with very little shrub or timber present (NWCG

2021). This represents 50 percent of those landowners' lands within Fuel Model 93 from above that are left as fallowed.

The small portion of areas that are tilled (and not simply fallowed) remain as Fuel Model 93. Tilled areas are considered NB (NWCG 2021). This represents the areas of one landowner who tills 50 percent of their land every summer.

The increased wildfire risk also likely applies to the areas in the wildfire analysis area that do not appear to be irrigated. Therefore, it is possible the wildfire risk is slightly higher in the wildfire analysis area than is represented in Table V-2 and Figure V-2 because the NB agricultural fields (Fuel Model 93) could be fallowed or dryland wheat agriculture, which are burnable.

2.1.3 Existing Infrastructure

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 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.

2.1.4 Climate

The area has a cooler, semi-arid climate. Based on available monthly normals of climate data between 1991 and 2020 for the Heppner station approximately 14 miles south of the site boundary, the driest months on average are July, August, and September, which have precipitation averages of 0.31, 0.28, and 0.43 inches per month, respectively (Table V-4; NOAA 2023). These three summer months are also the hottest months with average daily max temperatures of 86 degrees Fahrenheit (°F), 86°F, and 77°F, respectively (Table V-3; NOAA 2023). The total average annual precipitation for the area is 13 inches per year, which is indicative of a semi-arid climate (NOAA 2023). Additionally, the area receives approximately 13 inches of snow in the winter months, with the coldest month, December, having approximately 4 inches of snowfall, an average daily maximum temperature of 43°F, and an average daily minimum temperature of 27°F (Table V-4; NOAA 2023).

Table V-4. Summary of Monthly Normal Temperature and Precipitation at Heppner Station (1991–2020)

Month	Avg. 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	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: Heppner Station, OR US USC00353827 (NOAA 2023)			

2.1.5 Burn Probability

Burn probability is the likelihood of a wildfire greater than 250 acres burning a given 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 range from nonburnable (a majority of non-burnable fuel types such as water, agriculture, or urban) to very high burn probability, which indicates greater than a 1-in-50 chance of a wildfire larger than 250 acres in a single year. The site boundary and wildfire analysis area all have burn probabilities ranging from zero (agricultural areas) to moderate (1-in-1,000 to 1-in-500) 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 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 (Table V-5; Figure V-3). There are no high (1-in-100 to 1-in-50) burn probability areas within the site boundary or wildfire analysis area.

Table V-5. Burn Probability

Burn Probability	Site Boundary	Wildfire Analysis Area
0	48%	51%
Low (<= 1-in-10,000)	0%	0%
Low (1-in-10,000 to 1-in-5,000)	0%	1%
Moderate (1-in-5,000 to 1-in-1,000)	15%	11%
Moderate (1-in-1,000 to 1-in-500)	35%	33%
High (1-in-500 to 1-in-100)	2%	4%
High(1-in-100 to 1-in-50)	0%	0%
Very High (1-in-50 to 1-in-25)	0%	0%
Total	**100% (10,960 acres)**	**100% (19,795 acres)**

However, based on landowner surveys regarding agricultural practices within the site boundary (Attachment K-1), the areas categorized as NB, or burn probability of 0, as shown above in Table V-5 and Figure V-3 do not accurately represent the burn probability within the site boundary. These NB areas are mostly burnable areas, and the burn probability is higher than 0. Based on the landowner surveys and as described above in Section 2.1.2, the landowners do not irrigate and they have cycles of growing dryland wheat on 50 percent of their land.

Burn probability of 0 includes fuel types such as water, urban, agriculture, barren rock, or glacial areas (CBI 2020). After further analysis, most of the area within the site boundary that is categorized as burn probability of 0 above can be more accurately categorized to represent wildfire risk as moderate burn probability, either as moderate (1-in-5,000 to 1-in-1,000) or moderate (1-in-1,000 to 1-in-500), with only a small portion remaining as burn probability of 0. Table V-6 shows the refined analysis for consideration that more accurately reflects the burn probability within the site boundary that takes into account the landowner's agricultural practices.

Table V-6. Reassessed Burn Probability within Site Boundary for Consideration

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%**

After further analysis, areas categorized with a burn probability of 0 was reduced from 48% to 5% of the site boundary. Moderate burn probability (1-in-1,000 to 1-in-500) more accurately represents the dryland wheat areas within the site boundary. This represents approximately half of the agricultural areas originally categorized as NB, or burn probability of 0, from Table V-5 above. These areas are not NB and are more accurately represented by a moderate burn probability. Moderate burn probability (1-in-1,000 to 1-in-500) more accurately represents the burn probability for 58% of the site boundary (Table V-6).

Moderate burn probability (1-in-5,000 to 1-in-1,000) more accurately represents the areas that are fallowed and contain stubble within the site boundary. This is a lower burn probability than the dryland wheat areas as these areas are fallowed or contain stubble. This represents approximately half of the agricultural areas originally categorized as NB, or burn probability of 0, from Table V-5 above that are left as fallowed. These areas are not NB and are more accurately represented by a moderate burn probability. Moderate burn probability (1-in-5,000 to 1-in-1,000) more accurately represents the burn probability for 34 percent of the site boundary (Table V-6).

The small portion of areas that are tilled remain as NB or burn probability of 0. This represents the areas of one landowner who tills 50 percent of their land every summer.

The increased burn probability also likely applies to the areas in the wildfire analysis area that do not appear to be irrigated. Therefore, it is possible the burn probability is slightly higher in the wildfire analysis area than is represented in Table V-5 and Figure V-3 because the NB areas (burn probability = 0) could be dryland wheat, stubble, or fallowed, which are burnable.

2.2 Seasonal Fire Risk

> *(B) Seasonal wildfire risk, based on factors that are expected to remain fixed for multiple months but may be dynamic throughout the year, including but not limited to, cumulative precipitation and fuel moisture content;*

The Applicant evaluated seasonal wildfire risk using factors that are expected to remain fixed for multiple months but may be dynamic throughout the year, including cumulative annual and monthly precipitation, weather advisories that include fuel moisture content data, and an evaluation of Average Flame Length, which is the average length of flames expected during a fire, given local fuel and weather conditions. There are no historic or active fire locations or perimeters within the wildfire analysis area (ODF and USFS 2018; NIFC 2019, 2020, 2021a, 2021b, 2023). Within Morrow County, there were 37 fires 50 acres or larger burning more than 56,543 acres between 2013 and 2018, many of which were a result of dry lightning storms (Morrow County 2019).

The seasonal wildfire risk within the site boundary and wildfire analysis area is moderate based on the seasonally dry climate, potential for a high rate of fire spread based on Average Flame Length, and low average rainfall during the summer months.

2.2.1 Precipitation

Based on available climate data for the Heppner station approximately 14 miles south of the site boundary, the driest months on average include July, August, and September, which have averages of 0.31, 0.28, and 0.43 inches per month, respectively (Table V-4; NOAA 2023). All other months have between 1 and 2 inches of precipitation per month. These three summer months are also the hottest months with average daily max temperatures of 86°F, 86°F, and 77°F, respectively (Table V-4; NOAA 2023). The total average annual precipitation for the area is 13 inches per year which is indicative of a semi-arid climate (Table V-4; NPS 2019, NOAA 2023).

2.2.2 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. 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; the drying and wetting processes of dead fuels is such that the moisture content of these fuels is strongly affected by weather changes. These moisture contents are influenced by precipitation, air moisture, air and surface temperatures, wind, cloudiness, as well as by fuel factors such as surface to volume ratio, compactness, and arrangement. Fuel moisture content is dynamic throughout the year and throughout the day (USFS 1970). Therefore, 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 (NIFC 2022). During construction and operation, fire danger forecasts would be monitored, and facility activities and mitigation measures would be adjusted based on their annual variations under the methods and measures identified in the Emergency Management Plan and WMP (Attachment V-1), discussed further below.

Fuel moisture for types of vegetation varies. For example, annual grasses may reach a highly flammable stage while broadleaf vegetation is still in prime growth and not in a peak flammable stage (USFS 1970). Additionally, living foliage of evergreen trees and shrubs can burn even with moisture contents over 100 percent. Typical fire regimes in grassland and steppes of the Columbia River Plateau are characterized by a fire return interval (the number of years expected between fires) of 40 to 81 years and expected severity (the net ecological effect of the fire after is has burned) of replacement, which causes greater than 75 percent kill or top-kill of the upper canopy layer (USFS 2012). Fires in the Columbia River Plateau burn in fuel types that are best described as moderate load, dry climate grass-shrub (Fuel Model 122), and low load, dry climate grass (Fuel Model 102). Fuel Models describe the types of vegetation that are responsible for fire spread and are used in fire behavior modeling. In Fuel Model 122, fire is carried by grasses and shrubs. In Fuel Model 102, the primary fuel is grass, with shrub cover not contributing to the flaming front.

The wildfire analysis area is primarily agriculture (Fuel Model 93) and grassland (Fuel Model 102) as described above in baseline fire risk (Table V-2). Along the northwestern and southern edges of the wildfire analysis area outside of the site boundary, there are discrete portions of herbaceous and shrub/scrub vegetation. These areas would behave similar to Fuel Models 122, as they have more herbaceous shrubs vegetation (Figure V-2).

2.2.3 Flame Length

Average Flame Length shows the average length of flames expected, given local fuel and weather conditions (ODF and USFS 2018). 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. A majority of the site boundary has a modeled average flame length of 0 feet (48 percent) followed by 4 to 8 feet (38 percent) (Table V-7; ODF and USFS 2018). The areas of 4 to 8 feet of average flame length are concentrated in the southeastern, southwestern, and northern portions of the site boundary and wildfire analysis area (Table V-7; ODF and USFS 2018). In the analysis area, the average flame length modeled ranges from 0 to 8 feet, with 0 feet as the majority (51 percent) (Figure V-4 and Table V-7; ODF and USFS 2018). 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 (Figure V-7).

Table V-7. Average Flame Length

Average Flame Length (feet)	Site Boundary	Wildfire Analysis Area
0	48%	51%
>0-4	13%	11%
4-8	38%	37%
8-11	1%	0%
>11	0%	0%
Total	**100% (10,960 acres)**	**100% (19,795 acres)**

However, based on landowner surveys regarding agricultural practices within the site boundary (Attachment K-1), the areas categorized as NB, or average flame length of 0 feet, as shown above in Table V-7 and Figure V-4 do not accurately represent the average flame length within the site boundary. These NB areas are mostly burnable areas, and the average flame length is greater than 0 feet. Based on the landowner surveys and as described above in Section 2.1.2 and Section 2.1.5, these landowners do not irrigate and they have cycles of growing dryland wheat on 50 percent of their land.

Average flame length of 0 feet, or NB areas, includes fuel types such as water, urban, agriculture, barren rock, or glacial areas (CBI 2020). After further analysis, most of the area within the site boundary that is categorized with an average flame length of 0 feet above can be more accurately categorized to represent wildfire risk with average flame lengths 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. Table V-8 shows the refined analysis for consideration that more accurately reflects the average flame length within the Site Boundary that takes into account the landowner's agricultural practices.

Table V-8. Reassessed Average Flame Length within Site Boundary for Consideration

Average Flame Length (feet)	Site Boundary
0	5%
>0-4	32%
4-8	61%
8-11	1%
>11	0%
Total	**100%**

Average flame length of 4 to 8 feet more accurately represents the dryland wheat areas within the site boundary. This represents approximately 50 percent of the landowner's lands within areas with an average flame length of 0 feet from Table V-7 above.

Average flame length of 0 to 4 feet more accurately represents the areas that are fallowed and contain stubble within the site boundary. This is a lower average flame length than the dryland wheat areas as these areas are fallowed or contain stubble. This represents 50 percent of those landowners' lands with an average flame length of 0 feet from above that are left as fallowed.

The small portion of areas that are tilled remain as NB or with an average flame length of 0 feet. This represents the areas of one landowner who tills 50 percent of their land every summer.

The increased average flame lengths also likely apply to the areas in the wildfire analysis area that do not appear to be irrigated. Therefore, it is possible the average flame length is slightly higher in the wildfire analysis area than is represented in Table V-7 and Figure V-4 because the NB areas, or areas with an average flame length of 0 feet, could be dryland wheat, stubble, or fallowed, which are burnable.

2.3 Areas of Heightened Risk and Hazard to Potential Structures

(C) Areas subject to a heightened risk of wildfire, based on the information provided under paragraphs (A) and (B) of this subsection;

Areas of heightened risk are described using the CWPP Planning Tool Hazard to Potential Structures analysis layer (Table V-9; 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 hazard to potential structures within the site boundary is primarily very low (37 percent) and low (44 percent) (Table V-9). 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. As discussed in Exhibit P, these areas contain sagebrush shrub-steppe and eastside grasslands (Figure P-2). There are also moderate and high hazards to potential structures along Bombing Range Road in the west. Northwest of the site boundary but within the analysis area includes a very high hazard to potential structures west of Bombing Range Road, which appears to be a residential and agricultural property.

Potential impacts to existing infrastructure within the site boundary include 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 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, are agricultural properties, wind turbines to the west and south, agriculture to the north and east, and residences near Doherty Road to the east.

Table V-9. Areas of Heightened Risk (Hazard to Potential Structures)

Potential Impact	Site Boundary	Wildfire Analysis Area
Very High	0%	0%
High	3%	3%
Moderate	16%	18%
Low	44%	42%
Non-burnable / Very Low	37%	37%
Total	**100% (10,960 acres)**	**100% (19,795 acres)**

According to the Morrow County CWPP, there are 17 communities at risk from urban interface fires in Morrow County that are high risk due to, but not limited to, fuel loading, initial response time to structures and wildland, location of structures, and lack of water supply (Morrow County 2019). These communities at risk include the Naval Weapons Systems Training Facility Boardman overlapping the northwest portion of the analysis area and the town of Lexington 9 miles southwest of the site boundary. The Morrow County Community Wildfire Protection Plan also describes the boundaries of the wildland-urban interface (WUI), which includes populated areas at risk, forested areas that obtain critical human infrastructure, and forest areas that are at risk for large-scale fires (Morrow County 2019). The WUI boundaries take into account the distribution of structures and communities adjacent to or intermixed with wildland fuels. The northwestern edge of the wildfire analysis area overlaps the Bombing Range / Coal Fire WUI and northeastern edge of the site boundary overlaps the Butter Creek WUI along Lexington-Echo Highway.

2.4 High-Fire Consequence Areas and Overall Wildfire Risk

(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

The CWPP data on overall wildfire risk (Figure V-9) are used to identify high-fire consequence areas (ODF and USFS 2018). Based on the Layer Descriptions and Values spreadsheet attached to the Pacific Northwest Quantitative Wildfire Risk Assessment (PNRA) report (Gilbertson-Day et al. 2018), overall wildfire risk is 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 (CBI 2020). 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 (CBI 2020). The percent of the site boundary that falls into each Fire Risk Rating is identified in Table V-10 and displayed on Figure V-6. Areas of low wildfire risk are primarily in the west in areas of agriculture and pastures. 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. 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.

Table V-10. Overall Fire Risk Rating

Overall Fire Risk Rating	Site Boundary	Wildfire Analysis Area
Very High	0%	0%
High	1%	1%
Moderate	1%	1%
Low	12%	10%
Low Benefit	0%	0%
Benefit	0%	0%
No Data[1]	87%	88%
Total	**100% (10,960 acres)**	**100% (19,795 acres)**

1. There are 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 (Gilbertson-Day et al. 2018; ODF and USFS 2018).

2.5 Methodology

(E) All data sources and methods used to model and identify risks and areas under paragraphs (A) through (D) of this subsection.

Data from the Oregon CWPP Planning Tool was used for the analyses provided in response to OAR 345-022-0115(1)(a) (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 map shows the assigned risk classification (extreme, high, moderate, low and no risk) for every tax lot in the state. For those tax lots that are both within the wildland-urban interface and classified as high or extreme Planning Tool risk, the owners will receive written notification from Oregon Department of Forestry and may be subject to future changes to defensible space and home building codes. However, as of August 4, 2022, the statewide wildfire risk map (that was released on June 30, 2022, as an outcome of Senate Bill 762) has been temporarily withdrawn for further refinement. The Oregon Explorer's data presented are from the 2018 Quantitative Wildfire Risk Assessment. 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. The following Oregon CWPP Planning Tool 2018 datasets were used to inform this analysis:

- Slope,
- Fuel Models,
- Average Flame Length,
- Burn Probability,
- Hazard to Potential Structures, and
- Overall Wildfire Risk.

3.0 Wildfire Mitigation Plan

(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:

The Applicant prepared the attached Draft WMP (Attachment V-1) to meet applicable standards under OAR 345-022-0115(1)(b), which requires the WMP to:

(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;

See Section 2.0 of the Draft WMP (Attachment V-1).

(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;

See Sections 3, 4, and 5 of the Draft WMP (Attachment V-1).

(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;

See Section 4.1 of the Draft WMP (Attachment V-1).

(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

See Sections 4.2 and 6.0 of the Draft WMP (Attachment V-1).

(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.

See Section 5.0 of the Draft WMP (Attachment V-1).

4.0 Conclusion

The data reviewed and presented here demonstrate that wildfire risk and consequences of fire in the site boundary are typical for the vegetation type and fire regime encountered in Columbia Basin Plateau. Within the site boundary, assets that could currently be impacted include residential structures, agricultural areas, distribution lines, an electrical substation, and roads. If a wildfire did ignite near those assets, the assets could be at risk. After construction of the Sunstone Solar Facility, more assets such as the solar arrays, associated infrastructure, and converted agriculture vegetation could be in the path of wildfire, and overall risk within the site boundary would increase. It is anticipated that due to moderate probability of ignition and moderate expected intensity as measured by average flame length, fuels, weather, and topography, post construction overall fire risk would be moderate. Therefore, the Energy Facility Siting Council may conclude that the Facility will comply with OAR 345-022-0115.

5.0 Submittal Requirements and Approval Standards

5.1 Submittal Requirements

Table V-11. Submittal Requirements Matrix

Requirement	Location
OAR 345-021-0010(1)(v) Information about wildfire risk within the analysis area, providing evidence to support findings by the Council as required by OAR 345-022-0115, including but not limited to, a draft Wildfire Mitigation Plan that satisfies the requirements of OAR 345-022-0115(1)(b).	Section 1.0 and Attachment V-1

5.2 Approval Standards

Table V-12. Approval Standard

Requirement	Location
OAR 345-022-0115	
(1) To issue a site certificate, the Council must find that:	Section 2.0
(a) The applicant has adequately characterized wildfire risk within the analysis area using current data from reputable sources, by identifying:	Section 2.0
(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;	Section 2.1
(B) Seasonal wildfire risk, based on factors that are expected to remain fixed for multiple months but may be dynamic throughout the year, including but not limited to, cumulative precipitation and fuel moisture content;	Section 2.2
(C) Areas subject to a heightened risk of wildfire, based on the information provided under paragraphs (A) and (B) of this subsection;	Section 2.3
(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	Section 2.4
(E) All data sources and methods used to model and identify risks and areas under paragraphs (A) through (D) of this subsection.	Section 2.5
(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:	Section 3.0, and Attachment V-1
(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;	Section 3.0, and Attachment V-1
(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;	Section 3.0, and Attachment V-1
(C) Identify preventative actions and programs that the applicant will carry out to minimize the risk of facility components causing wildfire, including	Section 3.0, and Attachment V-1

Requirement	Location
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	Section 3.0, and Attachment V-1
(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.	Section 3.0, and Attachment V-1
(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.	Section 1.0
(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.	Section 1.0

6.0 References

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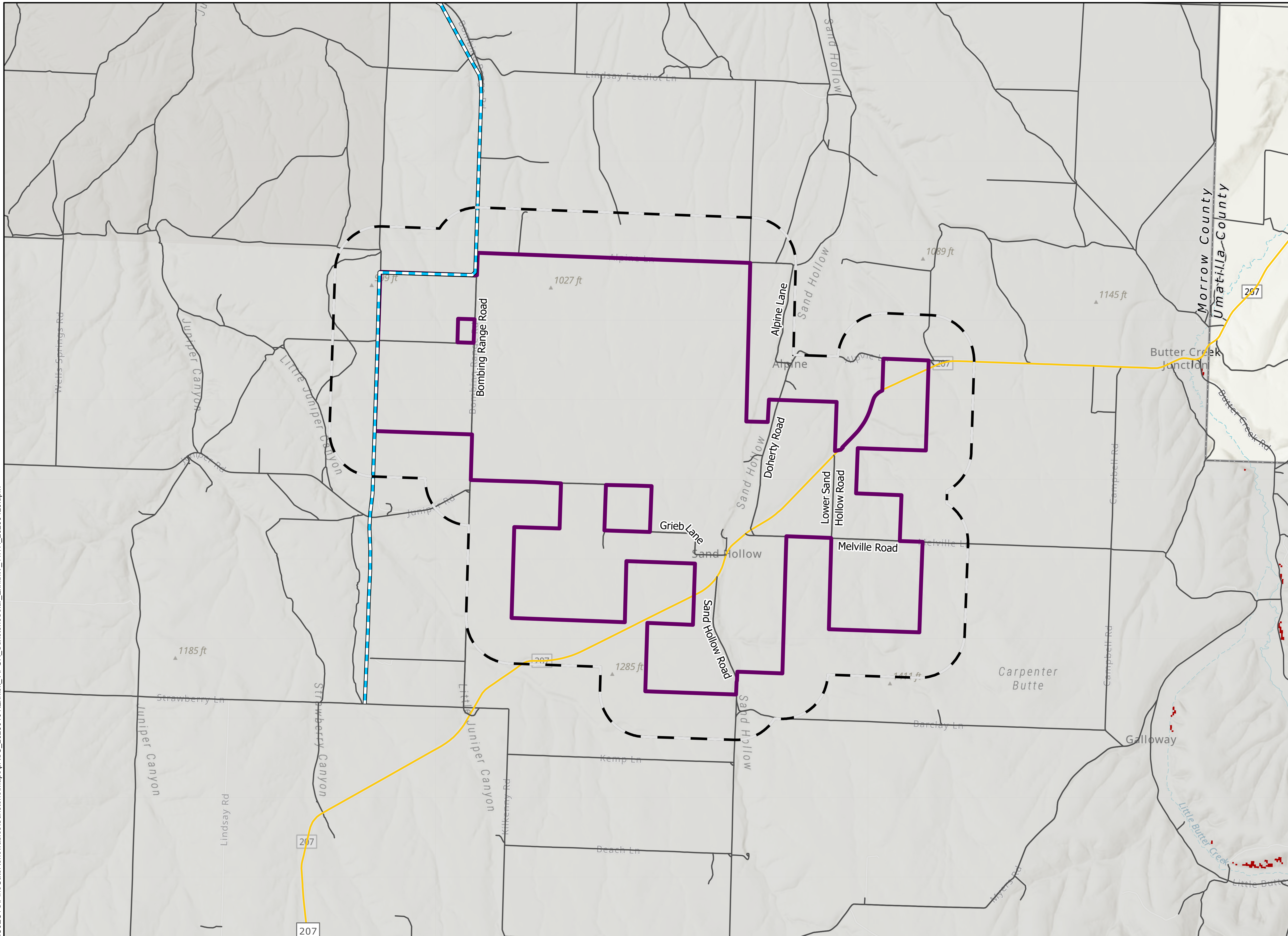
Figures



Sunstone Solar Project

Figure V-1 Slope

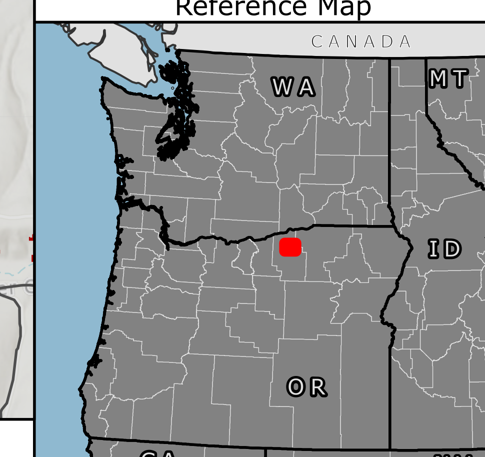
MORROW COUNTY, OR

- Site Boundary
- Analysis Area (0.5-mile Buffer)
- County Boundary
- State Highway
- Local Roads
- Existing UEC Transmission Line

Slope
- 0 - 25 degrees
- 25 - 50 degrees

TETRA TECH
PINEGATE RENEWABLES

Reference Map



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0 1 2 4 Miles

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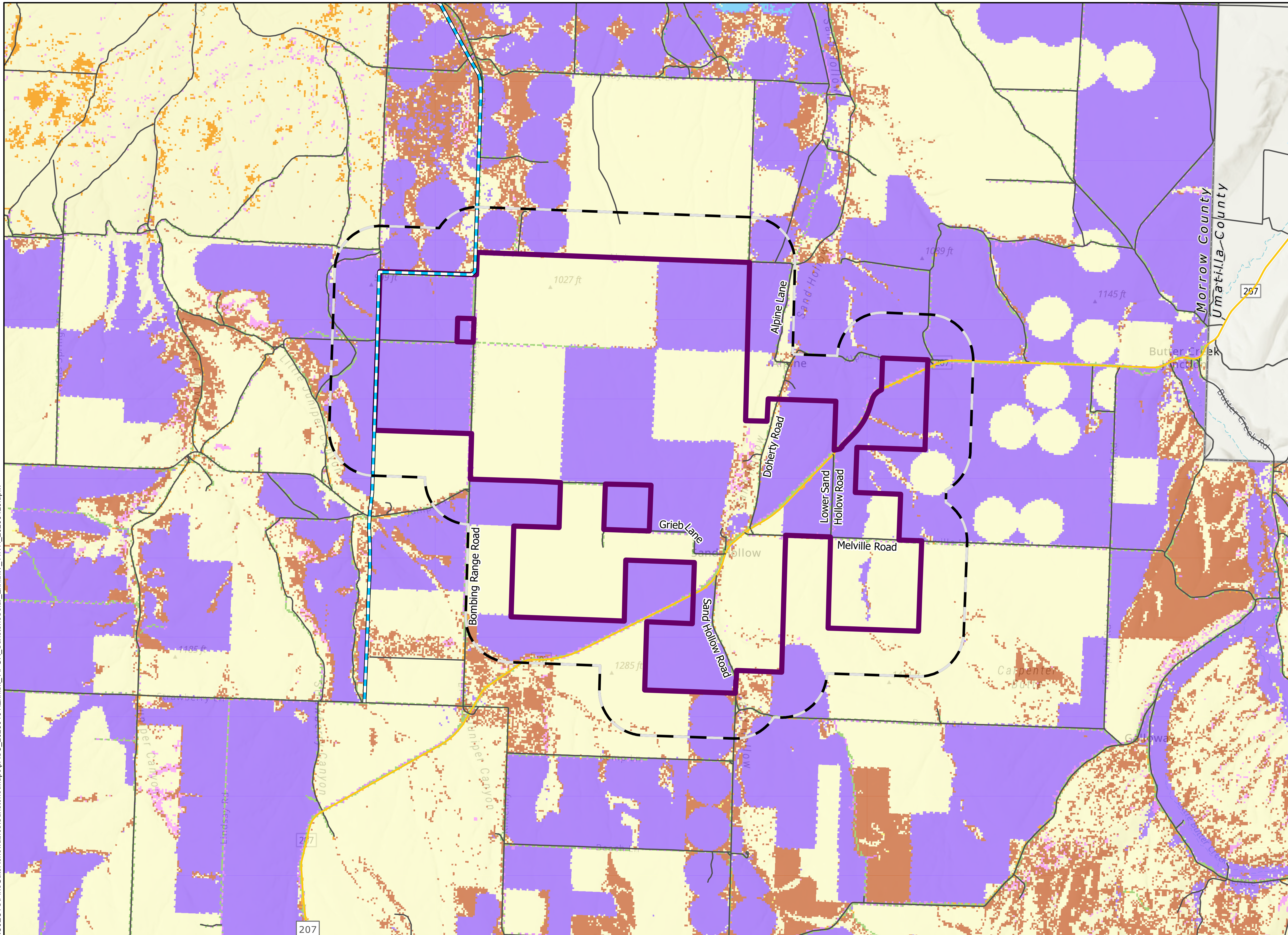


Sunstone Solar Project

Figure V-2 Fuel Models

MORROW COUNTY, OR

- Site Boundary
- Analysis Area (0.5-mile Buffer)
- County Boundary
- State Highway
- Local Roads
- Existing UEC Transmission Line

Fuel Models*

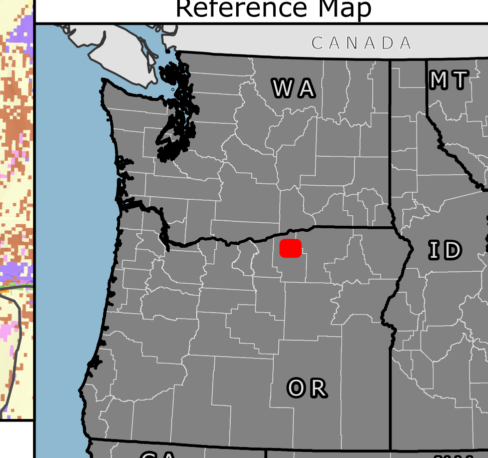
- 91
- 93
- 99
- 101
- 102
- 103
- 121
- 122
- 142
- 161
- 182
- 183
- 186

*See Exhibit V regarding analysis considerations for areas with Fuel Model 93.

TETRA TECH

PINEGATE RENEWABLES

Reference Map



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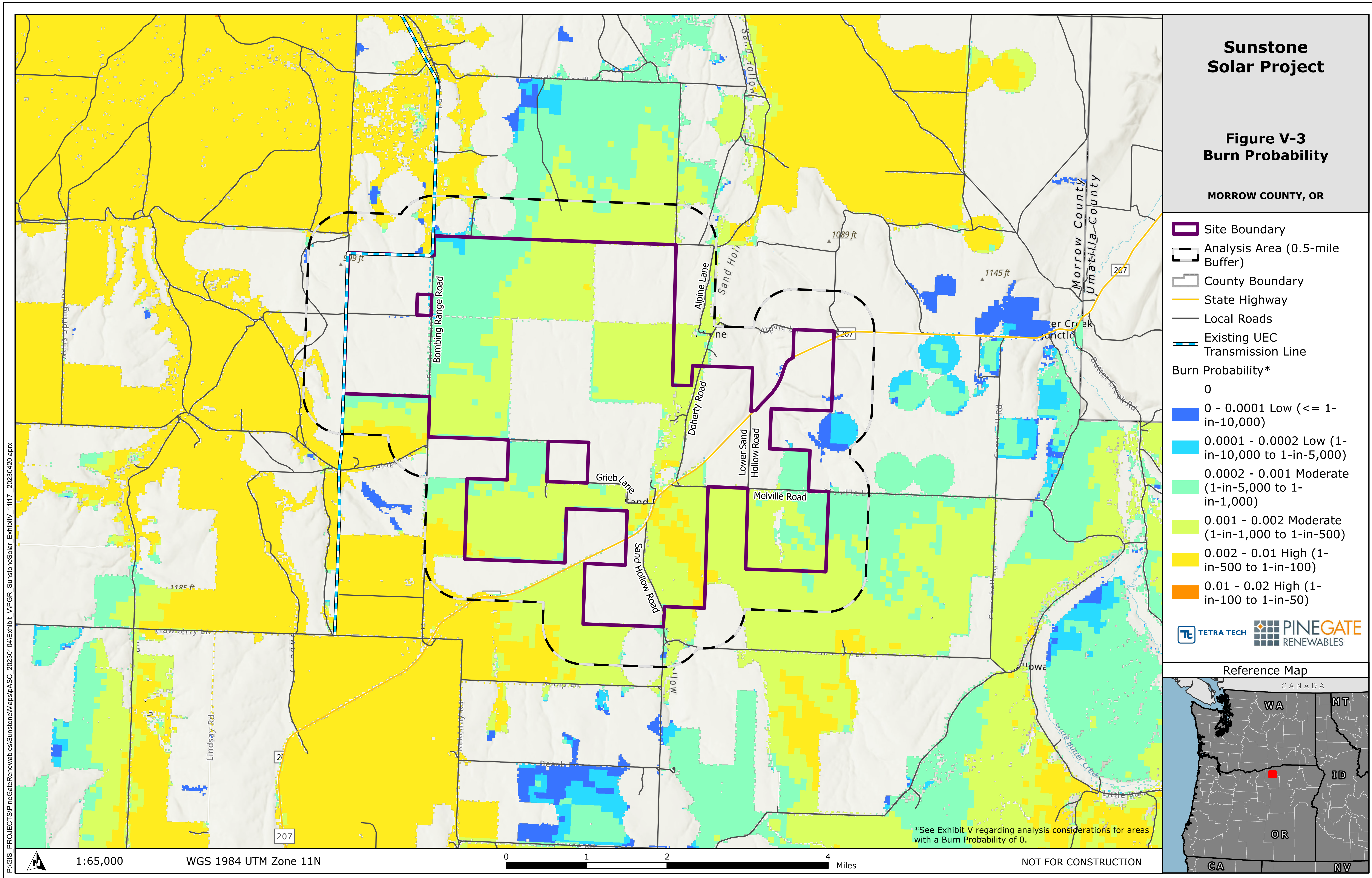

Sunstone Solar Project
Figure V-3
Burn Probability
MORROW COUNTY, OR
Site Boundary
Analysis Area (0.5-mile Buffer)
County Boundary
State Highway
Local Roads
Existing UEC Transmission Line
Burn Probability*
0
0 - 0.0001 Low (<= 1-in-10,000)
0.0001 - 0.0002 Low (1-in-10,000 to 1-in-5,000)
0.0002 - 0.001 Moderate (1-in-5,000 to 1-in-1,000)
0.001 - 0.002 Moderate (1-in-1,000 to 1-in-500)
0.002 - 0.01 High (1-in-500 to 1-in-100)
0.01 - 0.02 High (1-in-100 to 1-in-50)
TETRA TECH
PINEGATE RENEWABLES
Reference Map
CANADA
WA
MT
ID
OR
CA
NV
Bombing Range Road
Alpine Lane
Doherty Road
Lower Sand Hollow Road
Melville Road
Grieb Lane
Sand Hollow Road
Morrow County
Umatilla County
1089 ft
1145 ft
1185 ft
207
*See Exhibit V regarding analysis considerations for areas with a Burn Probability of 0.
1:65,000
WGS 1984 UTM Zone 11N
0
1
2
4
Miles
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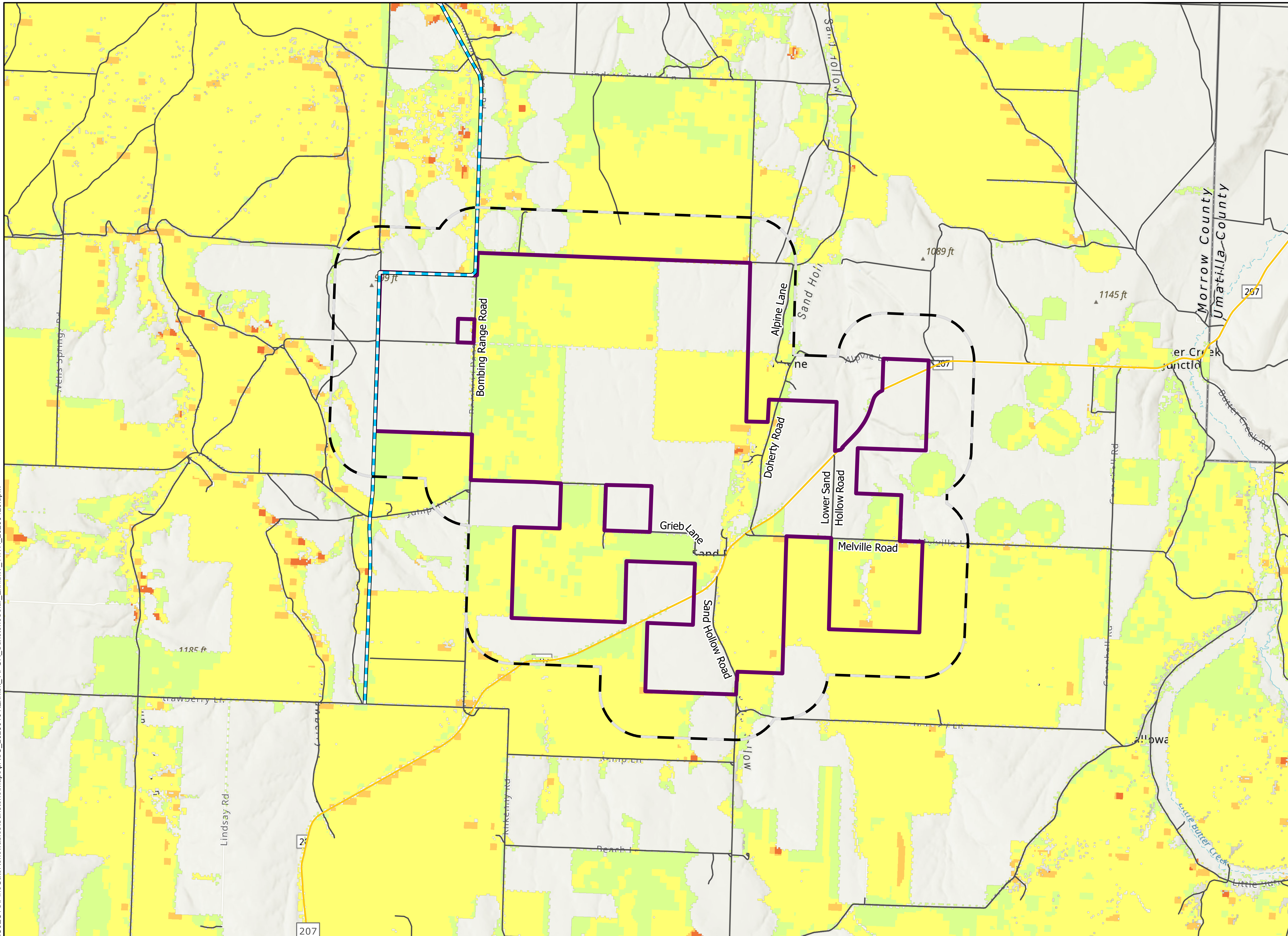


Sunstone Solar Project

Figure V-4
Average Flame Length

MORROW COUNTY, OR

- Site Boundary
- Analysis Area (0.5-mile Buffer)
- County Boundary
- State Highway
- Local Roads
- Existing UEC Transmission Line

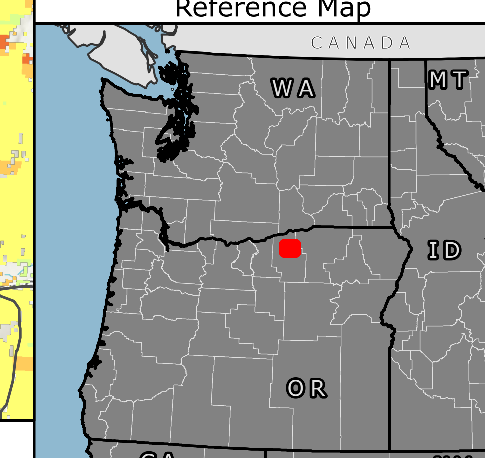
Average Flame Length*

- 0
- >0 - 4 ft
- 4 - 8 ft
- 8 - 11 ft
- > 11 ft

* See Exhibit V regarding analysis considerations for areas with an Average Flame Length of 0 feet.

TETRA TECH
PINEGATE RENEWABLES

Reference Map



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WGS 1984 UTM Zone 11N

0 1 2 4 Miles

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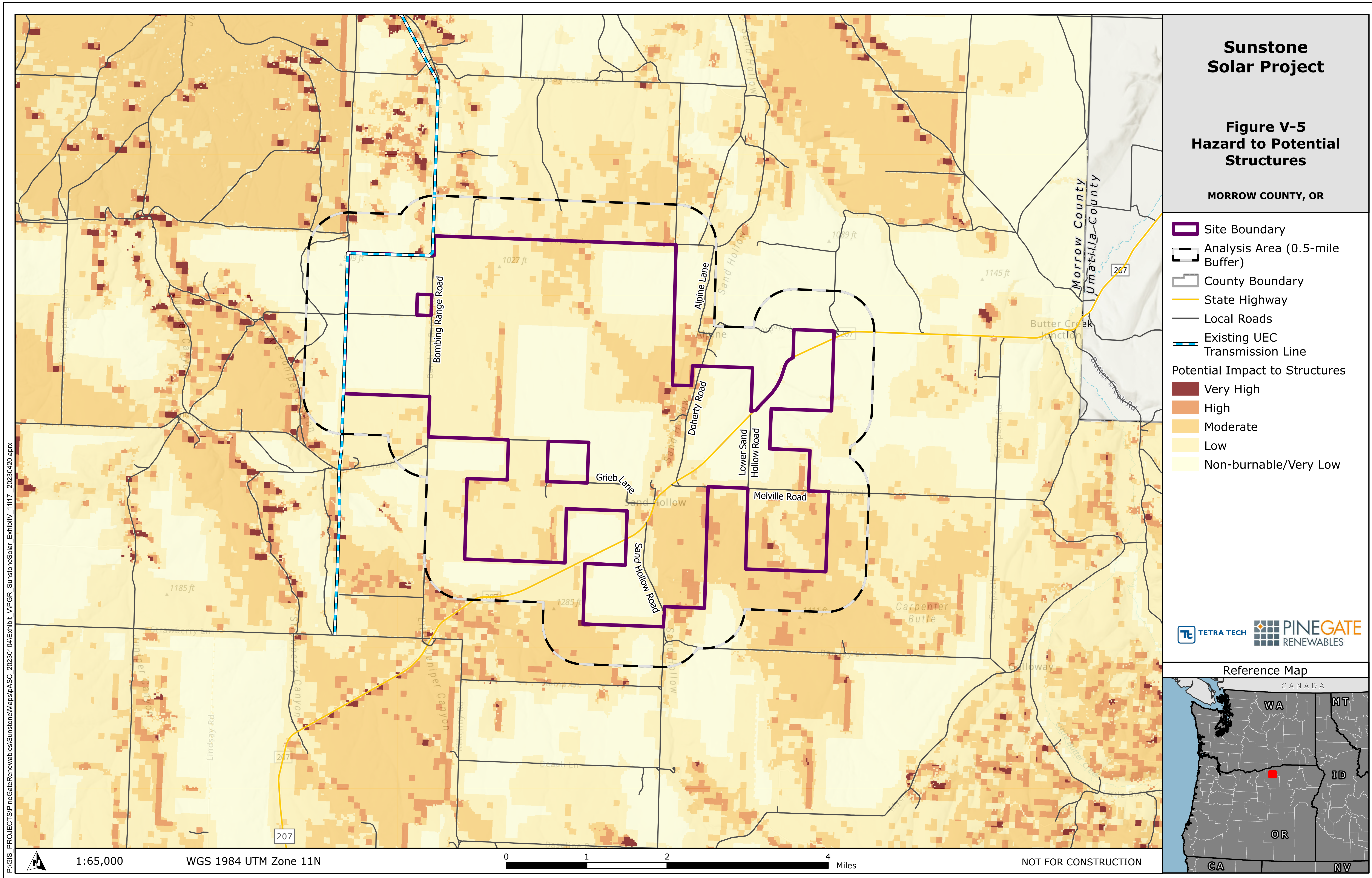

Sunstone
Solar Project
Figure V-5
Hazard to Potential
Structures
MORROW COUNTY, OR
Site Boundary
Analysis Area (0.5-mile Buffer)
County Boundary
State Highway
Local Roads
Existing UEC Transmission Line
Potential Impact to Structures
Very High
High
Moderate
Low
Non-burnable/Very Low
TETRA TECH
PINEGATE RENEWABLES
Reference Map
CANADA
WA
MT
ID
OR
CA
NV
Bombing Range Road
Alpine Lane
Doherty Road
Lower Sand Hollow Road
Grieb Lane
Melville Road
Sand Hollow Road
Sand Hollow
Morrow County
Umatilla County
Butter Creek Junction
Butter Creek Rd
Carpenter Butte
Galloway
207
1027 ft
1089 ft
1145 ft
1185 ft
1285 ft
Lindsay Rd
Juniper Canyon
1:65,000
WGS 1984 UTM Zone 11N
0
1
2
4
Miles
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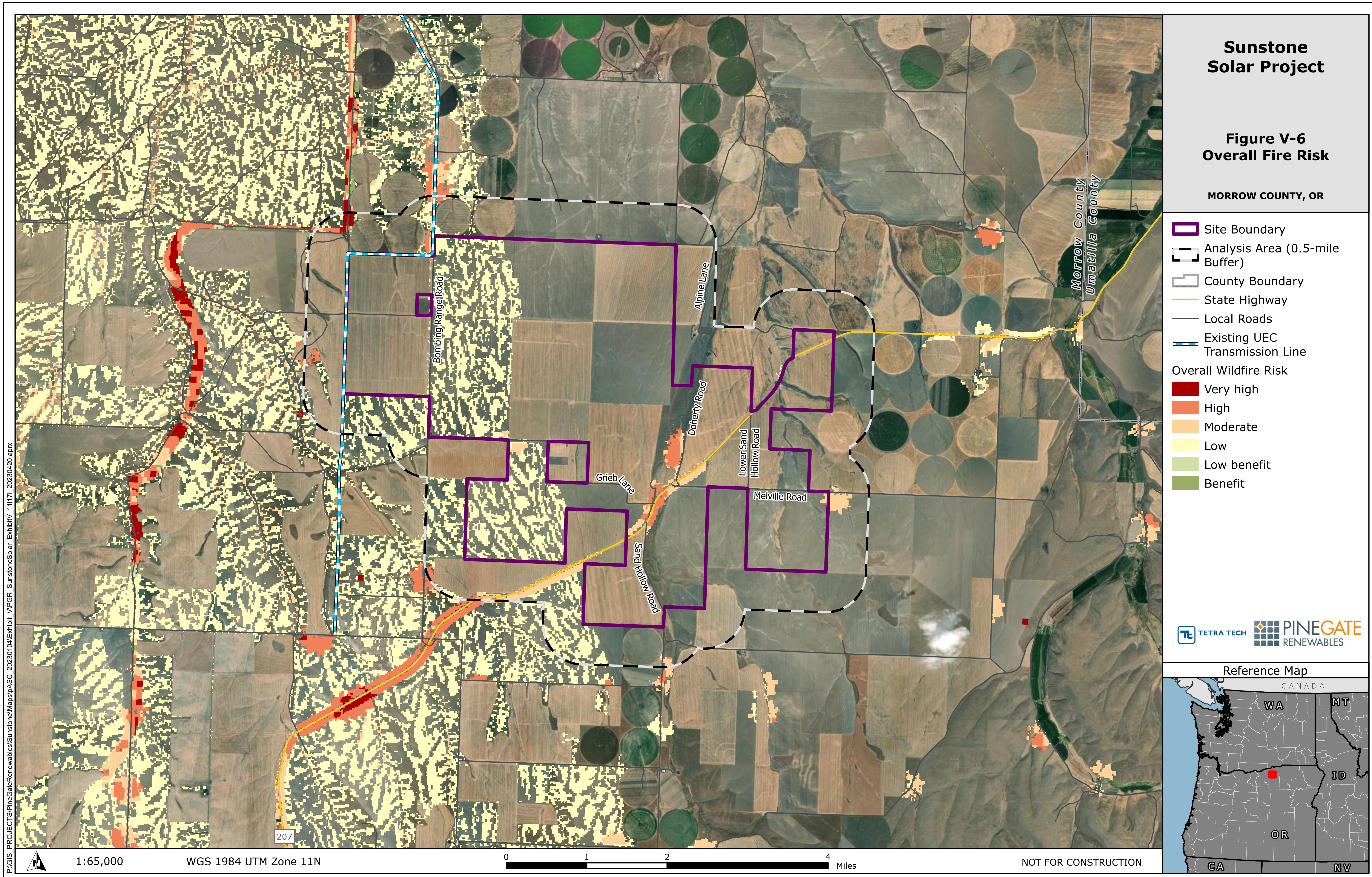

Sunstone Solar Project
Figure V-6
Overall Fire Risk
MORROW COUNTY, OR
Site Boundary
Analysis Area (0.5-mile Buffer)
County Boundary
State Highway
Local Roads
Existing UEC Transmission Line
Overall Wildfire Risk
Very high
High
Moderate
Low
Low benefit
Benefit
TETRA TECH
PINEGATE RENEWABLES
Reference Map
CANADA
WA
MT
ID
OR
CA
NV
Bombing Range Road
Alpine Lane
Doherty Road
Lower Sand Hollow Road
Grieb Lane
Melville Road
Sand Hollow Road
Morrow County
Umatilla County
207
1:65,000
WGS 1984 UTM Zone 11N
0
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Attachment V-1. Draft Wildfire Mitigation Plan

Sunstone Solar Project
Draft Wildfire Mitigation Plan

Sunstone Solar Project
June 2023

Prepared for

PINE GATE RENEWABLES | GETTING SOLAR DONE.

Sunstone Solar, LLC

Prepared by

TETRA TECH

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 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;*

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 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.

3.2 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.

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)			

4.0 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 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 Preventative Programs

The Applicant will implement the following programs to minimize fire risk during operations of the Facility.

4.2.1 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 Fire Weather Monitoring

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 halt work in certain high risk locations or employ additional mitigation measures.

4.2.5 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 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 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 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).

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.

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.

5.0 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.
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 4 to identify future technologies or best practices that could be implemented at the Facility.

Table 4. 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.

Reference	Description	Method
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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