Exhibit P

Fish and Wildlife Habitats and Species

Carty Generating Station
February 2024

Prepared for

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Acronyms and Abbreviations

AC	alternating current
APLIC	Avian Powerline Interaction Committee
ASC	Application for Site Certificate
BCP	Boardman Coal Plant
BESS	battery energy storage system
BGEPA	Bald and Golden Eagle Protection Act
Certificate Holder / PGE	Portland General Electric Company
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
GPS	Global Positioning System
kV	kilovolt
MBTA	Migratory Bird Treaty Act
MW	megawatt
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
ORBIC	Oregon Biodiversity Information Center
PV	photovoltaic
RFA	Request for Amendment
WAGS	Washington ground squirrel
USACE	U.S. Corps of Engineers

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1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

Exhibit P was prepared to meet the submittal requirements in Oregon Administrative Rules (OAR) 45-001-0010(1)(p) to provide information about the fish and wildlife habitats and species that could be affected by the Amended Carty Solar Farm. State threatened, endangered, and candidate species are exclusively addressed in Exhibit Q.

2.0 Analysis Area

The analysis area for fish and wildlife habitat and species identified in Exhibit P includes the Amended Site Boundary as defined in detail in Section 4.1.1.2 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station), plus a 0.5-mile buffer, in accordance with OAR 345-001-0010(35)(c). The Exhibit P analysis area is shown on Figure P-1.

Figure P-1 also identifies the Biological Study Area where field surveys were performed in 2023 (Attachment P-1). Because disturbances are not proposed in all areas of the Amended Site Boundary, the Biological Study Area covered approximately 1,213 acres of the 3,603-acre Amended Site Boundary. As described below in Section 4.1, the desktop review in support of this exhibit was conducted for the entire fish and wildlife habitat and species analysis area (Figure P-1).

3.0 Agency Consultation

PGE has consulted with the Oregon Department of Fish and Wildlife (ODFW) regarding the appropriate protocols for documenting the presence of state sensitive species as required in OAR 345-021-0010(1)(p)(D) and the classification of fish and wildlife habitat as required in OAR 345-021-0010(1)(p)(B). AECOM is the consulting firm that conducted the 2023 biological surveys for the Amended Carty Solar Farm described throughout this exhibit. Tetra Tech is the consulting firm that prepared this exhibit and its attachments. A summary of this consultation process is provided below.

- April 17, 2023. PGE and AECOM held a meeting to discuss level of survey intensity within the former BCP areas, use of The Nature Conservancy data, and level of effort expected for other sensitive species surveys.
- April 20, 2023. AECOM met with ODFW biologists to review survey protocols and to visit active Washington ground squirrel colonies.
- June 23, 2023. AECOM met with ODFW to obtain guidance on WAGS identification based on scat photos.
- December 1, 2023. PGE, AECOM, and Tetra Tech met with ODFW biologists to discuss the results of the 2023 biological surveys.
- January 16, 2024. PGE and Tetra Tech met with ODFW biologists to discuss habitat impacts and mitigation, as well as Site Certificate conditions.

4.0 Description of Biological and Botanical Surveys Performed – OAR 345-021-0010(1)(p)(A)

OAR 345-021-0010(1)(p) Information about the fish and wildlife habitat and the fish and wildlife species, other than the species addressed in subsection (q) that could be affected by the proposed facility, providing evidence to support a finding by the Council as required by OAR 345-022-0060. The applicant must include:

OAR 345-021-0010(1)(p)(A) A description of biological and botanical surveys performed that support the information in this exhibit, including a discussion of the timing and scope of each survey.

4.1 Desktop Review

In 2023, Tetra Tech conducted a desktop review to verify and revise the status and occurrences of species originally identified in 2016 (PGE 2018). Tetra Tech first reviewed ODFW's sensitive species list to identify state sensitive species with the potential to occur within the analysis area based on the ecoregion (ODFW 2021), and then removed any not listed in Morrow County (Oregon Explorer 2023). Species were further excluded for consideration if no potential habitat was present

within the analysis area (Oregon Explorer 2023). Oregon Biodiversity Information Center (ORBIC) data (ORBIC 2023) was then reviewed to determine available species occurrence locations within the analysis area. The results of this desktop review are discussed in Section 6.1, and the results from field surveys verified available habitat for wildlife species and provided further documentation of sensitive species within the analysis area.

Bird checklists recorded through eBird were reviewed for Carty Reservoir, a more than 1,000-acre industrial waste treatment and cooling pond located approximately 10 miles south of the Columbia River. Those checklists indicate a high use of migrating waterbirds recorded there from February through May and September (eBird 2023). Six water obligate species (i.e., grebes and mergansers) were recorded, as well as 30 water associate species (i.e., ducks, geese, coots, pelicans, cormorants, gulls, terns, egrets, herons, shorebirds).

4.2 Field Surveys

Table P-1 provides a summary of biological and botanical field surveys conducted at the Facility in 2023 within portions of the analysis area (Figure P-1). The survey reports are included in Attachment P-1, except for the wetlands and waters survey report, which is included in Exhibit J, Attachment J-1.

Table P-1. Summary of Field Surveys Conducted at the Facility in 2023

Survey	Survey Timing	Reference	Extent
Vegetation and Habitat Mapping	April, May, and June	Attachment P-1	Biological Study Area
Noxious Weed Surveys			Biological Study Area
Rare Plant Surveys			Biological Study Area
General Wildlife Surveys			Biological Study Area
Raptor Nest Surveys			1-mile buffer of Biological Study Area
Washington Ground Squirrel Surveys	April and May		Biological Study Area, plus 1,000-foot buffer in suitable Washington ground squirrel habitat, and not separated from proposed ground disturbance by a habitat barrier.
Wetlands and Waters Surveys	April and May	Exhibit J, Attachment J-1	Wetland Study Area (approximately 1,167 acres)

4.2.1 Vegetation and Habitat Mapping

Vegetation and habitat mapping occurred in April, May, and June 2023 by AECOM biologists within the Biological Study Area (AECOM 2023a; included in Attachment P-1). Because disturbances are not proposed in all areas of the Amended Site Boundary, the Biological Study Area covered approximately 1,213 acres of the 3,603-acre Amended Site Boundary. During the habitat mapping, habitat categories established by the ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0025) were used to rank the habitat types present within the Biological Study Area. At least

one vegetation survey plot, consisting of a 30-ft radius circle, was established for each field-delineated habitat type documented in the Biological Study Area. At each of these vegetation survey plots the dominant plant species were recorded and their percent cover estimated. The absolute cover for a given plant species was estimated by visually assessing the approximate percentage of the plot that species occupied including canopy cover for shrub and tree species. Dominant plant species included those species that comprised of more than 2 percent of the overall plot. Survey plot locations were established in areas that most fully represented the delineated habitat type, avoiding areas with atypical features like rock piles, recent disturbance, and roads. For the portions of the analysis area that were not covered by the Biological Study Area, habitat mapping is based on a desktop analysis using aerial photography interpretation and the Certificate Holder's familiarity with the site acquired through operation of the former BCP and existing CGS natural gas power plant (i.e., Unit 1).

4.2.2 Noxious Weed Surveys

Noxious weeds were documented incidentally during other biological surveys in April, May, and June 2023 within the Biological Study Area (AECOM 2023a; included in Attachment P-1). Noxious weeds were primarily documented while conducting the vegetation and habitat mapping and Washington ground squirrel (WAGS; *Urocitellus washingtoni)* surveys. All weed species listed in the Morrow County Weed Department's A and B weed lists were documented. The "A List" (noxious) weeds are classified as injurious to public health, crops, livestock, land, or property and mandated for control. The "B List" weeds (weeds of economic importance) are of limited distribution in the county and are subject to intensive control or eradication where feasible. Locations of distinct infestations or small clusters of individual plants were collected with GPS units. In areas where weeds were more widespread, those species were incorporated into the habitat mapping.

4.2.3 Rare Plant Surveys

Rare plants were documented incidentally during other biological surveys in April, May, and June 2023 within the Biological Study Area (AECOM 2023a; included in Attachment P-1). Lawrence's milkvetch (*Astragalus collinus* var. *laurentii*; threatened) was the only Oregon Department of Agriculture's (ODA)-listed plant species that could occur in the analysis area, based on previous site investigations and of ranges and habitat requirements of ODA threatened, endangered, and candidate plant species (PGE 2018). All milkvetch species encountered incidentally during other survey efforts were identified to species. Results from the 2023 surveys are summarized in Exhibit Q and presented in the corresponding survey report (Attachment P-1).

4.2.4 General Wildlife and Raptor Nest Surveys

Wildlife observations were documented while conducting biological surveys within the Biological Study Area in April, May, and June of 2023 (AECOM 2023a; included in Attachment P-1). A list of wildlife species encountered was created and observations of special status species' activity centers

(e.g., nests, dens, burrows) were documented with a Global Positioning System (GPS) point to mark the location.

The raptor nest survey area included a 1-mile buffer of the Biological Study Area. Surveys were performed by AECOM and PGE biologists. PGE regularly monitors raptor and common raven (*Corvus corax*) nests within 1 mile of their existing CGS facilities. To avoid duplicative efforts, AECOM only surveyed areas not covered by PGE in the raptor nest survey area. Raptor nests were documented by AECOM while conducting biological surveys in April and May 2023 and during targeted raptor nest surveys in June 2023. Documented nests were described and their location documented with a GPS unit during pedestrian and windshield surveys. Binoculars were used to search for and identify raptor nests in suitable habitat (e.g., trees, cliffs, rock outcroppings). Results from AECOM and PGE field surveys are presented in Section 7.1.

4.2.5 Washington Ground Squirrel Surveys

AECOM biologists conducted WAGS surveys from April 19-25 and May 22-26, 2023, following the protocol requirement for two survey phases (AECOM 2023a; included in Attachment P-1). The first day also included ODFW WAGS training to identify the species and learn the survey protocol. The WAGS surveys generally followed methodology developed in the Status and Habitat Use of the Washington Ground Squirrel (*Spermophilus washintoni*) on State of Oregon Lands, South Boeing, Oregon in 1999 (Morgan and Nugent 1999). The WAGS survey area included the Biological Study Area plus a 1,000-foot buffer in suitable habitats. Suitable habitat generally includes native and non-native grasslands and shrub-steppe habitats. Active agriculture and developed habitats are not considered suitable WAGS habitat and therefore were not included in the WAGS survey area. Active agriculture and developed habitats were field verified to confirm both habitat type and boundary Results from the 2023 WAGS surveys are summarized in Exhibit Q and presented in the corresponding survey report (Attachment Q-1).

4.2.6 Wetlands and Waters Surveys

Two site visits were conducted on April 24 and May 25, 2023, by AECOM biologists to delineate wetlands and other water features within the Wetlands Study Area (AECOM 2023b). Because disturbances are not proposed in all areas of the Amended Site Boundary, the Wetlands Study Area covered approximately 1,213 acres within and adjacent to the Amended Site Boundary. The Wetlands Study Area is the same as the Biological Study Area. Wetlands were determined using methods described in the U.S. Corps of Engineers (USACE) Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008). Data collected during wetlands and waters surveys informed habitat categorization and helped with the determination of state sensitive species presence described in this exhibit. Results from the 2023 wetlands and waters surveys are summarized in Exhibit J and presented in the corresponding survey report (Attachment J-1).

5.0 Identification and Description of Habitat – OAR 345-021-0010(1)(p)(B)(C)

OAR 345-021-0010(1)(p)(B) Identification of all fish and wildlife habitat in the analysis area, classified by the general fish and wildlife habitat categories as set forth in OAR 635-415-0025 and the sage-grouse specific habitats described in the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-140-0000 through 635-140-0025 (core, low density, and general habitats), and a description of the characteristics and condition of that habitat in the analysis area, including a table of the areas of permanent disturbance and temporary disturbance (in acres) in each habitat category and subtype.

OAR 345-021-0010(1)(p)(C) A map showing the locations of the habitat identified in (B).

5.1 ODFW Habitat Categorization

The ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0015) provides a framework for assigning one of six category types to habitats based on the relative importance of these habitats to fish and wildlife species. The definition of each category type, as well as an example of each category type within the analysis area, is shown in Table P-2. The Facility does not occur in sage-grouse habitat and therefore the Greater Sage-Grouse Conservation Strategy for Oregon does not apply.

Table P-2. ODFW Habitat Categorization

ODFW Habitat Category	Definition[1]	Examples of ODFW Habitat Categories within Analysis Area
1	Irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population, or unique assemblage.	• Occupied Washington ground squirrel burrow complexes identified during 2023 surveys. Category 1 habitat includes the burrow locations buffered by 785 feet to include the adjacent habitat.
2	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.	• WAGS seasonal home range shift areas. Category 2 habitat includes the ODFW-recommended 4,921-foot buffer (1,500 meters) of active WAGS burrows in suitable habitat.

ODFW Habitat Category	Definition[1]	Examples of ODFW Habitat Categories within Analysis Area
3	Essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.	• Big Sage/Juniper Woodland and Big Sage Shrubland – These habitats provide forage and shelter for a wide variety of wildlife species. • Riparian Areas – This habitat provides abundant insects, plants, and moisture throughout the year.
4	Important habitat for fish and wildlife species.	• Broom Snakeweed Shrubland, Broom Snakeweed/Juniper Woodland, and Rabbitbrush Shrubland – These habitats may still provide habitat for wildlife, but the partial dominance of non-native weed species and recent disturbances preclude them from being considered limited in the area. • Cheatgrass Savannah – This habitat may be adjacent to sites that provide higher quality habitats or may encompass features that can provide habitat for wildlife.
5	Habitat for fish and wildlife having high potential to become either essential or important habitat.	• No Category 5 habitat is presented in this exhibit.
6	Habitat that has low potential to become essential or important habitat for fish and wildlife.	• Agricultural Areas – Include irrigated crop circles and areas associated with active agriculture. • Developed Areas – These areas include existing infrastructure and developed areas, such as the existing sewage lagoons.
1. Source: OAR 635-415-0025.		

5.2 Description of Fish and Wildlife Habitat in the Analysis Area

The analysis area is situated within a mix of shrub steppe, annual grasslands, agricultural, and developed habitat types. The analysis area is generally flat; one drainage is present within Sixmile Canyon, and Carty Reservoir is located in the central portion of the analysis area.

Dominant vegetation identified by AECOM (2023a) includes big sage (*Artemisia tridentata*), cheatgrass (*Bromus tectorum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), broom snakeweed (*Gutierrezia sarothrae*), and rubber rabbitbrush (*Ericameria nauseosa*). Small areas surrounding the

Carty Reservoir consist of riparian vegetation, which includes black cottonwood (*Populus trichocarpa*) and Russian olive (*Elaeagnus angustifolia*). Wetland areas associated with Sixmile Canyon contain similar riparian vegetation in addition to wetland plants such as common reed (*Phragmites australis*). Representative photos of the area are included in the Biological Resources Survey Report (AECOM 2023a; Attachment P-1).

Habitat types within the analysis area are described in Table P-3 and displayed in Figure P-2. All habitat types and categories were identified within the Biological Study Area by AECOM during 2023 field survey efforts (Attachment P-1). In addition to the habitat mapping completed by AECOM, Tetra Tech reviewed mapping performed for previous RFAs and performed aerial photo interpretation to complete the habitat mapping of the analysis area. Some habitat types identified during surveys were combined into a single habitat type for purposes of this exhibit (e.g., cheatgrass savannah, weedy disturbed, and grassland post-burn were combined to non-native grassland; broom snakeweed shrubland and broom snakeweed/juniper woodland were combined to broom snakeweed shrubland; rabbitbrush shrubland and rabbitbrush/weedy shrubland were combined to rabbitbrush shrubland; and all habitat types containing riparian vegetation were combined to a single riparian habitat type).

Table P-3. Description of Habitat Types within Analysis Area

Habitat Type	Dominant Vegetation
Agriculture	Cultivated crops and associated disturbed areas
Developed	Roads and existing disturbed industrial areas
Big Sage Shrubland	Big Sage (*Artemisia tridentata*)
	Bare Ground
	Broom snakeweed (*Gutierrezia sarothrae*)
	Cheatgrass (*Bromus tectorum*)
	Yarrow (*Achillea millefolium*)
Big Sage/Juniper Woodland	Big Sage
	Bare Ground
	Broom snakeweed
	Cheatgrass
	Western Juniper (*Juniperus occidentalis*)
Broom Snakeweed Shrubland	Cheatgrass (*Bromus tectorum*)
	Broom snakeweed
	Bluebunch Wheatgrass (*Pseudoroegneria spicata*)
	Balsam Root (*Balsamorhiza* sp.)
	Western Juniper
	Russian Thistle (*Salsola australis*)

Habitat Type	Dominant Vegetation
Non-native Grassland	Cheatgrass
	Bare Ground
	Bulbous Bluegrass (*Poa bulbosa*)
	Crested Wheatrgrass (*Agropyron cristatum*)
	Sandberg Bluegrass (*Poa secunda*)
	Yellow Sweet Clover (*Melilotus officinalis*)
	Medusa Head (*Taeniatherum caput-medusae*)
	Tall Tumble Mustard (*Sisymbrium altissimum*)
	Russian Thistle
	Broom Snakeweed
Rabbitbrush Shrubland	Cheatgrass
	Rubber Rabbitbrush (*Ericameria nauseosa*)
	Bluebunch Wheatgrass
	Balsam Root
	Yellow Sweet Clover
	Crested Wheatgrass
	Broadleaved Pepperweed (*Lepidium latifolium*)
Riparian	Cheatgrass
	Russian Olive (*Elaeagnus angustifolia*)
	Black Cottonwood (*Populous trichocarpa*)
	Western Juniper

5.3 Quantity of Habitat Types by Habitat Category within the Analysis Area

Table P-4 shows the acreages within the analysis area of each habitat type with the assigned habitat category. The locations of each habitat type by category within the analysis area are shown on Figure P-2, as directed by OAR 345-021-0010(1)(p)(C). Presence of a particular habitat category within the analysis area does not indicate that this habitat will necessarily be impacted by the Amended Carty Solar Farm. Table P-6 in Section 8.1 presents the areas of permanent disturbance and temporary disturbance (in acres) in each habitat category and habitat type with discussion on potential impacts to fish and wildlife habitat.

Table P-4. Acres of Habitat Type by ODFW Habitat Categories within Analysis Area

Habitat Type	Acres within Analysis Area[1]						Total Acres within Analysis Area[1]
	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6	
Agriculture	-	-	-	-	-	1,316	**1,316**
Big Sage Shrubland	49	167	420	69	-	-	**705**
Big Sage/Juniper Woodland	-	81	57	-	-	-	**138**
Broom Snakeweed Shrubland	37	936	-	1,545	-	-	**2,518**
Developed	1	2	-	-	-	368	**371**
Non-native Grassland	5	21	-	349		-	**375**
Open Water	-	-	1,072	-	-	-	**1,072**
Rabbitbrush Shrubland	101	591	-	227		-	**919**
Riparian	17	56	355	2		-	**430**
Totals	**210**	**1,854**	**1,904**	**2,192**	**0**	**1,685**	**7,844**

1. Acres within analysis area do not total the acres of potential impact. Impacts are discussed in Section 8.

6.0 Identification of State Sensitive Species and Site-Specific ODFW Issues – OAR 345-021-0010(1)(p)(D)

OAR 345-021-0010(1)(p)(D) Based on consultation with the Oregon Department of Fish and Wildlife (ODFW) and appropriate field study and literature review, identification of all State Sensitive Species that might be present in the analysis area and a discussion of any site-specific issues of concern to ODFW.

6.1 Identification of State Sensitive Species

Based on the desktop analysis and field surveys, 17 state sensitive species and 2 eagle species have potential to occur in the analysis area (Table P-5). Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are addressed in Exhibit P as species of concern protected under the Bald and Golden Eagle Protection Act (BGEPA). Of the 17 state sensitive species that have potential to occur in the analysis area, 7 are sensitive-critical and 10 are sensitive in the Columbia Plateau Ecoregion (ODFW 2021). This includes 2 reptile, 10 bird, and 5 mammal species. No state sensitive fish species are known or expected to occur in Carty Reservoir (PGE 2017). State threatened and endangered species are addressed in Exhibit Q.

6.2 Site-Specific Issues Identified by ODFW

ODFW did not identify any site-specific issues for the Amended Carty Solar Farm. During the consultation described in Section 3.0, there were brief discussions regarding fence design specific to deer and elk getting in the enclosed solar area. The fencing in these areas will be 8 feet in height with an additional 1-foot of razor or barb wire, which is adequate to exclude deer and elk.

Table P-5. ODFW State Sensitive Species and Eagles with Potential to Occur in the Analysis Area

Common Name	Scientific Name	State Status[1]	Expected Habitats[2]	Probability of Occurrence within Analysis Area[3, 4, 5, 6]	Potential Use of Habitat Within the Analysis Area
Reptiles					
Northern Sagebrush Lizard	*Sceloporus graciosus graciosus*	Sensitive	Sagebrush habitat, but also chaparral, juniper woodlands, and coniferous forests.	High. Observed during 2016[7] surveys.	Shrub-steppe habitats with sandy soils
Western Painted Turtle	*Chrysemys picta bellii*	Sensitive-Critical	Marshy ponds, small lakes, slow-moving streams, and quiet, off-channel portions of rivers. Prefer waters with muddy bottoms and aquatic vegetation.	Moderate. Recorded in Morrow County. Analysis area within fair predicted habitat.	Carty Reservoir
Birds					
Bald Eagle	*Haliaeetus leucocephalus*	None[3]	Nests 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.	High. Observed during 2023 surveys. Two nests documented along south shore of Carty Reservoir.	Trees in riparian habitat associated with the margins of Carty Reservoir
Brewer's Sparrow	*Spizella breweri breweri*	Sensitive	Large expanses of sagebrush habitat.	Moderate. Documented within the analysis area by PGE during routine breeding bird surveys (last documented in 2013). Analysis area within good predicted habitat.	Sagebrush and other shrublands

Common Name	Scientific Name	State Status[1]	Expected Habitats[2]	Probability of Occurrence within Analysis Area[3, 4, 5, 6]	Potential Use of Habitat Within the Analysis Area
Burrowing Owl (Western)	*Athene cunicularia hypugaea*	Sensitive-Critical	Open grassland and shrub-steppe habitats with burrows created by other species, such as badgers, to use for nesting.	Moderate. Analysis area within good predicted habitat. Note PGE documented burrowing owls in the analysis area prior to a 2008 fire.	Shrub-steppe habitats, grassland habitats
Common Nighthawk	*Chordeiles minor*	Sensitive	Nesting habitat: open landscapes with little ground cover in sagebrush and rocky scablands and rimrock habitats of eastern Oregon.	High. Observed by PGE biologists during breeding bird surveys as recently as June 2023. Analysis area within fair to good predicted habitat.	Rocky portions of shrublands and grasslands, agricultural fields
Ferruginous Hawk	*Buteo regalis*	Sensitive-Critical	Open, arid landscapes. They typically use grassy areas and shrub-steppe with scattered shrubs or trees for perching and nesting. Also nest on rimrock or undisturbed ground.	High. Observed during 2023 surveys.	Shrub-steppe habitats, grassland habitats
Golden Eagle	*Aquila chrysaetos*	None[3]	Forages in open habitats.	High. Two historic ORBIC nest territories overlap the analysis area. PGE has documented foraging eagles on a regular basis. Analysis area within fair to good predicted habitat. Analysis area lacks nesting habitat but provides foraging habitat.	All mapped habitats within analysis area

Common Name	Scientific Name	State Status[1]	Expected Habitats[2]	Probability of Occurrence within Analysis Area[3, 4, 5, 6]	Potential Use of Habitat Within the Analysis Area
Grasshopper Sparrow	*Ammodramus savannarum*	Sensitive	Dry grassland habitat, generally with low to moderate grass height and low percent shrub cover.	High. Observed by PGE biologists during breeding bird surveys as recently as 2023. Analysis area within very limited predicted habitat.	Grassland habitats
Lewis's Woodpecker	*Melanerpes lewis*	Sensitive-Critical	Ponderosa pine forests, oak woodlands, oak-pine woodlands, cottonwood riparian forests, and areas burned by wildfires.	Low, during migration. Recorded in Morrow County. Analysis area not within predicted habitat.	Trees in riparian habitat around Carty Reservoir
Loggerhead Shrike	*Lanius ludovicianus*	Sensitive	Tall sagebrush for nesting and roosting and open areas with grasses and significant bare ground for foraging.	High. PGE biologists have documented the species within the analysis area (last documented in 2020) and in eBird checklists within the Amended Site Boundary. Analysis area within good predicted habitat.	All terrestrial habitats
Long-billed Curlew	*Numenius americanus*	Sensitive-Critical	Open habitat with relatively short grass and little woody vegetation.	High. Observed by PGE biologists during surveys as recently as 2023. Analysis area within fair to good predicted habitat.	Grassland habitats, agriculture

Common Name	Scientific Name	State Status[1]	Expected Habitats[2]	Probability of Occurrence within Analysis Area[3, 4, 5, 6]	Potential Use of Habitat Within the Analysis Area
Sagebrush Sparrow	*Amphispiza nevadensis*	Sensitive-Critical	Large patches or expanses of shrub-steppe habitat with high shrub cover, particularly big sagebrush.	High. PGE biologists have documented sagebrush sparrows during breeding bird surveys as recent as 2023. Analysis area within good predicted habitat.	Big sage shrubland habitat
Swainson's Hawk	*Buteo swainsoni*	Sensitive	Expansive grassland habitat with scattered nest trees.	High. Observed during 2023 surveys. One nest documented within analysis area.	Shrub-steppe habitats, grassland habitats, agriculture
Mammals					
Hoary Bat	*Lasiurus cinereus*	Sensitive	Middle age to older mixed coniferous and deciduous forests for roosting and breeding. Forages along edges of riparian corridors and openings within forests.	Low, during migration. Recorded in Morrow County.	Riparian habitat around Carty Reservoir
Pallid Bat	*Antrozous pallidus*	Sensitive	Dry, open habitat. Prefer grassland, shrub-steppe, and dry forest ecotones for foraging. Use crevices in cliffs, caves, mines, or bridges (and sometimes, buildings) for day, night, or maternity roosts, or hibernacula.	Moderate. Recorded in Morrow County.	Shrub-steppe habitats, grassland habitats, riparian habitat
Silver-haired Bat	*Lasionycteris noctivagans*	Sensitive	Late-successional conifer forests, although they may be found in other habitat types during migration.	Moderate, during migration. Recorded in Morrow County.	Riparian habitat around Carty Reservoir

Common Name	Scientific Name	State Status[1]	Expected Habitats[2]	Probability of Occurrence within Analysis Area[3, 4, 5, 6]	Potential Use of Habitat Within the Analysis Area
Spotted Bat	*Euderma maculatum*	Sensitive	Crevices in cliffs, caves, and canyon walls for day and night roosting. They also roost in trees adjacent to meadows at night. They typically forage in meadows, shrub-steppe, or along riparian corridors and water sources.	Low, during migration. Not recorded in Morrow County. Analysis area not within predicted habitat.	Treed edges along Carty Reservoir
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Sensitive-Critical	Use caves, mines, and isolated buildings for day and night roosting, maternity roosts, and hibernacula. Occasionally, uses hollow trees and bridges for day or night roosting.	Moderate. Recorded in Morrow County.	Roosts in caves, mines, hollow trees, built structures

[1] State Sensitive Species Status Definitions (ODFW 2021):

Sensitive = Fish and wildlife species that are facing one or more threats to their populations and/or habitat; are defined as having small or declining populations, are at-risk, and/or are of management concern. Implementation of appropriate conservation measures to address existing or potential threats may prevent them from declining to the point of qualifying for threatened or endangered status.

Sensitive-Critical = Sensitive species of particular conservation concern; have current or legacy threats that are significantly impacting their abundance, distribution, diversity, and/or habitat. They may decline to the point of qualifying for threatened or endangered status if conservation actions are not taken.

[2] Expected Habitats (ODFW 2023)

[3] Oregon Explorer species by county and species predicted habitats (Oregon Explorer 2023).

[4] ORBIC (2023) occurrence locations are from a variety of sources that vary in accuracy and precision. Because some ORBIC records, particularly older records, have a high level of uncertainty, some occurrence locations are represented by large polygons in order to reflect this lack of precision. These polygons are sometimes more than 1 mile in diameter around a single occurrence location, and do not necessarily reflect the actual location of the sensitive species. As a result, the ORBIC occurrence information was used as a rough approximation of occurrence.

[5] eBird 2023.

[6] Oregon Breeding Bird Atlas (Adamus et. al 2001).

[7] PGE 2018.

7.0 Baseline Survey of Habitat Use by State Sensitive Species – OAR 345-021-0010(1)(p)(E)

OAR 345-021-0010(1)(p)(E) A baseline survey of the use of habitat in the analysis area by species identified in (D) performed according to a protocol approved by the Department and ODFW.

The desktop analysis described in Section 4.1 was performed to determine which sensitive species may be using the habitats available within the analysis area for breeding, foraging, or stop over habitat during migration. Baseline field surveys for available wildlife habitat were completed in 2023 within portions of the analysis area and sensitive wildlife species were recorded during both the habitat and WAGS surveys, as described in Section 4.2. Additional details on the field survey methods and results are provided in Attachment P-1. The use of habitats within the analysis area by state sensitive species are summarized in Table P-5.

7.1 Results of Field Surveys

7.1.1 2023 Biological Resources Surveys

Habitat types were identified within the Biological Study Area during surveys and habitat types within the analysis area, but beyond the Biological Study Area were identified by review of previous RFAs and aerial photo interpretation. All the habitat types were then categorized according to ODFW's Fish and Wildlife Habitat Mitigation Policy Habitat Categorization flowchart (ODFW 2008). Seven noxious weed species and no rare plant species were identified within the Biological Study Area (Attachment P-1).

One amphibian, three reptile, 40 bird, and six mammal species were observed during field surveys within the Biological Study Area. Three WAGS colonies were detected during 2023 surveys (AECOM 2023c). Aside from WAGS, no other state-listed threatened, endangered, or candidate species were observed during surveys (Attachment P-1).

Two state sensitive species were observed during 2023 AECOM field surveys: one ferruginous hawk (*Buteo regalis*) and a family group of Swainson's hawks. The ferruginous hawk was observed in the distance flying to the east of the analysis area, and a pair of Swainson's hawks with a fledgling were observed in the southeast portion of the analysis area in a cluster of juniper trees; no nest was observed.

For the 2023 field season, PGE monitored historic nests and recorded new nests in the analysis area. A total of one bald eagle, three red-tailed hawk (*Buteo jamaicensis*), one osprey (*Pandion haliaetus*), one great horned owl (*Bubo virginianus*), and one Swainson's hawk active nests were documented by PGE within the analysis area. Of these, only Swainson's hawks are on the ODFW sensitive species list. The active Swainson's hawk nest was located in a Western juniper tree just

east of the former BCP coal yard. The two bald eagle nests were located right next to each other, one serving as the alternate nest, along the southern shoreline of Carty Reservoir.

8.0 Description of Potential Adverse Impacts – OAR 345-021-0010(1)(p)(F)

> *OAR 345-021-0010(1)(p)(F) A description of the nature, extent and duration of potential adverse impacts on the habitat identified in (B) and species identified in (D) that could result from construction, operation and retirement of the proposed facility.*

Construction and operation of the Facility will result in both permanent and temporary impacts to wildlife and their habitats. Permanent impact areas are those that will be converted from the existing condition to a different condition for the life of the Amended Carty Solar Farm (e.g., BESS and associated perimeter fencing, collector substations, operations and maintenance building, solar areas). The two solar areas will produce permanent impacts to wildlife and their habitats as the vegetation will be removed and replaced with gravel or revegetated after construction. The solar areas include all solar components (i.e., modules, inverters, transformers, tracking systems, posts, perimeter fencing, access roads, and other associated equipment). The support poles associated with the 1-mile-long, 34.5-kV overhead collector line running along the road easement of the eastern shore of Carty Reservoir are also categorized as a permanent impact. These components are described in detail in Section 4.0 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station).

Temporary impact areas include areas proposed to be temporarily impacted during construction of the 34.5-kV underground collector line and aboveground permanent project facilities. One temporary construction area will be created to support construction, store supplies and equipment, and facilitate the delivery and assembly of materials and equipment. This area is 21.4 acres in size and is located in an area that was formerly part of the BCP power block; following demolition of the BCP, the area was left as gravel and crushed concrete. The RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station) presents the temporary and permanent impacts of each Amended Carty Solar Farm component in Section 4.4. Restoration of the temporary impact areas will occur following construction as described in the Amended Revegetation and Noxious Weed Control Plan (Attachment P-2).

8.1 Potential Impacts to Fish and Wildlife Habitat

Potential impacts on fish and wildlife habitat include the temporary and permanent disturbance to habitat associated with the construction and operation of the Amended Carty Solar Farm. The acres of temporary and permanent disturbances are summarized in Table P-6. Some impacts will be avoided or minimized as described in Section 9.0. Impacts that cannot be avoided will be mitigated as described in the Amended Wildlife and Habitat Monitoring and Mitigation Plan (Attachment P-3).

Table P-6. Acres of Temporary and Permanent Disturbances

ODFW Habitat Category	Habitat Type	Temporary Disturbance (acres)	Permanent Disturbance (acres)
1	NA	0	0
2	Big Sage Shrubland	0.3	15.3
	Big Sage/Juniper Woodland	0.1	7.8
	Broom Snakeweed Shrubland	0.9	126.6
	Rabbitbrush Shrubland	2.5	5.2
	Category 2 Subtotal	**3.8**	**154.9**
3	Big Sage Shrubland	0	40.3
	Big Sage/Juniper Woodland	0	57.3
	Open Water[1]	0.3	0
	Riparian	0.8	4.9
	Category 3 Subtotal	**1.1**	**102.5**
4	Broom Snakeweed Shrubland	0.4	149.2
	Non-native Grassland	0.5	132.4
	Rabbitbrush Shrubland	2.1	151.9
	Category 4 Subtotal	**3.0**	**433.5**
5	NA	0	0
6	Developed	29.3	169
Total		**37.2**	**859.9**

[1] There are not any temporary disturbances in open water habitat types. The habitat mapping included the rip-rap shoreline on the eastern edge of Carty Reservoir as an open water habitat type. Refer to Exhibit J for detailed analysis of impacts on wetlands and waters.

8.2 Potential Impacts to State Sensitive Species

This section addresses potential adverse impacts to state sensitive species identified in Section 6.0. Habitat loss and modification resulting from construction activities will occur in permanent impact areas and temporary construction areas, and the associated impacts on wildlife will vary by species. In addition to these habitat-related impacts, potential adverse impacts to sensitive species due to construction and operation activities may include potential nesting and breeding disturbance, collision with solar arrays, security perimeter fencing, overhead collector lines, vehicles and heavy equipment, and disturbance related to artificial lighting.

8.2.1 Reptiles

Two state sensitive reptile species have the potential to occur within the analysis area: Northern sagebrush lizards and Western painted turtles. Northern sagebrush lizards were recorded in two

locations in the northeast portion of the proposed Southern Solar Area during surveys conducted in 2016.

Construction will result in loss of habitat where northern sagebrush lizards have been observed in the recent past, although their preferred habitat (big sagebrush and open sandy soils) is limited within the Amended Site Boundary. Based on the habitat mapping, there is big sagebrush habitat located in the northwest section of the proposed Southern Solar Area, as well as a couple of small, isolated areas northwest of the BCP. This species is fast and expected to avoid construction equipment, although construction-related mortalities are still possible, especially along newly constructed dirt roadways.

Western painted turtles have not been recorded within Carty Reservoir; therefore, adverse impacts associated with the Amended Carty Solar Farm will be negligible. The Amended Carty Solar Farm will not directly disturb Carty Reservoir; however, indirect impacts could occur if sediment enters the reservoir from nearby construction disturbance or if project-related chemicals spill into the reservoir. Per Site Certificate Condition 9.1, implementation of the Erosion and Sediment Control Plan (Exhibit I, Attachment I-1) during construction will avoid and minimize sediment and stormwater runoff from entering the reservoir. Per Site Certificate Conditions 5.9 and 10.37, implementation of a Spill Prevention, Control and Countermeasure Plan and the Hazardous Materials Management and Monitoring Plan will ensure measures are in place to avoid and minimize environmental effects of spills and hazardous materials.

8.2.2 Birds

Ten state sensitive bird species and two protected eagle species have the potential to occur within the analysis area and could be potentially impacted by the Amended Carty Solar Farm (Table P-5). Other, non-sensitive bird species potentially occurring within the Amended Site Boundary could be impacted by the Amended Carty Solar Farm. Construction and operation of the Amended Carty Solar Farm will result in minimal permanent loss of habitat, which will displace some nesting and foraging birds. Birds using habitat within the Amended Site Boundary are expected to relocate to other suitable habitat in the greater vicinity of the Amended Carty Solar Farm to the north, south, and east of the Amended Site Boundary; land use to the west is active agriculture.

Temporary impacts from noise and visual disturbance associated with the presence of personnel, vehicles, and equipment during construction could disrupt normal feeding or breeding activities or cause birds to avoid the area. Operations will have reduced levels of human activity compared to construction but could still cause birds to alter their typical behavior and/or avoid the area.

Unlike avian fatality data available for wind turbines, there has been limited standard fatality data associated with photovoltaic (PV) solar energy infrastructure collected and available across the country. The available data on avian mortality at utility-scale solar energy sites suggests mortality at PV facilities is low, compared to collisions occurring with other anthropogenetic infrastructure (e.g., wind turbines, communication towers, tall buildings). In a study by Kosciuch et al. (2020) that analyzed fatality monitoring data from 10 PV solar facilities in California and Nevada, a fatality

estimate of 2.5 birds/MW/year was calculated, but this was reduced to an average annual fatality rate of 1.8 birds per MW per year when an outlier project was removed.

It is theorized that waterbirds confuse the reflective array of solar panels located near ground level to be a body of water and attempt to land on them, and other bird species may fly into the reflective panels like they would windows, unable to perceive the difference between the sky and the glass. The Kosciuch et al. (2020) study showed that water obligate bird fatalities were present in most of the studies (80 percent). Water obligates are species that depend on water for mobility and cannot take flight from land, while water associates are species that rely on water for foraging, reproduction, and/or roosting. Kosciuch et al. (2020) stated that the causal mechanism responsible for water obligate mortalities at PV facilities could not be concluded with their study, and their results were not predictive outside of the vicinity of the sites included in their study.

In a recent solar study that included six small solar arrays located next to Lake Michigan, no water obligate mortalities were recorded and only two water associate mortalities showed evidence of death caused by colliding with solar panels (Rodriguez et al. 2023). In addition, an analysis that summarized bird fatalities to date at PV solar facilities in Alberta, Canada, was conducted and found no correlation with water associate and water obligate mortalities being present at higher numbers than other avian species (Kosciuch et al. 2022).

The results from three publicly available studies from large-scale California PV facilities reported the avian taxonomic groups most highly represented as fatalities were passerines (49 percent), followed by doves/pigeons (22 percent), although loons and grebes ranked second at one facility (23 percent; WEST 2014). Passerines are "perching birds" that make up almost half of all bird species, so that high percentage could easily correlate with the high number of birds in that taxonomic group. When analyzing the fatality species composition, often the species with the largest populations spend most of their time close to the ground and inhabit landscapes with relatively low-growing vegetation or are habituated to human structures. These species often represent the highest number of fatalities at PV facilities (e.g., horned larks, western meadow larks, mourning doves, house sparrows, house finches, gray partridge; Kosciuch et al. 2020, Kosciuch et al. 2022, WEST 2014).

In Oregon, results of a fatality study at a 56-MW photovoltaic facility near Prineville detected only three bird fatalities during one year of standardized searches, including only two native birds: horned lark (*Eremophila alpestris*) and a dark-eyed junco (*Junco hyemalis*) (ODOE 2020). These findings, which are the first for the region in Oregon, imply that significant fatality events are unlikely at photovoltaic solar facilities in the area. However, low numbers of common ground-dwelling bird species fatalities are possible (ODOE 2020).

Although the fatality numbers from solar studies suggest the probability for waterbird fatality events associated with hitting solar panels is low, waterbirds may attempt to land on the solar panels at the two solar areas located next to a known waterbird stop-over area (Carty Reservoir), especially in times of poor weather and low visibility, and during nocturnal migration.

Artificial lighting has been shown to attract nocturnally migrating birds, resulting in collisions with structures such as communication towers, guy wires, and wind turbines. Research has shown that lighting at solar energy facilities can be designed to minimize that attraction, including using lights that are directed downward, have the lowest allowable intensity, and are on timers or motion sensors.

The 34.5-kV overhead collector line also poses a collision risk to birds given the proximity to Carty Reservoir. The collector line, estimated to be approximately 1 mile in length, is located along the eastern shoreline road of Carty Reservoir. Implementing the measures in the PGE (2020) Avian Protection Plan as referenced in the Amended Wildlife Habitat Monitoring and Mitigation Plan (Attachment P-3) will minimize the effects of the overhead collector line on birds. Powerline electrocution to raptor species along this same stretch of aboveground collector line is not expected at the Amended Carty Solar Farm because it will be constructed following the Avian Powerline Interaction Committee (APLIC) suggested practices manual and PGE's avian-safe design standards as outlined in the PGE (2020) Avian Protection Plan.

The security perimeter fencing proposed in this RFA, estimated to be up to 15 miles long, is an additional collision hazard for birds. The Amended Carty Solar Farm security fencing will be chain-link perimeter fencing up to 8 feet in height with additional strands of barbed wire on top.

During the 2023 survey effort, one active Swainson's hawk (state sensitive) nest was observed in a lone juniper tree east of the proposed Northern Solar Area and one active bald eagle nest was observed within the riparian areas associated with Carty Reservoir (Figure P-3). Construction activities occurring near these nests during the sensitive breeding season could cause the nests to fail. The protective buffers and monitoring requirements identified in Site Certificate Condition 10.8 will be implemented for sensitive raptor nests that are determined to be active during construction. Active Swainson's hawk nests' sensitive periods identified in Condition 10.8 apply from April 1 to August 15, and bald eagle (*Haliaeetus leucocephalus*) nests' sensitive periods apply from January 1 to August 15. Active raptor nests of great horned owls (*Bubo virginianus*) and red-tailed hawks (*Buteo jamaicensis*) were recorded within the riparian habitat types associated with Carty Reservoir. The protective measures included in Condition 10.8 do not apply to these species as they are generally more tolerant of disturbance. Implementation of the PGE (2020) Avian Protection Plan as referenced in the Amended Wildlife Habitat Monitoring and Mitigation Plan (Appendix P-3) would avoid or minimize impacts to these species, as feasible.

Construction occurring during the songbird breeding season (as early as February and lasting through August for horned larks) could cause active nests to fail due to direct destruction of nests or nearby disturbance causing nest abandonment. All active bird nests from native species are protected under the MBTA.

As described above, 10 state sensitive bird species and two eagle species may occur within the analysis area. Impacts specific to sensitive bird species with the potential to occur within the Amended Site Boundary are addressed below. Measures described in Section 9.0 will be used to minimize or avoid these potential impacts.

- **Bald eagle (no state status, BGEPA-protected):** Two bald eagle nests were recorded during 2023 surveys, one of which is an alternate nest within one active territory (Attachment P-1). Minor disturbances to riparian habitat (Table P-6) would not directly disturb any known eagle nests. This species has also not been presented in the limited solar fatality data and is assumed not to be at risk of colliding with solar arrays. However, the overhead electrical collection line poses a collision risk to birds. PGE's Avian Protection Plan (PGE 2020) includes use of flight diverters or other line marking devices if warranted, which would reduce the likelihood of collision. Electrocution from the collector line is not expected due to the avian-safe design standards.

- **Brewer's sparrow (state sensitive):** No Brewer's sparrows were recorded during 2023 surveys (Attachment P-1), although they could occur in the limited shrub-steppe habitat within the Amended Site Boundary. Construction and operation of the Amended Carty Solar Farm will result in the loss of suitable breeding and foraging habitat and potential nesting disturbance and potential collision risks with vehicles, solar arrays, perimeter fencing, and overhead collector line. Sparrow fatalities have been documented at PV solar facilities (WEST 2014), although no Brewer's sparrows have been reported specifically. Brewer's sparrows are a nocturnal migrant (ADW 2023); therefore, this species may be attracted to artificial lights produced by the Amended Carty Solar Farm during migration, increasing collision risks.

- **Burrowing owl (state sensitive-critical):** No burrowing owls were recorded during 2023 surveys (Attachment P-1), although they could occur in grassland and shrubland habitats within the Amended Site Boundary, especially if burrowing mammals are present. Potential adverse impacts include the loss of foraging and breeding habitat and potential collision risks with vehicles, solar arrays, perimeter fencing, and overhead collector line during the breeding season. Burrowing owl fatalities have been documented at PV solar facilities and this species is a nocturnal migrant (WEST 2014); therefore, this species may be attracted to artificial lights produced by the Amended Carty Solar Farm during migration, increasing collision risks.

- **Common nighthawk (state sensitive):** No common nighthawks were recorded during the 2023 surveys conducted by AECOM (Attachment P-1). Common nighthawks were recorded during PGE's breeding bird survey in 2023. Nesting habitat is present within the Amended Site Boundary. Nest sites can include a variety of substrates in open areas including bare ground, gravel, and lithosol. Males also tend to roost on gravel roads, and therefore may roost within the Amended Site Boundary. Nesting disturbance and collision with vehicles could occur during construction and operation. Nighthawks most often feed at dawn and dusk during low light conditions and nighthawk fatalities have been documented at PV solar facilities (WEST 2014), therefore collision risks with the solar arrays, perimeter fencing, and overhead collector line are possible. This species is a diurnal migrant and should not be

adversely impacted by artificial lighting at the Amended Carty Solar Farm during migration.

- **Ferruginous hawk (state sensitive-critical):** Ferruginous hawks were recorded during 2023 surveys (Attachment P-1). The potential adverse impact to this species includes loss of foraging habitat, as no nests were observed within the analysis area. Limited hawk fatalities have been documented at PV solar facilities, and no ferruginous hawk fatalities specifically; therefore, the solar arrays should not create a collision risk to this species. However, the overhead electrical collection line poses a collision risk to birds. PGE's Avian Protection Plan (PGE 2020) includes use of flight diverters or other line marking devices if warranted, which would reduce the likelihood of collision. Electrocution from the collector line is not expected due to the avian-safe design standards.

- **Golden eagle (BGEPA):** No golden eagles were recorded during 2023 surveys (Attachment P-1), although they could forage in open grassland or shrubland habitats within the Amended Site Boundary. This species has also not been presented in the limited solar fatality data and is assumed not to be at risk of colliding with solar arrays. However, the overhead electrical collection line poses a collision risk to birds. PGE's Avian Protection Plan (PGE 2020) includes use of flight diverters or other line marking devices if warranted, which would reduce the likelihood of collision. Electrocution from the collector line is not expected due to the avian-safe design standards.

- **Grasshopper sparrow (state sensitive):** No grasshopper sparrows were recorded during the 2023 surveys conducted by AECOM (Attachment P-1). Grasshopper sparrow was recorded during PGE's breeding bird survey in 2023. They could nest in the grassland habitats within the Amended Site Boundary. Construction and operation of the Amended Carty Solar Farm will result in the loss of suitable nesting and foraging habitat for grasshopper sparrows during the breeding season. Potential adverse impacts from collision risks exist with vehicles, heavy equipment, solar arrays, perimeter fencing, and overhead collector line. Sparrow fatalities have been documented at PV solar facilities (WEST 2014). Grasshopper sparrows are also a nocturnal migrant (Hill and Renfrew 2018); therefore, this species may be attracted to artificial lights produced by the Amended Carty Solar Farm during migration, causing additional collision risks.

- **Lewis's woodpecker (sensitive-critical):** No Lewis's woodpeckers were recorded during 2023 surveys (Attachment P-1). The Amended Site Boundary does not provide breeding habitat, but the species could travel through the treed riparian areas during migration. Construction of the Amended Carty Solar Farm will not impact suitable habitat. Additionally, as a diurnal migrant (Audubon 2023), this species will not be adversely impacted by artificial lighting. This species has also not been presented in the limited solar fatality data. However, potential adverse impacts may occur for migrant individuals passing

through due to collision with perimeter fencing and overhead collector line.

- **Loggerhead shrike (state sensitive):** No loggerhead shrikes were recorded during 2023 surveys (Attachment P-1), although they could occur in the shrub habitats within the Amended Site Boundary. The potential adverse impacts to loggerhead shrike include habitat loss, nesting disturbance, and collisions associated with vehicles, heavy equipment, solar arrays, perimeter fencing, and overhead collector line. Loggerhead shrike fatalities have been documented at PV solar facilities and this species is a nocturnal migrant (WEST 2014); therefore, this species may be attracted to artificial lights produced by the Amended Carty Solar Farm during migration, creating increased collision risks with solar arrays, perimeter fencing, and overhead collector line.

- **Long-billed curlew (state sensitive-critical):** No long-billed curlews were recorded during the 2023 surveys conducted by AECOM (Attachment P-1). Long-billed curlew were recorded during PGE's annual raptor nest survey in 2023. They could occur in grassland habitats within the Amended Site Boundary. Potential adverse impacts include loss of potential nesting and foraging habitat as well as potential collision with the solar arrays, perimeter fencing, overhead collector line, and moving vehicles and heavy equipment operating on-site during the spring and summer months. Long-billed curlew fatalities have been documented at PV solar facilities and this species is a nocturnal migrant (WEST 2014); therefore, this species may be attracted to artificial lights produced by the Amended Carty Solar Farm during migration, creating additional collision risks. Additionally, long-billed curlews are susceptible to human disturbance during the breeding season, which can result in nest abandonment or disruption of brood-rearing (Dugger and Dugger 2002); the construction of the Amended Carty Solar Farm may adversely impact active breeding attempts if construction occurs in proximity to long-billed curlew during the breeding season.

- **Sagebrush sparrow (state sensitive-critical):** No sagebrush sparrows were recorded during the 2023 surveys conducted by AECOM (Attachment P-1). Sagebrush sparrow were recorded during PGE's breeding bird survey in 2023. This species prefers expanses of shrub-steppe habitat with high shrub cover, particularly big sagebrush, although they could occur in the limited shrub-steppe habitat within the Amended Site Boundary. Potential adverse impacts to sagebrush sparrows include permanent habitat loss, nesting disturbance, collision with solar panels and security fencing, and possibly lighting-related disturbance during migration, though this species' migratory behavior is poorly described. Sagebrush sparrow fatalities have been documented at PV solar facilities and this species is nocturnal migrant (WEST 2014); therefore, this species may be attracted to artificial lights produced by the Amended Carty Solar Farm during migration, causing additional collision risks.

- **Swainson's hawk (state sensitive):** This species was recorded nesting at two locations in the analysis area during 2023 surveys; in addition, a pair of adults with a fledgling were observed in the southeast portion of the analysis area (Figure P-3; Attachment P-1). Construction will result in loss of foraging habitat and reduce nesting habitat if trees are removed. There is also collision risk associated with the aboveground collector line and solar arrays. Hawk fatalities have been documented at PV solar facilities (WEST 2014).

8.2.3 Mammals

Five state sensitive bat species have the potential to occur within the analysis area, although two of these species have a low probability (hoary bat and spotted bat) and one a moderate probability (silver-haired bat) of potentially moving through during migration (Table P-5). The permanent removal of habitat associated with the two solar areas and substation will reduce the foraging opportunities for two bat species potentially using the Amended Site Boundary: pallid bat (*Antrozous pallidus*) and Townsend's big-eared bat (*Corynorhinus townsendii*). Carty Reservoir and the surrounding wetland habitat will remain available for foraging and roosting.

Collision with solar panels and security fencing is a potential threat to bats. Post-construction bat mortality data at utility scale photovoltaic solar energy sites are limited. Smallwood (2022) reviewed 18 California fatality monitoring reports from 1982 to 2018 and calculated an average fatality estimate of 0.06 bats/MW/year at PV solar arrays, 2.56 bats/kilometer (km)/year along perimeter fences, and zero fatalities associated with generation tie-in power lines.

9.0 Measures to Avoid, Reduce, or Mitigate Impacts – OAR 345-021-0010(1)(p)(G)

> *OAR 345-021-0010(1)(p) (G) A description of any measures proposed by the applicant to avoid, reduce, or mitigate the potential adverse impacts described in (F) in accordance with the general fish and wildlife habitat mitigation goals and standards described in OAR 635-415-0025 and a description of any measures proposed by the applicant to avoid, minimize, and provide compensatory mitigation for the potential adverse impacts described in (F) in accordance with the sage-grouse specific habitat mitigation requirements described in the Greater Sage-Grouse Conservation Strategy for Oregon at OAR 635-140-0000 through 635-140-0025, and a discussion of how the proposed measures would achieve those goals and requirements.*

This section describes measures to avoid, minimize, and mitigate for impacts to state sensitive and other wildlife species and their habitats, and describes how those measures are expected to achieve the habitat mitigation goals of OAR 635-415-0025. The Facility does not occur in sage-grouse habitat; therefore, the mitigation requirements associated with the Greater Sage-Grouse Conservation Strategy for Oregon do not apply.

Some of the potential impacts described in Section 8 have been or will be avoided or minimized through micrositing, timing of construction, and other conditions described in the Third Amended Site Certificate (Council 2022) and summarized in Section 9.1. For unavoidable impacts associated with ground-disturbing activities that temporarily or permanently remove functional habitat, compensatory mitigation has been proposed as summarized in Section 9.2.

9.1 Avoidance and Minimization

9.1.1 Facility Design

Measures employed during design of the Amended Carty Solar Farm to avoid and minimize impacts to fish and wildlife habitat, as well as state sensitive species, included the following:

- To the extent feasible, PGE sited the Amended Carty Solar Farm on previously disturbed habitat, including developed areas and degraded habitat adjacent to developed areas.
- PGE sited all components of the Amended Carty Solar Farm outside of Category 1 habitat, per Site Certificate Condition 10.7.
- PGE will construct the overhead collector line and 300-foot-long transmission line following PGE's avian-safe design standards which are consistent with the suggested practices manual published by APLIC (APLIC 2012). This is expected to minimize the risk of electrocution and collision to all bird species, including bald eagles, golden eagles, Swainson's hawks, and ferruginous hawks.

9.1.2 Construction and Operation Plans

Per Condition 10.1, PGE will finalize its Amended Wildlife and Habitat Monitoring and Mitigation Plan with ODFW. PGE will adhere to the measures included in the Amended Wildlife and Habitat Monitoring and Mitigation Plan (Attachment P-3) and Amended Revegetation and Noxious Weed Control Plan (Attachment P-2) to avoid, reduce or mitigate adverse impacts on fish and wildlife and their habitats during construction and operation of the Amended Carty Solar Farm. In general, those measures include a combination of project siting, pre-construction surveys, temporal and spatial avoidance buffers, compensatory mitigation (Section 9.2), habitat restoration, and monitoring (per Condition 10.2). PGE also will take steps to control designated noxious weeds and prevent fires and will implement measures from their company-wide Avian Protection Plan (PGE 2020).

The Certificate Holder proposes revisions to two Site Certificate Conditions to incorporate the amendments proposed in RFA 4.

The Certificate Holder proposes revisions to Condition 5.5 to require consultation with the Morrow County Weed Control Supervisor and obtain approval of the Amended Revegetation and Noxious Weed Control Plan prior to construction of the Amended Carty Solar Farm approved in Final Order on RFA 4 as follows:

5.5 Prior to beginning construction of Unit 1, ~~facility components approved in Final Order on RFA1, or~~ facility components approved in Final Order on RFA2, or facility components approved in Final Order on RFA4, the certificate holder must consult with the Morrow County Weed Control Supervisor and obtain approval of a Revegetation and Noxious Weed Control Plan. The final Revegetation and Noxious Weed Control Plan must be submitted to the Department of Energy, based upon the draft amended plan provided as Attachment ~~D~~ X of the Final Order on Amendment ~~24~~, for approval prior to the start of construction.

During construction and operation of the facility, the certificate holder must implement a revegetation and weed control plan. The certificate holder must comply with the applicable provisions of the Morrow County Weed Control Ordinances, as determined by the Morrow County Weed Control Supervisor and the Gilliam County Weed Control Officer.
[Final Order IV.D.2.6] [AMD1] [AMD2] [AMD4]

The Certificate Holder proposes modifications to Condition 10.1 to clarify which portions of the condition are applicable to CGS Unit 1 and Carty Solar Farm as follows:

10.1 Prior to construction, the certificate holder shall:

i. For Unit 1, ~~C~~consult with the Oregon Department of Fish and Wildlife and prepare a final Wildlife and Habitat Monitoring Mitigation Plan and submit the plan to the Department for review and approval. The certificate holder must conduct all wildlife and habitat monitoring as described in the approved Wildlife and Habitat Monitoring and Mitigation Plan, as amended from time to time.
[Final Order IV.H.2.1] [Mandatory Condition OAR 345-027-0020(6)] [AMD4]

ii. For Carty Solar Farm, ~~S~~submit for review and approval by the Department, in consultation with the Oregon Department of Fish and Wildlife, a final Wildlife and Habitat Monitoring Mitigation Plan based upon the mitigation methodology and enhancement actions in the draft amended plan provided in the Final Order on Amendment ~~24~~. The certificate holder must conduct all wildlife and habitat monitoring as described in the approved Wildlife and Habitat Monitoring and Mitigation Plan, as amended from time to time.
[AMD1] [OAR 345-025-0016] [AMD1] [AMD2] [AMD4]

9.1.3 Environmental Training and Sensitive Resource Awareness

Per Condition 10.12 and Condition 10.17, PGE will provide environmental training to construction and operation staff to avoid impacts to sensitive species, their habitat, review exclusion areas/seasonal avoidance buffers, and other environmental issues. Training includes reporting injured or dead wildlife to the on-site environmental manager.

9.1.4 Speed Limits

Per Condition 10.15, PGE will impose a speed limit of 20 miles per hour during construction and operation, which will minimize the occurrence of wildlife and vehicle collisions. A speed limit of 10 miles per hour will be implemented during the active WAGS season in proximity to known colonies.

9.1.5 Avian Protection

PGE will implement the following avian protection measures:

- Condition 10.8 – nest buffers and seasonal restrictions.
- Condition 10.10 – design above-ground electrical collection and transmission lines in accordance with PGE's overhead line avian-safe design standards and suggested practices for avian protection on power lines established by APLIC.
- Condition 10.11 – raptor nest monitoring.
- Company-wide Avian Protection Plan (PGE 2020)
    - Avian-safe design, consistent with Condition 10.10.
    - Consideration of risk factors for avian collisions and use of flight diverters, if warranted.
    - Internal reporting system for tracking avian mortalities.
- Implement the Amended Wildlife Habitat Monitoring and Mitigation Plan (Attachment P-3)
    - Raptor nest monitoring and nest buffers and seasonal restrictions; consistent with Condition 10.8.
    - Where feasible, conduct site preparation for construction to minimize potential for impacting nesting birds, such as performing ground/vegetation clearing outside of the typical bird breeding season (generally March to July).

9.2 Mitigation

Per Conditions 10.1, 10.2, and 10.3, PGE will consult with ODFW and ODOE to finalize the Amended Wildlife and Habitat Monitoring and Mitigation Plan (draft included as Attachment P-3), including agreement on the total acreage mitigation required. PGE will acquire the legal right to a habitat mitigation area where habitat enhancement actions and monitoring will take place to account for the mitigation needs for the temporary and permanent impacts of the Amended Carty Solar Farm.

10.0 Monitoring Program – OAR 345-021-0010(1)(p)(H)

OAR 345-021-0010(1)(p)(H) A description of the applicant's proposed monitoring plans to evaluate the success of the measures described in (G).

No formal monitoring program is applicable to some of the measures discussed in Section 9.0. For instance, other than through professional review of the information included in this RFA, there is no monitoring program for design of the Amended Carty Solar Farm. Similarly, adherence to speed limits will be expected but not formally monitored.

Environmental monitors will be on-site during construction to support implementation of the environmental training and sensitive resource awareness.

Both the Amended Revegetation and Noxious Weed Control Plan (Attachment P-2) and the Amended Wildlife Habitat Monitoring and Mitigation Plan (Attachment P-3) contain monitoring methods and success criteria established through previously approved site certificate amendments. This RFA does not propose any changes to the monitoring methods or success criteria presented in those plans.

Avian protection is monitored through implantation of the Amended Wildlife Habitat Monitoring and Mitigation Plan, which includes specific avian monitoring efforts for the Facility. The Amended Wildlife Habitat Monitoring and Mitigation Plan includes by reference the monitoring program that PGE implements company-wide through its Avian Protection Plan (PGE 2020).

11.0 Conclusion

As part of the RFA process, PGE identified and categorized the fish and wildlife habitats within the analysis area pursuant to OAR 635-415-0025. Based on survey results, infrastructure for the Amended Carty Solar Farm was adjusted to avoid all impacts to Category 1 habitat, and where feasible, to Category 2 habitats. For other habitat categories, the Certificate Holder will mitigate for habitat impacts consistent with OAR 635-415-0025. Therefore, based on the information provided in this exhibit, there is sufficient evidence upon which the Council may find that the design, construction, and operation of the Facility as modified by this RFA, considering the proposed mitigation measures, is consistent with the fish and wildlife mitigation goals and standards of OAR 635-415-0025. Accordingly, PGE demonstrates compliance with OAR 345-022-0060.

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Figures

(Figure P-3 is Confidential and provided under separate cover)

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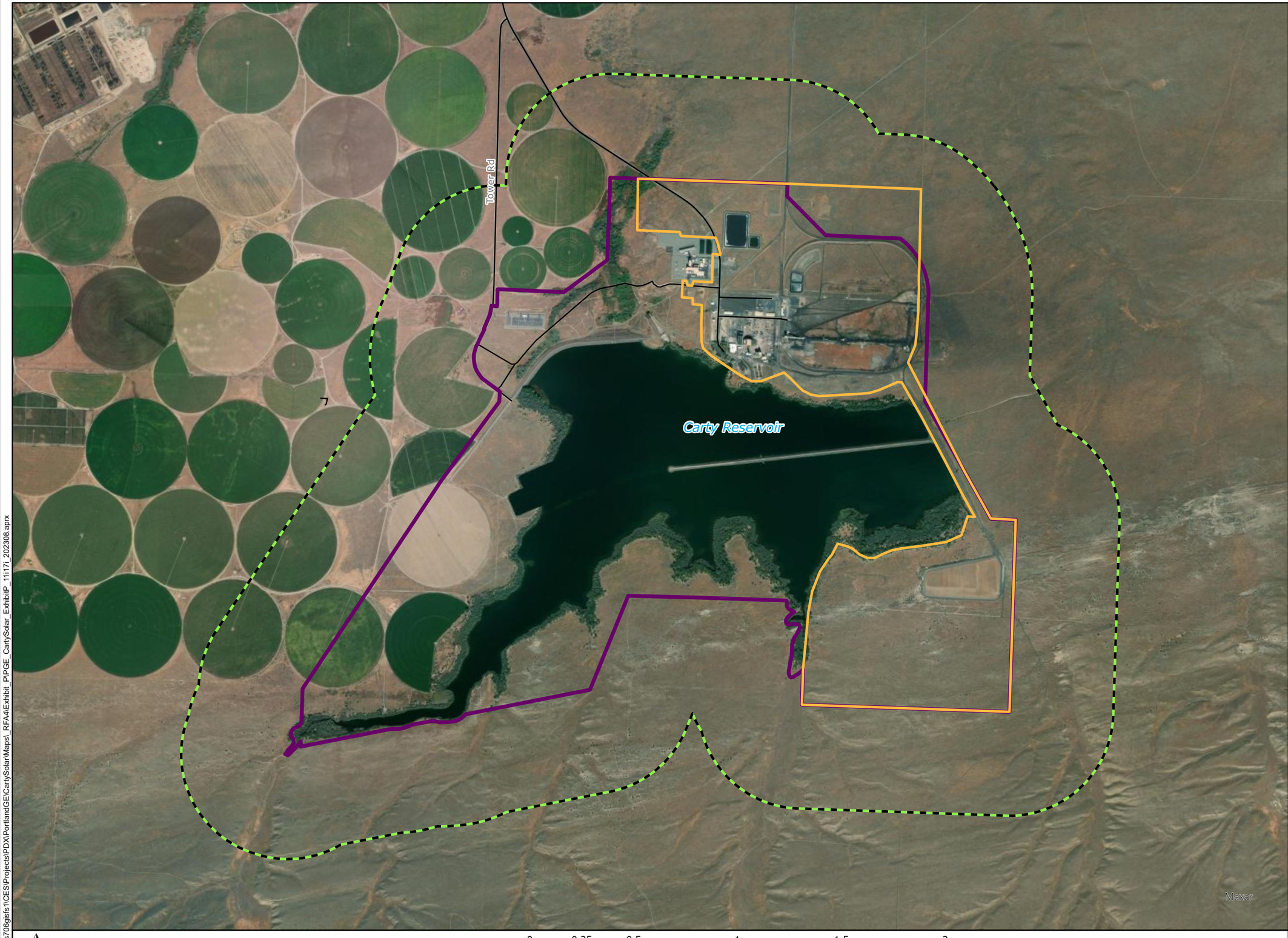
Carty Generating Station Request for Amendment 4

Figure P-1 Analysis Area for Fish and Wildlife Habitat

MORROW COUNTY, OR

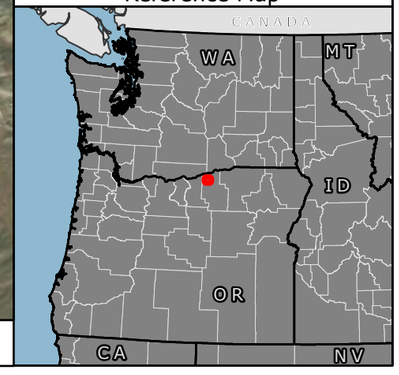


- Amended Site Boundary
- Analysis Area (0.5-mile buffer)
- Local Roads
- Biological Study Area (AECOM 2023)

TETRA TECH

PGE

Reference Map



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WGS 1984 UTM Zone 11N

0 0.25 0.5 1 1.5 2 Miles

NOT FOR CONSTRUCTION

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Carty Generating Station Request for Amendment 4

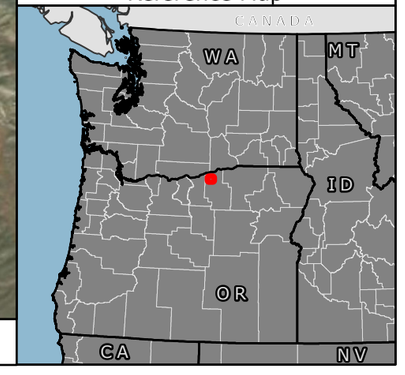
Figure P-2 Habitat Types and Habitat Categories in the Analysis Area

MORROW COUNTY, OR

Amended Site Boundary
Analysis Area (0.5-mile buffer)
Local Roads
Biological Study Area (AECOM 2023)
Habitat Category 1
Habitat Type (labeled with Habitat Category)
Agriculture
Big Sage Shrubland
Big Sage/Juniper Woodland
Broom Snakeweed Shrubland
Developed
Non-native Grassland
Open Water
Rabbitbrush Shrubland
Riparian

TETRA TECH
PGE

Reference Map



Tower Rd
Carty Reservoir
Maxar

1:28,000
WGS 1984 UTM Zone 11N
0 0.25 0.5 1 1.5 2 Miles
NOT FOR CONSTRUCTION

\\Cess706gisfs1\CES\Projects\PDX\PortlandGE\CartySolar\Maps_RFA4\Exhibit_P\PGE_CartySolar_ExhibitP_11171_202308.aprx

Attachment P-1. Biological Survey Reports

(Confidential and provided under separate cover)

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Attachment P-2. Amended Revegetation and Noxious Weed Control Plan

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Carty Generating Station: Amended Revegetation and Noxious Weed Control Plan[1]

July 2, 2014[2], December 14, 2018[3], February 19, 2021,[4] **February XX, 2024**

1 INTRODUCTION

Portland General Electric (PGE or certificate holder) received a site certificate from the Energy Facility Siting Council (Council) in June 2012 authorizing the construction and operation of a 900 megawatt (MW) combined-cycle natural gas-fueled energy generating facility in Boardman, Oregon in Morrow County (Carty Generating Station). The Council's 2012 approval authorized construction and operation of two 450-MW combined-cycle natural gas-fueled turbine generators (Unit 1 and Unit 2). PGE commenced Unit 1 construction on January 9, 2014; PGE completed Unit 1 construction on December 26, 2016; Unit 1 began operation on July 29, 2016. The construction commencement deadline for Unit 2 expired in June 2017 and therefore the certificate holder no longer has the authority to construct or operate Unit 2.

The Council issued the First Amended site certificate on December 14, 2018, authorizing a site boundary change and the construction and operation of a 50 MW photovoltaic solar unit, five 34.5 kilovolt (kV) interconnecting transmission line routing options, and temporary construction and laydown areas (Carty Solar Farm). The construction commencement and completion deadlines for the components authorized in the First Amended site certificate are February 4, 2022, and February 4, 2025, respectively. The Council issued the Second Amended site certificate on November 19, 2020 authorizing a boundary change; construction and operation of a new substation and associated distribution lines, septic system, backup water pipeline, wastewater pipeline, office/warehouse building, and security guard station; and incorporation of existing facilities that had been permitted under the Boardman Coal Plant site certificate including Carty Reservoir, existing transmission infrastructure, and interconnecting water pipelines. The construction commencement and completion deadlines for the components authorized in the Second Amended site certificate are December 9, 2023 and December 9, 2026 respectively. The Council issued the third site certificate on July 22, 2022, authorizing the extension of construction commencement and completion deadlines for the 50-MW Carty Solar Farm that was authorized in the First Amended site certificate by three years; with conditions requiring construction to commence by February 4, 2025 and requiring construction completion by February 4, 2028.

The certificate holder submitted a Request for Amendment 4 (RFA 4) to the Site Certificate for the Carty Generating Station that was authorized in the original application in 2012. In RFA 4, the certificate holder proposed to increase the output of the Carty Solar Farm from 50 MW to approximately 185 MW by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and utilizing a minor amount

[1] This Plan is incorporated by reference in the Site Certificate for the Carty Generating Station and must be understood in that context. It is not a "stand-alone" document. This Plan does not contain all revegetation and weed control measures required of the certificate holder.

[2] A draft version of this Plan was included as Exhibit 1 to the Energy Facility Siting Council's Final Order on the Carty Generating Station Application for Site Certificate (June 29, 2012). In accordance with Site Certificate Condition 5.5 the certificate holder consulted with the Morrow County Weed Control Supervisor and obtained Oregon Department of Energy (ODOE) approval of the Plan prior to the start of construction (December 2013). As allowed by Section IX of the Plan, ODOE reviewed and approved the amended Plan on July 7, 2014.

[3] Minor Plan updates were made to reference additional facilities within Morrow County included in the First Amended Site Certificate, and the updated Plan was reviewed and approved by the Morrow County Weed Control Supervisor in December 2017 (see Section 7, References). Subsequent edits were made in February 2017 to remove references to the unbuilt transmission line between Grassland Switchyard and Slatt substation and remove references to Gilliam County. Finally, revisions to the agency consultation procedures, revegetation monitoring protocol, and success criteria were made in consultation with ODOE and ODFW in June 2018.

[4] Minor Plan updates were made to reference additional facilities within Morrow and Gilliam Counties included in the Second Amended site certificate, and for submittal of plan prior to 2021 septic system and substation construction activities.

of undisturbed land adjacent to the formerly used areas. As part of RFA 4, the certificate holder proposed the addition of battery energy storage systems (BESS) to the Carty Generating Station.

The site certificate for the facility requires restoration of disturbed areas to satisfy the requirements of the Fish and Wildlife Habitat standard (OAR 345-022-0060), which aligns with the mitigation goals and policies within the ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635 Division 415). In order to meet the 'no net loss of habitat quality' goal of the mitigation policy, the certificate holder shall revegetate disturbed areas according to a set of agreed-upon success criteria that return the site to pre-disturbance condition. In addition, the certificate holder shall mitigate for permanent habitat impacts and temporal habitat loss in temporary disturbance areas by creating, enhancing, and monitoring a habitat mitigation area as detailed in the Wildlife Habitat Monitoring and Mitigation Plan (WHMMP). See the WHMMP for more detail on mitigation measures and mitigation acreages by disturbance type and habitat category.

This Amended Revegetation and Noxious Weed Control Plan (Amended Plan) outlines the goals, methods, and success criteria that will be used for revegetation of areas temporarily disturbed during construction of the Carty Generating Station, including: the already-constructed Carty Unit 1; Grassland Switchyard; the transmission line segment connecting Unit 1 to the switchyard; laydown and parking lot areas; water pipeline area; wastewater pipeline area, sewer line area; and, areas temporarily disturbed during construction of additional components approved under the First and Fourth~~Second~~ Amended site certificates. The new substation and associated distribution lines are not included because they will be constructed in developed graveled areas and therefore re-vegetation and weed management is not required under this plan. Weed management of developed gravel areas is managed under PGE's routine facilities maintenance activities.

This Amended Plan has been developed in consultation with the Oregon Department of Energy (ODOE), Oregon Department of Fish and Wildlife (ODFW), ~~and~~ the Morrow County Weed Control Supervisor, and the Gilliam County Weed Officer, and utilizes restoration, revegetation, and weed control methods developed by other energy projects in this region of Oregon that were approved by Oregon Energy Facility Siting Council (2007). The objective of this Amended Plan is to minimize and mitigate potential impacts to the site, help bolster the native plant community, and provide clear guidelines for the revegetation and weed control of all areas disturbed by facility-related activities that are not occupied by permanent structures or facilities.

It is estimated that temporary impacts will occur on up to ~~165~~ 95 acres within the amended site boundary (Table 1). In general, the intensity of construction impacts on vegetation and habitat in temporary disturbance areas will be low and will often be limited to the flattening of vegetation by rubber-tired vehicles. Such low impact areas will not require the revegetation or soil management measures (such as topsoil salvage) described below but may require noxious weed prevention best management practices (BMPs) as appropriate (such as washing vehicles arriving from outside Morrow County or Gilliam County). In some instances, however, the intensity of impacts in temporary disturbance areas will be higher and will involve the removal of topsoil and vegetation through grading, excavation, or drilling activities.

The certificate holder will implement revegetation and weed control measures in all temporary construction disturbance areas where soil is disturbed. Such soil disturbance sites will require active measures to restore vegetation cover in a timely manner, control erosion, and prevent the establishment and spread of noxious weeds (plant species listed as noxious under the Oregon Department of Agriculture [ODA] Noxious Weed Control Program, and the Morrow County and Gilliam County weed lists).

Table 1. Estimated acreage of areas temporarily disturbed during Carty Generating Station Construction

Habitat Type by Project Area	Temporary Impact Areas to be Revegetated (acres)
Unit 1 and Supporting Facilities[5]	55.4
Carty Solar Farm and Supporting Facilities[6]	~~107.43~~37.2
Amendment 2 facility components.[7]	2.15

2 GOALS AND OBJECTIVES

The overall goal of this Amended Plan is to return the facility site to pre-construction (or better) conditions. The Amended Plan has the following objectives:

- Promote recovery of disturbed areas;
- Re-establish native plant communities;
- Control the introduction and spread of undesirable plants;
- Protect the site from erosion; and
- Support existing wildlife habitat.

These objectives will be achieved by a combination of techniques, including, but not limited to, the following:

- Installing and maintaining appropriate erosion control BMPs and construction limit staking per the Oregon Department of Environmental Quality (ODEQ) 1200-C permit;
- Revegetating disturbed areas with native grasses, forbs, and shrubs (See Table 2 in Section 5 for species list);
- Controlling weed germination and growth for the life of the facility including facility pre-construction, construction and operation; and
- Establishing a regular monitoring program prior to and after construction to ensure the continued successful development of restored areas, and to quickly identify new populations of weeds.

3 SITE DESCRIPTION

The facility site is located in Morrow and Gilliam Counties, Oregon, approximately 13 miles southwest of the town of Boardman. The Carty Generating Station facility area is situated approximately 7–10 miles south of the Columbia River within the Columbia Plateau physiographic region. The facility includes two transmission lines: one 500 kV line that extends west from the Grassland Switchyard 17

[5] Unit 1 temporary disturbance areas are in the 5th year of revegetation monitoring as of 2021.

[6] Development of Carty Solar Farm has not yet occurred as of ~~2021~~2023. The certificate holder proposed in RFA 4 to increase the output of the Carty Solar Farm from 50 MW to approximately 185 MW by expanding into areas formerly used for PGE's Boardman Coal Plant.

[7] New septic system, Carty Substation, water pipeline, wastewater pipeline, office/warehouse building, security guard station, and associated plumbing and communication lines. Of the approved components, the ~~S~~septic system, ~~and~~ Carty Substation, and office/warehouse building construction ~~planned for 2021~~was completed between 2021 and 2023. The water pipelines and security guard station were ultimately not constructed.

miles to the Slatt Substation and one 230 kV line that extends approximately 17 miles northwest to the Dalreed Substation. There is no proposed disturbance associated with the existing transmission lines. All proposed new areas of disturbance are within Morrow County. The facility is located on an upland plateau at an elevation of approximately 650 feet above sea level.

Habitat Types and Subtypes within Facility Site

The facility area is composed primarily of shrub-steppe and grassland habitat subtypes or agricultural cropland. The agricultural lands are typically used for rotating crop production, including potatoes, onions, and corn. The Shrub-steppe habitat subtype located toward the eastern end of the facility, including areas near Unit 1, is rangeland that is no longer being grazed. There are some riparian and wetlands habitats present within the amended site boundary; however, all facility components – including transmission line towers – have been sited to avoid impacts on these habitats. Soil types in the area consist primarily of sandy loam, silt loam, and very stony loam.

Much of the native Shrub-steppe vegetation within the site boundary has been modified by livestock grazing and past wildfires. Functional mature shrub-steppe habitat is patchy and is dominated by big sagebrush (*Artemisia tridentata*), broom snakeweed (*Gutierrezia sarothrae*), bluebunch wheatgrass (*Pseudoroegneria spicata*), cheatgrass (*Bromus tectorum*), gray rabbitbrush (*Ericameria nauseosa~~us~~*), needle-and-thread grass (*Hesperostipa comata*), and Sandberg's bluegrass *(Poa secunda)*. Grasslands consist of cheatgrass, crested wheatgrass (*Agropyron cristatum*), bulbous bluegrass (*Poa bulbosa*), bluebunch wheatgrass, needle-and-~~-~~thread grass, Sandberg's bluegrass, redstem filaree (*Erodium cicutarium*), and mouse-ear chickweed (*Cerastium* sp.). Additional species found within the site boundary include yarrow (*Achillea millefolium*), yellow sweet clover (*Melilotus officinalis*), balsam root (*Balsamorhiza* sp.), tall tumble mustard (*Sisymbrium altissimum*), Western juniper (*Juniperus occidentalis*), Russian olive (*Elaeagnus angustifolia*), and black cottonwood (*Populous trichocarpa*). Riparian forests are dominated by Russian olive, Pacific willow (*Salix lucida* ssp.), Canada goldenrod (*Solidago canadensis*), amaranth (*Amaranthus* sp.), and broadleaf cattail (*typha latifolia*). The wetland areas associated with Sixmile Canyon not only contain similar riparian vegetation found around the reservoir, these areas also contain wetland plants such as common reed (*Phragmites australis*).

Weed Types within Facility Site

Multiple species classified as noxious weeds by the Oregon Department of Agriculture (ODA) occur in Morrow and Gilliam Counties. ODA has designated two categories of noxious weeds, "A" list species and "B" list species. Weeds designated on the "A" list are species of known economic importance which occur in the state in small enough infestations to make eradication or containment possible or are rare species not known to occur in the state but which have a presence in neighboring states, making future occurrence seem possible. Weeds on the "B" list are weeds of economic importance which are regionally abundant but may have limited distribution in some areas. Listed species identified during site surveys (2010–2023~~17~~) within the amended site boundary~~area have not~~ do not include~~d~~ any ODA "A" list species, but ~~have~~ include~~d~~ the following ODA "B" list species: diffuse knapweed (*Centaurea diffusa*), yellow star-thistle (*Centaurea solstitialis*), Canada thistle (*Cirsium arvense*), ~~and~~ bull thistle (*Cirsium vulgare*), perennial pepperweed (*Lepidium latifolium*), Scotch thistle (*Onopordum acanthium*), houndstongue (*Cynoglossum officinale*), medusahead rye (*Taeniatherum canput-medusae*), rush skeletonweed (*Chondrilla juncea*), saltcedar (*Tamarix ramosissima*), and alkali ~~swainsonpea~~ Swainsonpea (*Sphaerophysa salsula)*. The Morrow County weed list classifies yellow star-thistle, Scotch thistle, rush skeletonweed, and houndstongue as ~~an~~ "A" list species at the county level. ~~Rush skeletonweed (*Chondrilla juncea*) is another county "A" list species that is present in the area and has high potential to occur on the site.~~ Morrow County considers both yellow star-thistle and rush skeletonweed as high priority species needing ~~for~~treatment. The Morrow County weed list classifies diffuse knapweed, medusahead rye, perennial pepperweed, and Canada thistle as "B" list species at the county level. Gilliam County follows ODA regulations and does not have a separate weed list.

4 PRE-CONSTRUCTION AGENCY CONSULTATION

This section of the Amended Plan was incorporated on December 14, 2018, and does not apply to activities already completed, including construction of Unit 1 and its associated components. Therefore, this section applies to components approved in the First Amended site certificate and any subsequent site certificate amendments.

Prior to construction, the certificate holder shall consult with ODFW, ODOE, and Morrow and/or Gilliam County Weed Departments to discuss: habitat category and habitat subtype conditions; monitoring site locations and conditions; reference site (as needed, see Section 6) locations and conditions; revegetation methods; erosion and sediment control measures; weed inventory and control methods; monitoring methods; and implementation schedule.

Prior to facility construction, the certificate holder shall identify monitoring sites and reference sites (as needed) in consultation with ODFW and ODOE. If reference sites are needed, they should closely resemble the pre-disturbance characteristics of the revegetation area monitoring sites as indicated by site conditions, including vegetation density and relative proportions of desirable vegetation and species diversity (see discussions of monitoring protocol and success criteria in Section 6). The certificate holder shall consider land use patterns, soil type, local terrain, and noxious weed densities in selecting monitoring and reference sites. See Section 6 for a more detailed discussion of monitoring site selection and protocol.

Once monitoring and reference sites are selected by the certificate holder and approved by ODOE and ODFW, the monitoring and reference sites shall remain in the same location unless approval for use of a differing reference site is obtained from ODOE and ODFW.

It is expected that minor, <0.25-acre soil disturbance associated with future transmission line maintenance activities will require erosion control and seeding consistent with this plan but not the detailed five-year monitoring protocol. Impacts of any major transmission line construction work will be evaluated for revegetation and monitoring needs in consultation with ODFW and the County weed agencies.

5 REVEGETATION AND WEED CONTROL METHODS

Soil preservation and preparation techniques that are essential to a successful revegetation program, including topsoil segregation, erosion control, and noxious weed control, will begin prior to, or at the start of, construction. Other restoration and revegetation measures will be initiated immediately after construction and other disturbances to project areas are completed. Re-seeding activities may need to be delayed, depending on the season or on weather condition, but will always occur as soon as appropriate after construction.

The certificate holder will employ the following general restoration and revegetation steps to meet short- and long-term goals:

- Re-seed construction soil disturbance areas to restore vegetation;
- Prior to construction, pre-treat state-designated noxious weeds, as appropriate and practical, in temporary soil disturbance areas, with an emphasis on treatment of roadsides that will be used frequently throughout project construction;
- Prevent introduction of seeds and minimize dispersal of state-designated noxious weeds by following appropriate and standard methods of abatement, including BMPs for washing project-related vehicles and equipment, especially for vehicles newly arriving at the project site. Implement documentation procedure for ensuring that applicable vehicles are washed before use on site;
- Use proper soil management techniques, including stripping, stockpiling, and reapplying topsoil (generally defined as the upper 6 to 12 inches of soil where biological activity is concentrated) to establish surface conditions that will enhance development of diverse, stable,

and self-generating plant communities. Topsoil management will apply to all areas of the project where excavation, grading, or other construction activities could result in mixing of soil layers;

- Establish stable surface and drainage conditions and use standard erosion control devices and techniques to minimize soil erosion and sedimentation, including the installation of silt fencing, straw bales, mulch, straw wattle, erosion control fabric, and slope breakers, as appropriate.
- If the applicability requirements of the NPDES Stormwater discharge permit #1200-c are met, maintain compliance with the Erosion and Sediment Control Plan (ESCP) requirements of the National Pollution Discharge Elimination System (NPDES) 1200-C permit. Maintain the ESCP drawings onsite during construction.
- Use certified weed-free straw bales, straw mulch, hydromulch, and/or other appropriate weed-free mulch materials for soil erosion and sediment control measures;
- Prevent introduction of seeds from plants that are listed by Oregon or on the U.S. Department of Agriculture federal list (PLANTS website) as noxious or invasive weeds;
- Establish terrain compatible with the surrounding landscape (recontouring) that emphasizes restoration of existing drainage and landform patterns, to the extent practical; and
- Minimize construction impacts in the project area by, where practical and safe, limiting grading and clearing to avoid impacts to native vegetation and wildlife habitat.

5.1 Revegetation of Shrub-Steppe and Grassland

Shrub-steppe and Grassland habitat subtypes are the primary non-agricultural vegetation type present in the facility area. Much of these habitat subtypes are considered marginal in quality due the presence of invasive weeds and past fires.

Seed Mix

The certificate holder will use a seed mixture consisting of native grass, forb, and shrub species known to provide erosion control and wildlife forage benefits. Seed mixture selection was based on consultation with ODFW (2010b), online guidance provided by ODFW for the restoration of burned areas in northeastern Oregon (ODFW 2010a), consultation with County weed control staff (2013 and 2020), and availability from native seed suppliers. The current seed mix (Table 2) may be altered at the request of landowners, ODOE, and ODFW.

Plant materials (seed and nursery stock) used in revegetation must be adapted to the conditions of the site in order to have the best chance of germinating and long-term survival. All plant materials shall meet the following requirements, pending approval by ODFW and the Morrow and Gilliam County Weed Departments:

- Seed and nursery stock shall be "source identified." The original source for the plant material should be Columbia Plateau Ecoregion (north-central Oregon State). The seed should be a locally adapted biotype, adapted to conditions similar to the project site.
- Seed shall be certified "weed free", indicating there are no noxious weeds in the seed.
- Seed application rates shall be based on pure live seed per pound, which is passed upon purity and germination testing.
- Seed shall be tested within 120 days of application for purity, germination, and noxious weed content. Inert matter should not exceed 10%. A tetrazolium test may be performed on forb species, which are limited in availability in order to assess viability of the seed before it is used.

Table 2. Seed Mix for Temporarily Disturbed Project Areas in Shrub-Steppe and Grassland Habitat Types (Habitat Category 2, 3 and 4)

Common Name	Scientific Name	PLS lbs/Acre[1,2]	Description/ Purpose
Bluebunch wheatgrass	*Pseudoregneria spicata*	7	(N) (EC) (F)
Big bluegrass	*Poa ampla*	2	(N) (F)
Great Basin wildrye *	*Elymus cinereus*	1.5	(N) (EC) (F)
Needle and thread grass*	*Hesperostipa comata*	1.5	(N) (EC) (F)
Sandberg bluegrass*	*Poa secunda*	1.5	(N) (EC) (F)
Lewis flax	*Linum lewisii*	0.25	(N) (EC) (F)
Western yarrow	*Achillea millefolium*	0.15	(N) (EC) (F)
Wyoming sagebrush	*Artemisia tridentata*	0.25	(N) (F)

(N) = Native, (EC) = Erosion Control, (F) = Forage

* Optional species depending on site and availability

[1] PLS= pure live seed

[2] Final lbs/acre may change at the request of the landowner or ODFW

Areas of temporary disturbance will be graded to be consistent with existing topography and drainage patterns as soon as possible after the final construction ground disturbance and, if necessary, areas compacted by construction activities shall be ripped to a depth of 12" where feasible and roughened to provide maximum seed-soil contact. Re-seeding may not be necessary or appropriate in some areas, including places where vegetation has been flattened but not crushed and those where little or no vegetation was present prior to construction. Areas will be evaluated to determine whether re-seeding or other revegetation techniques are required to return the area to preconstruction vegetation conditions (as further described in Section 6, *Monitoring Program,* of the Amended Plan).

5.2 Seed Planting Methods and Schedule

Re-seeding of temporary disturbance areas will be conducted during the appropriate season and as weather conditions allow. The recommended seed mixture (Table 2) will be applied at an approximate rate of at least 8 to 12 pounds/acre and will be dependent on the method of seeding used. Seeds will be applied using either manual or mechanical methods, depending on factors such as the size of the area to be re-seeded and risk for further disturbance due to the use of planting equipment (e.g., tractor or all-terrain vehicle). Straw mulch, hydro-mulch, and/or other appropriate weed-free mulch material may be applied as needed immediately after seeding. The certificate holder anticipates using the restoration and re-seeding guidelines provided in this Amended Plan; however, the methods and timing could be altered at the request of landowners, ODOE, or ODFW.

Disturbed areas will be re-seeded as soon as possible after final construction disturbance in each area. Crews will attempt to conduct all re-seeding during the period from February through early April for construction disturbances that occurred during the winter and early spring. For areas where construction is completed outside of the winter or spring periods, re-seeding will be delayed until the months of October or November. If final construction and soil restoration is not completed at a time that allows immediate re-seeding during one of the two periods listed above (winter/spring or fall), the areas will be mulched or otherwise treated to minimize erosion, if necessary, until seeding can be conducted.

The certificate holder may employ broadcast seeding, drill seeding, and/or hydroseeding to apply the seed as appropriate and feasible; the choice of method will depend on slope and other site conditions. For example, drill seeding and broadcast seeding could be used as appropriate on areas with a slope of less than 3:1, and hydroseeding should be used on areas with a slope of greater than 3:1. Seeding rates (pounds of pure live seed per acre) must be adjusted according to the seeding method used. For hydroseeding, green~~-~~dyed, wood-fiber mulch shall be added to the slurry mixture at a rate of 1,000 pounds per acre. In addition to serving as a carrying agent for the seed, the biodegradable green mulch serves as a tracer for visually checking distribution to ensure complete and uniform coverage of the disturbed areas.

5.3 Weed Control Strategies

Weed control will be a priority for the life of the facility including pre-construction, construction and on-going operation and should begin early to prevent infestations and development of substantial weed seed reservoirs in the soil. Emphasis will be placed on avoiding infestations and controlling populations of state-listed and county-listed noxious weeds known to occur on the site.

The certificate holder shall conduct long-term weed surveys following the initial five years (or more) of annual surveys required to document revegetation success criteria under this amended plan. Once revegetation success has been documented, long term surveys of the revegetation areas will be conducted and reported consistent with the schedule for noxious weed monitoring of the Habitat Mitigation Area as described in the WHMMP. Comprehensive surveys will occur every five years (in years divisible by five) for the life of the facility. Weed control and monitoring activities will be conducted more frequently (at least every two years) in areas prioritized based on the results of the comprehensive surveys and reported to ODOE and ODFW as part of WHMMP reporting. Weeds will be controlled as needed to maintain and enhance habitat quality within the revegetation areas, with the goal of working toward eradication of targeted noxious weeds or, if eradication is not practical, decreasing their abundance to minimize impacts on native plant communities.

6 MONITORING PROGRAM

The certificate holder will monitor the revegetated areas according to the protocol and schedule described below. For revegetation of minor acreage from site improvements associated with the Second and Fourth Amended site certificates, ~~site improvements,~~ the certificate holder will use pre-construction consultation with ODFW, ODOE, and the Morrow and/or Gilliam County Weed Departments to determine the appropriate mix of monitoring methods, schedule, and success criteria appropriate to the scale and location of small revegetation areas. The purpose of monitoring is to evaluate long-term soil stability, vegetation composition and cover, and occurrence of noxious and invasive weeds within areas disturbed during construction. In order to properly assess the progress of vegetation establishment, the certificate holder shall maintain a record of revegetation work. In the record, the certificate holder shall include the date that construction activity was completed in the area to be restored, a description of the affected area (location, acres affected and pre-disturbances condition) and supporting figures representing the revegetated area, the date that revegetation work began and a description of the work done within the affected area. The certificate holder shall update the revegetation records as revegetation work occurs.

The certificate holder shall use experienced and properly trained personnel ("investigators") to conduct the monitoring required under this Amended Plan. The professional qualifications of the investigators are subject to approval by ODOE; the qualifications of the investigators shall be provided to ODOE prior to pre-construction monitoring (see Section 6) and ODOE shall be notified if changes in investigator occur.

It should be noted that post-construction annual monitoring and reporting for Unit 1 and its associated components commenced in 2017 and ~~will continue through 2021~~is still ongoing as of 2024 in areas that have not met revegetation criteria. ~~, or until~~ ODOE, in consultation with ODFW, ~~concludes that~~determines when success criteria have been met and when monitoring efforts are no longer needed, or ~~that~~ if a less frequent revegetation monitoring schedule may be implemented.

Post-construction annual monitoring for the new components approved in the Second and Fourth Amended site certificates ~~and the Carty Solar Farm and its associated facilities~~ may be conducted in coordination with monitoring for Unit 1 and its associated components, if the timing aligns; however, revegetation records and reporting should be maintained and submitted to ODOE separately (either as separate reports or clearly delineated sections of the same report) since the impacts, revegetation status, and activities may differ for the previously approved operating facility components compared to the facility components approved in the ~~First and~~ Second and Fourth Amended site certificates.

6.1 Pre-Construction Vegetation and Weed Survey

Revegetation success shall be measured at approved, fixed-point monitoring sites within the disturbed area and compared to pre-disturbance habitat conditions as documented by pre-disturbance vegetation monitoring at the same site. If pre-disturbance monitoring data is not available for a particular site, revegetation monitoring data will be compared to a reference site approved by ODFW. Pre-disturbance monitoring will be conducted using the same protocol described below for post-construction monitoring, which will allow comparison of revegetated condition to pre-disturbance condition. The pre-disturbance vegetation and weed survey plan shall be submitted for review and approval by ODOE, in consultation with ODFW, as part of the agency consultation described in Section 4 of this plan.

6.2 Monitoring Procedures

Annual post-construction vegetation and weed surveys will be conducted for a period of at least five years to monitor revegetation success and invasive species control needs at construction disturbance areas. A representative sample (at least 50%) of all disturbance sites will be monitored for revegetation success. As described above in Section 4, *Pre-Construction Agency Consultation*, monitoring sites and reference sites (as needed) shall be identified by the certificate holder and approved by ODOE, in consultation with ODFW, prior to construction. Reference sites (as needed) should be identified that closely resemble the pre-disturbance characteristics of the revegetation area monitoring site as indicated by site conditions, including vegetation density, relative proportion of desirable vegetation and species diversity of desirable vegetation.

Revegetation monitoring will begin in the first year following initial revegetation of temporary disturbance areas and continue annually for five years or until monitored sites are successfully revegetated according to the success criteria described below. All soil disturbance sites will be visited at least once within the first year following revegetation, and annual surveys will be conducted for five years, or until ODOE, in consultation with ODFW, determines the success criteria to be achieved.

To select quantitative monitoring sites, the certificate holder will divide the total disturbance area into multiple monitoring sites, each of which is predominately of one habitat type (grassland or shrub steppe) and no larger than five acres. After dividing the area into such sites, a subset of sites (comprising at least 50% of each habitat type's total temporary disturbance acreage) will be randomly selected to be quantitative monitoring sites. Pre-disturbance vegetation data will be collected at each quantitative monitoring site using a systematic sampling method that can be repeated for post-construction monitoring. For example, a minimum of one, randomly located 100-meter long by 5-meter wide belt transect could be used for documenting shrub and bunchgrass density, within which a point-intercept method or sampling quadrats could be used for collection of percent cover data. All sites not selected for quantitative monitoring would be qualitatively monitored using photo points and visual surveys.

During revegetation surveys, a qualified biologist shall inspect all areas of revegetation, including each revegetation area monitoring site, to assess revegetation success based on the success criteria and to recommend remedial actions, if needed. The qualified biologist will collect quantitative and qualitative monitoring information within the general revegetation area, revegetation monitoring sites, and within the reference sites (if needed), as detailed below.

Quantitative monitoring will include a systematic monitoring protocol conducted at each monitoring site. The following data will be collected at quantitative monitoring sites (both pre-disturbance and post-construction) and reference sites (if needed, just once):

- The habitat type of the area to be disturbed;
- Photo(s) representing the habitat (from documented location and direction so they are repeatable for post-disturbance revegetation monitoring);
- Density and percent cover of vegetation by plant species (determined through a quantitative sampling design such as randomly located quadrats, belt transects, or other monitoring design approved by ODFW);
- Percent cover bare ground within the same sampling plots, and also estimated for the entire monitoring site, noting any large areas (>100ft^2) of bare ground and estimated area;
- Percent cover of "other" ground cover by category (i.e., rock, gravel, hydro-mulch, vegetation litter, etc.);
- Percent cover estimate and species list of noxious weeds on the entire monitoring site in addition to sampling plot data; and
- Vegetation structural stage, slope, soil type.

The following qualitative monitoring data will be collected both pre-disturbance and post-construction at all disturbance sites that are not quantitatively monitored:

- Photo(s) representing the habitat (from documented location and direction so they are repeatable for post-disturbance revegetation monitoring);
- List of noxious weed species present and estimated percent cover; and
- Note any erosion issues that need remedial action or any large areas of bare soil (>100ft^2) that may require additional seeding.

6.3 Remedial Action and Maintenance

Following each of the surveys described above, the site certificate holder will consult with ODOE and ODFW to determine need for remedial measures to address remaining soil impacts and revegetation requirements not achieved through initial seeding or plantings. The nature of the remedial actions will depend on the problems that arise. ODOE may require reseeding or other remedial measures in those areas that do not meet the success criteria.

Common remediation measures will include:

- Reseeding of select areas where significant areas of bare soil remain after establishment of initial seeding;
- Determining the cause of low plant survival and implementation of actions appropriate to the cause of mortality (this may include selection of an alternate species better adapted to conditions at the site);
- Control of noxious weed/invasive plant species by qualified personnel using appropriate methods for the target species (e.g., herbicides applied according to label requirements if herbicides required);
- Repair of erosion control structures; and
- Soil decompaction.

The certificate holder will make every attempt to implement the recommended remedial actions as soon as possible, considering the season, weather conditions, and other site-dependent constraints.

The certificate holder will document revegetation progress and remedial actions in an annual Revegetation and Noxious Weed Control Monitoring Report to ODFW and ODOE (see section 5.4 below).

If a wildlife habitat area is damaged by fire during the first five years following initial seeding, the certificate holder shall work with the landowner to restore the damaged area. The certificate holder shall continue to report on revegetation progress during the remainder of the five-year period. The certificate holder shall report to ODOE the damage caused by fire and the cause of the fire, if known.

If an area is not trending toward meeting the success criteria at Year 5, the certificate holder may propose and ODOE may require remedial action and additional monitoring based on an evaluation of site capability. As an alternative, the certificate holder or ODOE, in consultation with ODFW, may conclude that revegetation of the area was unsuccessful and propose appropriate mitigation for the permanent loss of habitat quality and quantity. The certificate holder shall implement a remedial action plan, subject to the approval of ODOE in consultation with ODFW.

6.4 Revegetation Success Criteria

Revegetation will generally be considered successful when the revegetated areas support non-noxious plant communities that are similar in vegetation percent cover and erosion potential comparable to pre-disturbance condition or surrounding undisturbed areas. While the certificate holder shall evaluate whether all previously disturbed wildlife habitat areas are trending towards revegetation success, the success criteria are evaluated based on the revegetation success of the approved revegetated monitoring sites compared to either pre-disturbance condition or reference sites, as appropriate. A wildlife habitat area is successfully revegetated when the habitat quality is equal to, or better than, the habitat quality of the pre-construction condition of the monitoring site itself or of an appropriate reference site selected in consultation with ODFW.

When the site certificate holder determines that an area of the project has been successfully restored by satisfying all success criteria, this will be stated in the annual revegetation report. If ODFW and ODOE concur, the site certificate holder will conclude that it has no further obligation to perform revegetation activities in that area of the facility. Reseeding or replanting efforts will occur, in consultation with ODFW, in any area where monitoring identifies a restoration failure.

The following criteria will be used to determine success of revegetation efforts related to construction of facilities authorized under the ~~First and~~ Second and Fourth Amended ~~Site~~site ~~Certificate~~certificates~~.~~:

1. Native Shrubs: The average density of the shrub component should be at least 50 % of the pre-disturbance or reference site density within 5 years. At least 15 % of the shrub density should be the dominant species found during pre-disturbance monitoring or on the reference site. The diversity of shrub species within the revegetated areas should at least equal the shrub species diversity measured during pre-disturbance monitoring or on the reference site.

2. Native Grasses: Revegetated sites should maintain grass species diversity and density that is at least 85% similar to pre-disturbance or reference sites diversity and density. Native bunchgrasses should be given preference. Native grasses are to be planted at rates sufficient to achieve abundance and diversity characteristics of the grass component compared to pre-disturbance or reference site conditions.

3. Non-Native Weeds: Every attempt should be made to prevent and control all species listed on county, state, and federal noxious weed lists. Revegetation sites should not contain a higher percentage of non-native weed cover than the pre-disturbance or reference site condition. All state and federal laws pertaining to noxious weeds must be followed. Highly competitive invasive species such as cheatgrass and other weedy brome grasses are prohibited in seed mixtures and should be actively controlled if any are found in the reclaimed areas.

The following success criteria from the original plan apply to temporary disturbance areas associated

with Unit 1 construction. For those areas, PGE may either continue to use the criteria below, or follow the newer success criteria above using a reference site (approved by ODFW) for comparison.

1. The vegetation percent cover by native species and desirable non-native species (both seeded and naturally recruited) is 40 percent or more, or not significantly less than the percent vegetation cover of surrounding undisturbed areas.
2. Noxious weeds are absent or constitute only a small percentage (<5%) of vegetation otherwise dominated by native or desirable non-native species.
3. The percentage of bare soil (excluding rocky areas) in the sample plot is not significantly greater than the percentage of bare soil in surrounding undisturbed areas.

When ODOE, in consultation with ODFW, finds that the conditions of the wildlife habitat area revegetation monitoring sites satisfy the criteria for revegetation success, ODOE shall conclude that the certificate holder has met the restoration obligations for that area.

6.5 Reporting

The certificate holder will provide an annual Revegetation and Noxious Weed Control Monitoring Report for five years or until success criteria are achieved following initial revegetation of construction disturbance areas. In addition to the annual reports, PGE will share preliminary monitoring results with ODFW/ODOE as soon as possible following monitoring fieldwork to allow consultation regarding planning necessary remedial measures such as erosion control, reseeding, and weed control. Such consultation will allow more timely coordination and response to habitat management needs than may occur under the annual reporting process. This additional consultation is required for revegetation monitoring associated with facilities authorized under the ~~First and~~ Second and Fourth Amended site certificates and is recommended as a best management practice for Unit 1 revegetation areas.

Each annual report will contain a summary of field data collected during field visits and include: an assessment of whether revegetation area monitoring sites are trending toward meeting the success criteria; assessment of factors impacting the ability of the revegetated area monitoring sites to trend towards meeting the success criteria; a summary of consultation with ODOE, ODFW, and Morrow and Gilliam Counties and remedial measures (e.g., seeding, noxious weed control, and repair of erosion control structures) taken since the last annual report; any additional remedial measures planned; and the anticipated dates of completion of additional remedial measures.

6.6 Amendment of Plan

This Plan may be amended from time to time by agreement of the certificate holder and the Oregon Energy Facility Siting Council (Council). Such amendments may be made without amendment of the site certificate. The Council authorizes ODOE to agree to amendments to this Plan. ODOE shall notify the Council of all amendments, and the Council retains the authority to approve, reject, or modify any amendment of this Plan agreed to by ODOE.

7 REFERENCES

Oregon Department of Fish and Wildlife. 2010a. Rehabilitating Habitat. ODFW website: http://www.dfw.state.or.us/fire/fire_rehab.asp. Accessed on December 15, 2010.

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_____. 2013. Carty Generating Station project site field visit with Dave Pranger (Morrow County) and Don Farrar (Gilliam County), October 2, 2013.

_____. 2017. Personal communication between Andy Bidwell of PGE and Dave Pranger, Morrow County Weed Coordinator/Inspector. Email correspondence dated December 21, 2017.

_____. 2018. Conference call attended by PGE, ODFW, and ODOE to discuss revisions to the Carty Generating Station Revegetation and Noxious Weed Control Plan, June 12, 2018.

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Attachment P-3. Amended Wildlife and Habitat Monitoring and Mitigation Plan

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Carty Generating Station: Amended Wildlife and Habitat Monitoring and Mitigation Plan[1]

December 14, 2018[2], February 23, 2021[3], February XX, 2024[4]

I. INTRODUCTION

The Carty Generating Station includes existing generating components (Unit 1 and its associated components and existing components originally approved under the Boardman Coal Plant site certificate) and approved, but not yet constructed generating components (Carty Solar Farm and its associated components and new components proposed in the Second Amended site certificate). Portland General Electric (PGE or certificate holder) received a site certificate from the Energy Facility Siting Council (Council) in June 2012 authorizing the construction and operation of a 900 megawatt (MW) combined-cycle natural gas-fueled energy generating facility in Boardman, Oregon in Morrow County (Carty Generating Station). The Council's 2012 approval authorized construction and operation of two 450-MW combined-cycle natural gas-fueled turbine generators (Unit 1 and Unit 2). PGE commenced Unit 1 construction on January 9, 2014; PGE completed Unit 1 construction on December 26, 2016; Unit 1 began operation on July 29, 2016. The construction commencement deadline for Unit 2 expired in June 2017 and therefore the certificate holder no longer has the authority to construct or operate Unit 2.

The Council issued the First Amended site certificate on December 14, 2018, authorizing a site boundary change and the construction and operation of a 50 MW photovoltaic solar unit, five 34.5 kilovolt (kV) interconnecting transmission line routing options, and temporary construction and laydown areas (Carty Solar Farm). The construction commencement and completion deadlines for the components authorized in the First Amended site certificate are February 4, 2022, and February 4, 2025, respectively. The Council issued the Second Amended site certificate on November 19, 2020 authorizing a boundary change; construction and operation of a new substation and associated distribution lines, septic system, backup water pipeline, wastewater pipeline, office/warehouse building, and security guard station; and incorporation of existing facilities that had been permitted under the Boardman Coal Plant site certificate including Carty Reservoir, existing transmission infrastructure, and interconnecting water pipelines. The construction commencement and completion deadlines for the components authorized in the Second Amended site certificate are December 9, 2023 and December 9, 2026 respectively. The Council issued the Third Amended site certificate on July 22, 2022, authorizing the certificate holder to extend the construction commencement and completion deadlines for the components authorized with the first amendment. The construction commencement and completion deadlines authorized in the Third Amended site certificate are February 4, 2025 and February 4, 2028, respectively.

The certificate holder submitted a Request for Amendment 4 (RFA 4) to the Site Certificate. In RFA 4, the certificate holder proposed to increase the output of the Carty Solar Farm from 50 MW to approximately

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[1] This Amended Plan is incorporated by reference in the site certificate for the Carty Generating Station and must be understood in that context. It is not a "stand-alone" document. This plan does not contain all mitigation required of the certificate holder.

[2] A draft version of this plan was included as Exhibit 1 to the Energy Facility Siting Council's *Final Order on the Carty Generating Station Application for Site Certificate* (June 29, 2012). In accordance with Site Certificate Condition 10.1, the certificate holder consulted with the Oregon Department of Fish and Wildlife (ODFW) and obtained Department approval of the Plan prior to the start of construction (December 2013). As allowed by Section IX of the Plan, ODOE reviewed and approved an amended Plan on July 7, 2014. ~~This~~ The February 2018 amended plan ~~is being~~was submitted as part of the Request for Amendment No. 1 of the Carty Generating Station Site Certificate.

[3] Minor Plan updates were made to reference additional facilities within Morrow and Gilliam Counties included in the Second Amended site certificate.

[4] Minor Plan updates were made to reference changes to the Carty Solar Farm proposed in RFA 4.

185 MW by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and maximizing the buildable area southeast of Carty Reservoir. As part of RFA 4, the certificate holder proposed the addition of battery energy storage systems (BESS) to the Carty Generating Station.

This Amended Wildlife and Habitat Monitoring and Mitigation Plan (Amended Plan) describes wildlife monitoring that the certificate holder shall conduct during construction and operation of the Carty Generating Station (facility), including the already constructed Carty Unit 1; Grassland Switchyard; the transmission line segment connecting Unit 1 to the switchyard; ~~additional facilities as approved under Site Certificate Amendment 1, including the Carty Solar Farm site just southeast of Carty Reservoir and the associated interconnection transmission line; and~~additional facilities as approved under the Second Amended site certificate~~.~~; and the Carty Solar Farm with up to 185 MW and the BESS proposed in RFA 4. The monitoring objectives are to determine whether the facility causes significant fatalities of wildlife species or results in a loss of habitat quality.

This Amended Plan also describes methods and standards for preservation and enhancement of land near the Carty Generating Station to mitigate for impacts of the facility on wildlife habitat and addresses mitigation for both the permanent impacts of facility components and the temporal impacts of facility construction. The certificate holder shall protect and enhance the mitigation area(s) as described herein. This Amended Plan specifies habitat enhancement actions and monitoring procedures to evaluate the success of those actions. Remedial action may be necessary if the mitigation area(s) do not demonstrate progress toward habitat enhancement success.

II. DESCRIPTION OF THE FACILITY

The Carty Generating Station Site is located in Morrow and Gilliam Counties, Oregon, approximately 13 miles southwest of the town of Boardman, Oregon. The facility includes two transmission lines: one 500 kV line that extends west from the Grassland Switchyard 17 miles to the Slatt Substation and one 230 kV line that extends approximately 17 miles northwest to the Dalreed Substation. There is no proposed disturbance associated with the existing transmission lines. All proposed disturbance is within Morrow County. The facility would be located on an upland plateau at an elevation of approximately 650 feet above sea level. The facility components would be located entirely on private lands that are mostly characterized as shrub-steppe, grassland, developed or agricultural areas. There are some riparian and wetlands habitats present within the amended site boundary.~~; however, all~~ All new facility components will be sited to avoid impacts on ~~these habitats~~wetlands; there may be minor impacts to riparian habitats. Soil types in the area consist primarily of sandy loam, silt loam, and very stony loam.

Much of the native shrub-steppe vegetation within the site boundary has been modified by livestock grazing and past wildfires. Functional mature shrub-steppe habitat is patchy and is dominated by big sagebrush (*Artemisia tridentata*), broom snakeweed (*Gutierrezia sarothrae*), bluebunch wheatgrass (*Pseudoroegneria spicata*), cheatgrass (*Bromus tectorum*), gray rabbitbrush (*Ericameria nauseos*~~*aus*~~), needle-and-thread grass (*Hesperostipa comata),* and Sandberg's bluegrass *(Poa secunda)*. Grasslands consist of cheatgrass, crested wheatgrass (*Agropyron cristatum*), bulbous bluegrass (*Poa bulbosa*), bluebunch wheatgrass, needle-and-thread grass, Sandberg's bluegrass, redstem filaree (*Erodium cicutarium*), and mouse-ear chickweed (*Cerastium* sp.). Additional species found within the site boundary include yarrow (*Achillea millefolium*), yellow sweet clover (*Melilotus officinalis*), balsam root (*Balsamorhiza* sp.), tall tumble mustard (*Sisymbrium altissimum*), Western juniper (*Juniperus occidentalis*), and black cottonwood (*Populous trichocarpa*). Riparian forests are dominated by Russian olive (*Elaeagnus angustifolia*), Pacific willow (*Salix lucida ssp.*), Canada goldenrod (*Solidago canadensis*), amaranth (*Amaranthus* sp.), and broadleaf cattail (*typha latifolia*). Wetland areas associated with Sixmile Canyon not only contain similar riparian vegetation found around the reservoir; these areas also contain wetland plants such as common reed (*Phragmites australis*).

The Oregon Department of Fish and Wildlife (ODFW) describes habitat categories in its Wildlife Habitat Mitigation Policy (Oregon Administrative Rules [OAR] 635-415-0025). The facility will be constructed in two phases, with the generating components referred to as Unit 1 and the Carty Solar Farm. Unit 1 (generating unit and a portion of the switchyard), completed in 2016, occupies approximately 45 acres of Category 4 shrub-steppe habitat, and temporary construction-related impacts occurred on approximately 55.4 acres of Category 4 shrub-steppe habitat. Portland General Electric Company (PGE) established a Habitat Mitigation Area (HMA) of 78 acres (the HMA for Unit 1) to mitigate these permanent and temporal impacts.

PGE will establish the HMA for the Carty Solar Farm to mitigate permanent and temporal impacts that result from construction of the Carty Solar Farm. The overall HMA for the Carty Generating Station (the Carty Generating Station HMA, or just HMA in this document) will consist of the combined areas of the HMA for Unit 1 and the HMA for the Carty Solar Farm. Disturbance and mitigation acreage for the Carty Solar Farm ~~will be~~has been finalized (approximately 850 acres of mitigation) and updated in this Amended Plan in consultation with ODFW and the Oregon Department of Energy (ODOE) ~~prior to construction of each phase of the project~~ (see Section IV for HMA acreage calculation).

In addition to these two construction phases, minor construction activities will occur as a result of the Second Amended site certificate, which includes a new substation and associated distribution lines, septic system, new back up water pipeline, wastewater pipeline, new security guard station and associated plumbing and communication lines, and new office/warehouse building. Only the new septic system, new wastewater pipeline, and new security guard station and associated plumbing and communication lines would be constructed in vegetated areas with a total temporary disturbance of approximately 2.15 acres and permanent disturbance of 1.45 acre (estimated at the time of the Second Amendment). The ~~existing habitat management area (HMA)~~HMA for Unit 1 is large enough to accommodate this additional disturbance; therefore, no new HMA is proposed to account for the additional mitigation associated with the Second Amended site certificate.

III. WILDLIFE MITIGATION AND MONITORING MEASURES

The certificate holder shall use a qualified investigator (wildlife biologist) to conduct monitoring for Washington ground squirrel (WGS; *Spermophilus washingtoni*), post-construction avian and bat mortality study, raptor nest surveys, and avian use of the facility area. Specific monitoring and mitigation measures for these species are described below (also see Section VII for HMA monitoring requirements):

A. Washington Ground Squirrel

Best Management Practices

- The certificate holder shall impose and enforce a construction and operation speed limit of 20 miles-per-hour throughout the facility site and, during the active squirrel season (February 1 through June 30) a speed limit of 10 miles-per-hour on private roads near known WGS colonies.
- Conduct Environmental Awareness Training for all facility personnel and construction contractors prior to the beginning of construction or before entering the Project right-of-way (ROW). The training program shall discuss WGS and all other environmental issues related to the facility and include handouts with WGS identification information and reporting procedures. Smaller training sessions shall be conducted as needed for personnel that start after the beginning of construction.
- In order to discourage WGS from moving into planned construction areas that are currently not within 785 feet of a known WGS colony the certificate holder may disc or till a minimum of an 800-foot buffer within the perimeter of the planned ground disturbance areas in closest

proximity to squirrel activity areas. Proposed measures and areas where measures will be implemented shall be reviewed by ODOE, in consultation with ODFW, and shall be informed by the most recent WGS survey data. If the certificate holder discs or tills areas, the certificate holder shall plant dryland wheat or another cover crop approved by ODFW in tilled areas. Such areas shall be tilled annually until construction begins to maintain a soil disturbance regime that is unsuitable for use by WGS. Other potential measures for deterring WGS movement into planned construction areas, such as installation of perimeter silt fences, will be planned in coordination with and approved by ODFW. In addition to preventing WGS from moving into the planned construction areas, discing or tilling the planned construction area, and/or implementing other approved deterrence measures, means the area will no longer be considered WGS habitat and would not be included in the no-impact buffer area for any new WGS burrows that are established within 785 feet of the Facility Site Boundary. (Note, an approximately 45-acre portion of the Energy Facility Site was tilled and planted with winter wheat in December 2012 following coordination with ODFW and USFWS).

- If pre-construction surveys determine that WGS burrows have been established in previously inactive areas, the certificate holder shall immediately report to ODOE and ODFW. The certificate holder shall coordinate with ODOE and ODFW to establish additional mitigation measures or to obtain an Incidental Take Permit, as appropriate.
- The certificate holder will consult with ODOE and ODFW to discuss the situation and potential additional avoidance measures should WGS establish burrows within 785 feet of existing facilities, construction activity, or planned construction disturbance areas. If there is concern that, despite reasonable avoidance measures, WGS may accidently be killed or injured by construction activities, then the certificate holder shall work with ODFW to obtain an Incidental Take permit, as appropriate.

<u>WGS Monitoring</u>

The certificate holder shall conduct post-construction surveys on known colonies within the amended Site Boundary, on land owned by the certificate holder, and within the HMA where known active burrows were recorded during pre-construction field surveys. The surveys shall be led by a qualified wildlife biologist with WGS survey experience leading a survey crew experienced in biological surveys and confirmed ability to identify WGS burrows and hear WGS calls. Surveys will be conducted in year one, year three, and year five after operation of Unit 1 has begun (i.e., 2017, 2019, and 2021), and in year one, year three, and year five after Carty Solar Farm operation has begun (years tbd), and otherwise at least every five years (in years divisible by five) for the life of the facility. Known colonies, if identified, within the existing right-of-way for the 500 kV Grassland to Slatt and 230 kV Boardman to Dalreed transmission lines incorporated into the Second Amended site certificate will be included in the every-five-year WGS surveys. Planned work areas associated with transmission line maintenance will be spot checked for WGS activity as needed. Surveyors shall record evidence of WGS activity, current land use, and any conditions caused by the facility that might increase erosion or result in a decline in vegetation quality and adversely affect a WGS colony. Unit 1, portions of the potential Carty Solar Farm transmission line, and portions of new components proposed as part of the second amended site certificate are located on the southwest side of Tower Road. In consultation with ODFW, it was determined that Tower Road is a significant boundary to WGS habitat. Therefore, for active burrows located on the northeast side of Tower Road, the 785-foot buffer will not extend across Tower Road.

B. Raptor Nest Monitoring

During the year in which any phase of construction occurs, the certificate holder shall use a protocol approved by ODFW to conduct raptor nest surveys to determine whether there are any active nests that would potentially be disturbed during construction. Surveys will consist of ground-based and/or helicopter aerial searches, as appropriate to the construction activity locations planned for a given year. Surveys will be carried out to one mile from portions of the amended site boundary within which construction is planned.

If a nest is occupied by any of these sensitive raptor species, the certificate holder shall not engage in high-impact construction activities (activities that involve blasting, grading, or other major ground disturbance) or allow high levels of construction traffic within designated buffer distances for each species (Table 1). Buffer distances may be decreased with approval by ODFW and USFWS depending on the intensity of construction activity and whether sufficient barriers (e.g., vegetation, topography) are present to shelter a particular nest site from construction disturbance or if consultation determines a lesser distance is feasible and appropriate. The certificate holder also will instruct construction personnel to avoid any unnecessary activity within the buffer area.

Table 1. Critical Nesting Periods for Sensitive Raptors

Species	Disturbance Buffer Distance (line of sight)	Critical Nesting Period	Early Release Date
Ferruginous Hawk	0.6 mile	March 15 to August 15	May 31
Bald Eagle	0.5 mile	January 1 to August 15	May 31
Swainson's Hawk	0.25 mile	April 1 to August 15	May 31
Golden Eagle	1 mile	January 1 to August 15	May 31
Burrowing Owl	0.25 mile	April 1 to August 15	July 15
Long-billed Curlew*	0.5 mile	March 8 to June 15	May 31

*Although not a raptor species, a critical nesting period and buffer of 0.5 mile for active long-billed curlew nests were included in the Site Certificate. While not actively surveyed for, any curlew nests that are incidentally found will be protected with the stipulated nest buffer.

The certificate holder will direct a qualified biological monitor, as approved by ODOE, to observe the active nest sites during the sensitive period for signs of disturbance. The qualifications of the biological monitor shall be provided to ODOE in the annual report; the certificate holder shall provide notification to ODOE if changes in biological monitor occur. If an active State-sensitive raptor nest is found during construction that is for a species not currently identified in Table 1, the certificate holder will consult with ODFW and USFWS and institute buffer distances and monitoring as appropriate.

The certificate holder may begin or resume high-impact construction activities before the ending day of the sensitive period if any known nest site is not occupied by the early release date (Table 1). If a nest site is occupied, the certificate holder may begin or resume high-impact construction before the ending day of the sensitive period, with the approval of ODFW and USFWS, after the young are fledged. The certificate holder would use, and shall provide a copy to ODOE, of a protocol approved by ODFW and USFWS to determine when the young are fledged (that is, when the young are independent of the core nest site).

Annually during construction and in year one, year three, and year five after operations of Unit 1 have begun (i.e., 2017, 2019, and 2021) and year one, year three and year five after operations of Carty Solar Farm have begun (years tbd) and otherwise at least every five years (in years divisible by five) for the life of the facility, the certificate holder shall provide sensitive species raptor nest monitoring report to ODOE, ODFW and USFWS. The report will document the locations and nest productivity of sensitive raptor species nests within one mile of the amended site boundary. The existing 500 kV Grassland to Slatt and 230 kV Boardman Coal Plant to Dalreed transmission lines incorporated into the Second Amended site certificate will be included in the every-five-year raptor nest surveys with focus on any nests on transmission line structures or nearby that may be impacted by transmission line maintenance. Planned work areas associated with transmission line maintenance or construction will be spot checked for nearby raptor nesting activity prior to work. The certificate holder shall consult with USFWS and ODFW regarding any active protected bird nests found within the construction disturbance area or within the disturbance buffer distances (Table 1) of facility construction or operational activities.

If nest monitoring detects nest site abandonment or other adverse impact to nesting activity caused by facility activity, the certificate holder shall implement appropriate mitigation, in consultation with ODFW and subject to the approval of ODOE. The certificate holder shall propose and implement mitigation for the affected species in consultation with ODOE, ODFW, and USFWS. Mitigation shall be designed to benefit the affected species or contribute to overall scientific knowledge and understanding of what causes nest abandonment or nest failure. Mitigation may be designed to proceed in phases over several years. It may include, but will not be limited to, additional raptor nest monitoring, protection of natural nest sites from human disturbance or cattle activity (preferably within the general area of the facility), or participation in research projects designed to improve scientific understanding of the needs of the affected species.

All bird mortalities and active nests of all other protected bird species found in association with facility components shall be documented and reported consistent with PGE's adopted Avian Protection Plan. All eagle and other sensitive raptor species mortalities shall be reported immediately to USFWS and ODFW.

C. Avian Protection

The certificate holder maintains a company-wide Avian Protection Plan (APP) to reduce impacts to avian species from electrocutions and collisions with electric utility power lines and equipment. The APP is hereby adopted by reference. The APP includes the following three-phased approach to address avian risks that will be applied to the development of the Carty Generating Station:

- Preventive – Emphasize compliance with applicable laws, regulations, and permits. Use avian-safe standards company-wide for all designs ~~in areas identified as having high avian risk~~;
- Reactive – Implement the Avian Reporting System ~~(~~to ~~report~~document bird mortalities and conduct remedial measures as appropriate~~)~~; and
- Proactive – Conduct employee training and risk assessments of existing lines, modify lines when necessary, install nesting platforms, and contribute to research of avian/electrical equipment interactions.

Electrocution from high-voltage transmission lines is very rare because the distances between conductors, and between conductors and grounded hardware, are greater than the wingspan of

any raptor (APLIC 2006).[5] However, transmission lines ~~do~~ can present a collision risk for birds, particularly the static wire at the top of the structures. Consistent with the APP, the certificate holder shall employ ~~pre-construction~~ measures to protect raptors in the design and construction of transmission lines. Protection measures to reduce the potential risks to raptors and other birds will include the following:

- Design and construct all above-ground transmission line support structures following the practices suggested by the Avian Powerline Interaction Committee (APLIC)~~, including a minimum separation of 9 feet between all energized transmission conductors~~;
- If perching or nesting is determined to put birds at risk, measures to reduce risk will be evaluated and implemented if feasible;~~Install perch guards or other deterrents as needed and safe alternative perching or nesting locations, as appropriate;~~ and
- Install bird flight diverters ~~and~~ or other line marking devices ~~where necessary to minimize~~ in areas of bird collision risk if evaluation of the area, including ~~, such as~~ bird concentration areas (wetland/riparian areas) and known migratory flight routes, presents a probable risk.

A nest management procedure, which identifies steps facility employees must take when a nest is encountered on utility structures, is also included in the APP. As described in the APP, the certificate holder will track avian mortalities, nest management issues, and remedial actions taken using an internal reporting system and database~~, the Avian Reporting System~~. This reporting database allows: (1) tracking of incidents and remedial actions to ensure that all measures are completed and documented, (2) accumulation of a long-term data set, and (3) compliance with the reporting requirements of the USFWS Special Purpose Permit currently held by the certificate holder. The reporting system also provides data on the location and frequency of bird mortalities and problem nests.

Where feasible, the certificate holder shall conduct site preparation for construction of the Carty Generating Station and transmission line in a manner that minimizes potential for impacting nesting native birds protected by the Migratory Bird Treaty Act, such as conducting initial site clearing outside of the typical bird breeding season (generally March to July). Prior to commencement of construction activity during the breeding season, a qualified biologist shall survey the construction site to determine the presence of any active protected bird nests. Construction personnel shall be trained in avian awareness, reporting of protected bird nests, and the proper procedures if dead birds are found at the construction site.

D. Post-construction Avian and Bat Mortality Monitoring (Carty Solar Farm)

Monitoring Goals

The monitoring program will involve surveys designed to estimate bird and bat fatality rates at the Carty Solar Farm in the year following start of Carty Solar Farm operation. The certificate holder will analyze bird and bat carcass monitoring data to accomplish the following goals:

- Detect carcasses and estimate bird and bat fatality rates for the Carty Solar Farm;
- Estimate fatality rates for species of concern, if practicable; and
- Determine whether additional conservation measures are needed to reduce impacts to birds and bats at the Carty Solar Farm.

[5] APLIC (Avian Power Line Interaction Committee). 2006. Suggested Practices for Avian Protection On Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington D.C. and Sacramento, CA. http://www.aplic.org/uploads/files/2643/SuggestedPractices2006(LR-2).pdf. Accessed August 23, 2016.

Monitoring Methods

i) Study Design

The avian and bat mortality monitoring study is designed to maximize the accuracy of the fatality estimates and to correct for the following sources of field-sampling error: (1) carcasses that occur on a highly periodic basis, (2) carcass removal by scavengers, (3) searcher efficiency, and (4) carcasses or injured birds or bats that may land or move to areas not included in the search transects (Kunz et al. 2007). Post-construction monitoring at the Carty Solar Farm will involve standardized distance-sampling based carcass searches, searcher efficiency trials, and carcass persistence trials, consistent with recommendations from Huso et.al (2016b) and accepted monitoring designs at other utility-scale solar facilities (WEST 2016a-c). Surveys of the PV panel area will be conducted using a distance-sampling based methodology. The layout of PV facilities is often well-suited to a distance-sampling approach. Distance sampling involves searching a transect line and assumes that searcher efficiency decreases (possibly dramatically) as a function of distance from the observer and is ideally suited to situations in which animals (or carcasses) are sparsely distributed across a landscape (Buckland et al. 1993). As the landscape at the Carty Solar Farm would be flat and relatively clear of vegetation, a distance sampling design is well supported, as demonstrated at other PV solar facilities (WEST 2016a; Huso et. al 2016b).

Distance sampling adjusts carcass counts for variable searcher efficiency by calculating the *effective* searcher efficiency along a transect. Effective searcher efficiency is the average probability of detection in the searched area, derived from the detection function. As a highly simplified example, if a searcher walks a 10-m (33-ft) long transect line and detects 90% of all carcasses within 10-m of the line, and 60% of carcasses that are 10 to 30 m (33 to 99 ft) from the line, then the effective searcher efficiency between zero and 10 m would be 0.9 and the effective searcher efficiency between 10 and 30 m would be 0.6. For the total 10 by 30-m area, the effective searcher efficiency would be $\frac{0.9+0.6}{100m^2+200m^2} = 0.5$.

In practice, searcher efficiency is modeled as a continuous function of distance, and the detection function is estimated from bias trial data. An advantage to the use of data from bias trials is that the assumption that carcasses are randomly distributed within the search area (typical of most distance sampling designs) becomes unnecessary. Furthermore, having a sufficient sample size to fit the detection function is no longer dependent on what is observed, as in most distance sampling studies, and trials can be placed to measure potential covariates such as carcass size and ground cover. The fitted detection function is used to determine the overall probability of detection as well as to inform the approximate effective view shed of non-zero detection probability for observers.

Final study design will depend on actual as-built configuration of the Carty Solar Farm and post-construction site conditions, and current knowledge of avian mortality at PV solar farms and will be determined in coordination with ODFW. One potential design, if compatible with site design and conditions such as vegetation height, would be for surveyors to walk or drive an ATV along the facility's access roads, perpendicular to panel rows, and scan 90 meters (295 ft) along the PV array rows (Figure 1). Surveys will include a 50% sample of the blocks in the PV panel area. Study design may be refined, scaled down, or systematic study eliminated entirely if results from other PV solar farm systematic studies to date at the time of project construction indicate a low expected risk of bird mortality at Carty Solar Farm.

ii) **Search Interval and Search Period**

Surveys will be conducted once every three weeks November through February, and once every

two weeks from March through October in the year following start of Carty Solar Farm operation; this period includes spring and fall migration and summer nesting/maternity seasons for birds and bats, respectively. Carcass persistence trials will be conducted concurrently with carcasses searches, and if documented scavenger rates indicate that shorter or longer search intervals are needed, the search intervals may be modified to improve carcass detection rates. Guidance from Huso et. al (2016b) suggests determining search intervals such that the average probability a carcass is available to be found is at least 50%. Since carcass persistence may vary by carcass size, search intervals should be determined based on the size or sizes of principal species of interest; for example, if impacts to water-associated birds are a focus, then search intervals can be adjusted based on persistence times for large and medium-sized birds, such as grebes, ducks, and loons.

iii) **Searcher Qualifications**

Searchers will be trained to conduct carcass searches and will be familiar with and able to accurately identify bird and bat species likely to be found in the Carty Solar Farm area. Any unknown birds and bats or suspected state or ESA-listed species discovered during carcass searches will reported to a qualified biologist for positive identification.

iv) **Data Collection**

For each carcass or injured bird found, data recorded will include the following:

- Photos of the carcass from different angles and including a size-referencing object
- Date and time
- Initial species identification
- Sex, age, and reproductive condition (when possible)
- GPS location
- Nearest CARTY SOLAR FARM component (PV array, control house/storage facility, equipment, or other)
- Distance to the nearest PV panel
- Distance from observer when carcass first observed
- Substrate/ground cover conditions
- Condition of specimen
  -Dead and intact
  -Fresh or Dry
  -Dismembered
  -Feather spot (at least two or more primary feathers, five or more tail feathers, or ten or more feathers)
  -Other evidence of scavenging
  -Injured (note apparent injuries)

Bird and bat carcasses found in non-search areas (i.e., outside of the sampled areas described in Section i) will be coded as incidental finds and documented in a similar fashion to those found during standard searches. Incidental finds will be included in the raw survey summary totals but will not be included in the estimated fatality calculations. Carcasses be collected and disposed of consistent with PGE's Avian Protection Program and existing federal Migratory Bird Special Purpose Utility permit. Injured birds will be transferred to a licensed rehabilitator.

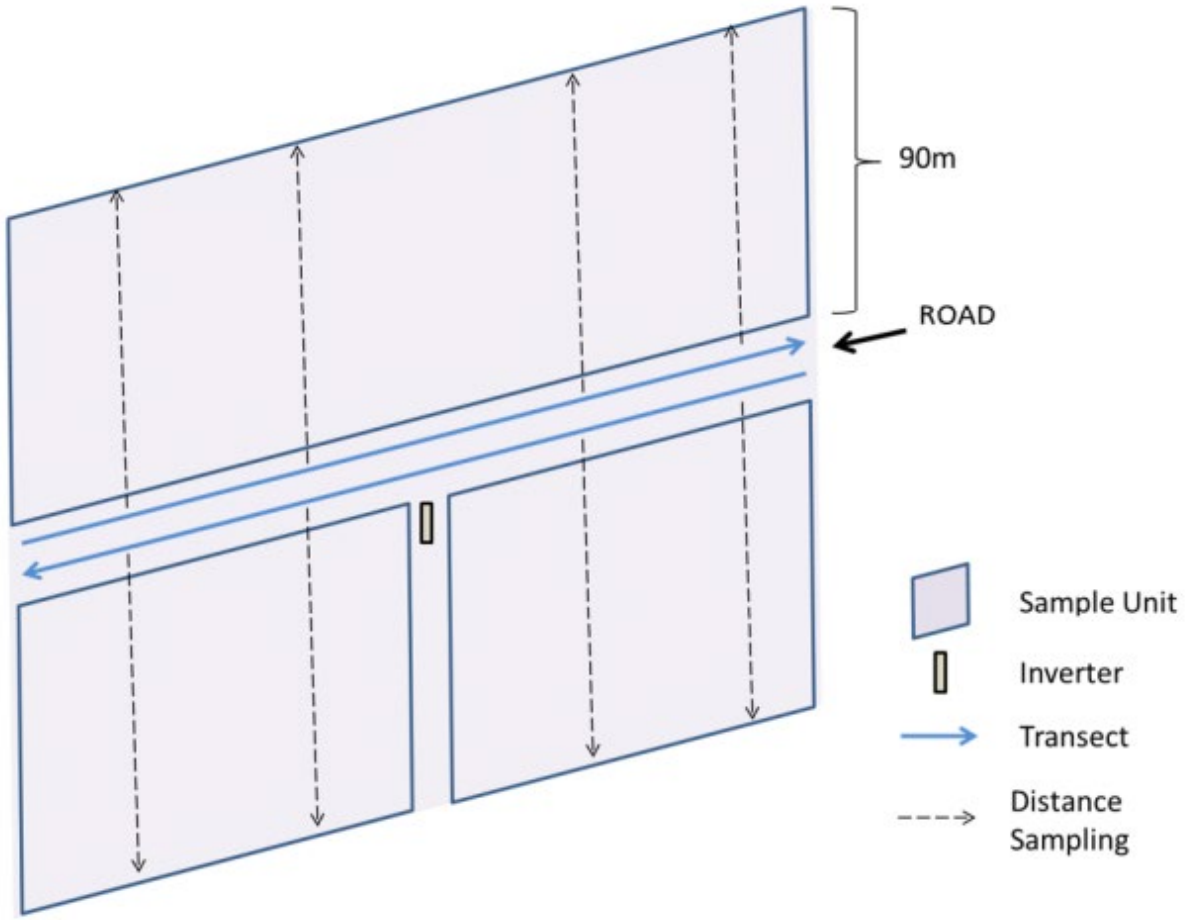

Figure 1. Example illustration of generic PV sampling unit with travel routes and searches using distance sampling ('observation perspectives').

(1) Searcher Efficiency and Carcass Persistence Trials

Searcher efficiency and carcass persistence trials will be conducted in conjunction with standard carcass surveys. Searcher efficiency trials will be placed throughout each season on scheduled search days to ensure trials are representative of search conditions throughout each season. Trials will be placed on at least five different days throughout each season. Searcher efficiency trials will be used to estimate the percentage of bird and bat carcasses that are detected during the carcass searches. Using the detection function fit from searcher efficiency trial data, the average probability of detecting a carcass along a specified length of panel rows can be calculated and used to adjust discovered carcasses for detection bias. Similarly, carcass persistence trials will be used to estimate the percentage of bird and bat carcasses that persist (i.e. are not removed by scavengers) long enough to be located by searchers. When considered together, the results of searcher efficiency and carcass persistence trials will inform the likelihood that a bird or bat carcass that falls within the searched area will be recorded. These correction factors will be incorporated into a fatality estimate model to estimate fatality rates.

The bias-trial sample sizes required to produce precise, adjusted fatality estimates are not well established, in part because needs may vary substantially depending on actual project-specific searcher efficiency, carcass persistence, and fatality rates. However, using searcher-efficiency trials to help evaluate the efficacy of the distance-sampling approach used in this investigation will require larger sample sizes to produce a sampling design that effectively accounts for distance as a key covariate of

interest. A minimum of 25 carcass samples per small size class, 15 for medium, and 10 for large is anticipated within the solar array per season (Table 2). Searcher efficiency will be summarized for each individual searcher, but to avoid needlessly inflating the variance of the estimate, individual searcher effects will not be included in the fatality estimation model.

Table 2. Approximate Searcher efficiency trial sample sizes per season.

Facility component	Size	Sample size
solar arrays	Small	25
	Medium	15
	Large	10
Totals		50

Carcasses of bird or bat species recovered during the study that are not listed under the Migratory Birds Species Act or state or federal endangered species regulations may be re-used in the searcher efficiency trials, as carcass condition allows. Species such as house sparrows (*Passer domesticus*) and European starlings (*Sturnus vulgaris*) may be used to represent small-sized birds; rock doves (*Columba livia*) and commercially raised hen mallards (*Anas platyrhynchos*) or hen pheasants (*Phasianus colchicus*) may be used to represent medium to large-sized birds. If visibility classes are established, to account for differences in vegetation, trial carcasses will be placed in a variety of vegetation types so that searcher efficiency rates can be determined for each visibility class. The number of carcasses used will be limited to ensure that a scavenger swamping does not occur. Searcher efficiency trials will be conducted blindly; the searchers will not know when trials are occurring, within which transects the trial carcasses are placed, or where trial carcasses are located within the project.

The number and location of trial carcasses found by searchers will be recorded and compared to the total number placed in the transects. Searchers will be instructed prior to the initial search effort to leave carcasses, once discovered to be trial carcasses (by inconspicuous ID tags), in place (these carcasses will also be used to calculate carcass persistence). The number of trial carcasses available for detection (non-scavenged) will be determined immediately after the conclusion of the trial. Searcher efficiency of the surveyors will generate the estimate of searcher bias for input into the fatality estimate models.

Carcass persistence trials will be conducted concurrently with searcher efficiency trials and, to the extent possible, using the same carcasses from the searcher efficiency trials. In total, 30 small, 20 medium, and 10 large carcasses will be randomly placed and monitored within the solar arrays, each season (Table 3). Carcass persistence trials in the solar arrays will be monitored, using motion-triggered, digital trail cameras (e.g., see Smallwood et al. 2010). The status of each trial carcass (e.g. gone/present, fresh/desiccated, whole/partial) will be recorded throughout the trial. The length of time carcasses persist on the ground will be used to generate the estimate of carcass persistence for input into the fatality estimate models.

It may not be necessary to use cameras to monitor every carcass, as carcass persistence can also be conservatively estimated by frequent field visits and using the last date a carcass was observed as its removal date. However, at least a subset of carcasses will be monitored with cameras to help determine fate of scavenged carcasses. Cameras may also be useful for other purposes. For example, if trained on solar arrays and facility fences, motion-activated cameras could help to document cause of avian and bat fatalities, which is often undetermined at solar farms. The number and purpose of cameras used will be determined along with final study protocol in consultation with ODFW and ODOE.

Table 3. Approximate Carcass Persistence Trail Sample Sizes Per Season.

Facility component	Size	Sample size
solar arrays	Small	30
	Medium	20
	Large	10
Totals		60

Fake cameras or cameras without bias trial carcasses may also be placed to avoid training ravens to recognize cameras as "feeding stations". Periodic ground-based checking of carcasses also will occur to guard against misleading indicators of carcass removal, such as wind blowing the carcass out of the camera's field of view. To minimize potential bias caused by scavenger swamping (Smallwood 2007, Smallwood et al. 2010), carcass-persistence specimens will be distributed across the entire Facility, not just in areas subject to standard surveys, and new specimens will be placed every two to three weeks in small numbers.

(2) *Data Analysis and Modeling*

Because the detectability of carcasses during field surveys can be imperfect, raw carcass counts generally underestimate actual mortality. Therefore, the Huso fatality estimator (Huso 2011; Huso et al. 2012, Huso et. al 2016a), modified to account for distance sampling (WEST 2016a, Huso et. al 2016b), will be applied to generate corrected fatality rate estimates for the Carty Solar Farm.
The Huso fatality estimator (Huso 2011; Huso et al. 2012) allows the user to model categorical covariates that may affect searcher efficiency and carcass persistence. AICc scores are used to evaluate the effectiveness of candidate models before generating final fatality estimates. Because the underlying assumption that searchers have a single opportunity to discover a carcass, only those carcasses determined to have occurred within the previous search interval will be used to generate adjusted fatality estimates. In addition, the model does not produce reliable estimates when there are few carcasses included in analysis.

When fewer than five carcasses belonging to a group of interest (e.g. small birds) are found and included in analysis, estimates will not be provided. Corrected fatality estimates will be reported for the solar Facility (PV panel area). Estimated mortalities will be expressed in terms of carcasses/MW/season and in other metrics appropriate for a solar facility to facilitate comparison with other studies. Analysis of data collected during the post-construction study will include seasonal fatality estimates for all birds and bats to the taxonomic level where fatality estimates can be calculated. Fatality estimates and confidence intervals will be compared to determine if differences in fatality estimates between taxa or group (e.g. birds compared to bats, large birds compared to small birds), or season. Because representative fatality estimates are more challenging to develop for small (i.e. <5) numbers of carcasses, appropriate taxonomic level fatality estimates will only be calculated if the number of carcasses is sufficient.

Reporting

The Certificate Holder will document the results of the monitoring in a summary report following the completion of the post-construction monitoring. The certificate holder may include this summary report of bird and bat fatality 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.

The summary report will include fatality estimates and data summaries. The report will include all data analyses, including correlation analyses and overall fatality estimates, and a discussion of monitoring

results and their implications. The certificate holder shall notify the appropriate agency immediately upon the discovery of a carcass of any state-listed, ESA-listed species or eagle on the Facility site.

Adaptive Management

i. Adaptive Management Goals

Adaptive management will allow the Certificate Holder to meet the goals of avoiding and minimizing impacts to birds and bats. After the end of the first year of post-construction monitoring, if the fatality rates do not exceed any thresholds of concern identified in Section 3.2, no additional monitoring will be conducted. However, if the fatality rates do exceed any of the thresholds of concern in Section 3.2, ODOE, in consultation with ODFW and the Certificate Holder, will determine if additional monitoring is warranted based on the number of observed carcasses and estimated fatality rates and consideration of any other significant information available at the time.

ii. Adaptive Management Process

To enable new information, including the results of post-construction monitoring, to influence and improve avoidance and minimization measures, certain trigger events and the subsequent changes or actions have been established. The events that would trigger need to consider the additional avoidance and minimization measures presented herein would be:

- Discovery of an eagle carcass
- New ESA-listing of a bird or bat species
- Discovery of an ESA-listed species carcass
- New state-listing of a bird or bat species
- Discovery of a state-listed species carcass
- The total number of observed bird and bat mortalities is higher than expected and likely to be significant, as defined in Section 3.2.6.

1) Discovery of an Eagle or ESA-listed Species Carcass

If an eagle or ESA-listed species carcass is discovered within the Carty Solar Farm, the following actions will be taken:

- Certificate Holder will, working with a qualified wildlife biologist, promptly identify and secure the carcass at the place of its discovery in the field until USFWS personnel can be reached and provide the further instruction for the storage of the carcass.
- Certificate Holder will notify USFWS, ODFW, and ODOE within one business day after discovery and positive identification of the carcass.
- Certificate Holder will work with the USFWS to evaluate available data concerning the find and, as appropriate, identify and implement avoidance and minimization measures to reduce the risk of future carcasses. Potential adaptive management approaches are presented in Section 3.2.7 below.
- Certificate Holder will assess the need to obtain additional authorizations in view of the new information.

2) New ESA-listing of a Bird or Bat Species

If a bird or bat species, known to occur or that has a high likelihood to occur within the Carty Solar Farm area, becomes listed under the ESA during the life of the facility, Certificate Holder will coordinate with USFWS. If this trigger is met, Certificate Holder will work with USFWS to assess the potential for the facility to impact the species and subsequently to determine the appropriate action(s), if any.

3) New State-listing of a New Bird or Bat Species

If a bird or bat species, known to occur or that has a high likelihood to occur within the Carty Solar Farm area, becomes listed by ODFW during the life of the facility, Certificate Holder will coordinate with ODFW and ODOE. If this trigger is met, Certificate Holder will work with ODFW and ODOE to assess the potential for the facility to impact the species and subsequently to determine the appropriate action(s).

4) Discovery of a State-listed Species Carcass

- Certificate Holder will, working with a qualified wildlife biologist, promptly identify and secure the carcass at the place of its discovery in the field until ODFW personnel can be reached and provide the further instruction for the storage of the carcass.
- Certificate Holder will notify ODFW and ODOE within one business day after the discovery and positive identification of the carcass.
- Certificate Holder will work with the ODFW and ODOE to evaluate available data concerning the discovery and, as appropriate, identify and implement avoidance and minimization measures to reduce the risk of future mortalities.
- Certificate Holder will assess the need to obtain additional authorizations in view of the new information.

5) Total Number of Observed Bird and Bat Mortalities is Higher than Expected and Likely to be Significant

Mortalities to birds and bats during operations are expected to be low. Significance of the levels of mortality of any bird or bat species would be determined in coordination with USFWS, ODFW and ODOE based on the best available information, including the most recent data on species' population sizes and trends and fatality rates at technologically and geographically similar facilities if available. At this time, there is no publicly available avian fatality data at PV facilities in Oregon, but there may be in the future. This approach recognizes that higher levels of mortality of common species may not be significant. Conversely, lower levels of mortalities of less common species may be of more concern, particularly if these species appear to be at risk (e.g., Oregon sensitive-critical species). Given the assessment and prediction that impacts are likely to be low, the following actions are suggested in response to monitoring outcomes:

- If documented fatalities are low and not considered significant for the species involved, no mitigation will be conducted.
- If fatalities are high enough that they could be considered significant for the species involved, Certificate Holder will meet and confer with the ODFW and ODOE and the applicable actions presented below will be carried out. If a particular cause can be identified, Certificate Holder will develop specific mitigation measures in consultation with ODFW and ODOE to address the occurrence.

6) Potential Adaptive Management Approaches

Circumstances that trigger the need for adaptive management will be investigated such that the Certificate Holder can, in consultation with ODFW and ODOE, implement avoidance, minimization, and mitigation measures designed and implemented to reduce impacts to birds and/or bats while maintaining Facility viability. If ODOE determines that additional avoidance, minimization or mitigation measures are appropriate based on analysis of the data, consultation with ODFW, and consideration of other significant information available at the time, the Certificate Holder, in consultation with ODOE and ODFW, shall propose and implement measures to address the concern, subject to the approval of ODOE. Avoidance, minimization, and mitigation actions that may be taken

under adaptive management include, but are not limited to, the following:

- Remove or modify any identified sources of bird or bat attraction to the extent practicable.
- If more than one eagle carcass is discovered in a 5-year time period, Certificate Holder will develop and implement a roadkill removal program on roads within or near the Carty Solar Farm, as appropriate, to offset Carty Solar Farm impacts to eagles.
- Implement technological solutions. If bird and/or bat carcass discoveries exceed the above-defined adaptive management triggers and new techniques or technology become available, the Certificate Holder, ODOE, and/or ODFW shall propose new approaches, techniques or technology designed to avoid and/or minimize impacts to the affected species, taking into consideration factors including but not limited to cost effectiveness and feasibility to implement, subject to the approval of ODOE. At this time, there are no technological solutions available. If ODOE determines that additional monitoring is appropriate based on analysis of the data, consultation with ODFW and Certificate Holder, and consideration of any other significant information available at the time, the Certificate Holder shall conduct additional specific, targeted monitoring to determine if adaptive management measures are effective.

IV. CALCULATION OF THE SIZE OF THE MITIGATION AREA

The HMA must be large enough and have characteristics that meet the standards set by ODFW's Wildlife Habitat Mitigation Policy. These standards include: no net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality for Category 2 habitat; no net loss of habitat quantity or quality for Category 3 habitat (in-kind, in-proximity mitigation); no net loss of habitat quantity or quality for Category 4 habitat; net benefit in habitat quantity or quality for Category 5 habitat (i.e., actions that improve habitat conditions); and minimize impacts for Category 6 habitat.

~~Unit 1 permanent impacts and estimated acreage permanent impacts for the Carty Solar Farm are shown in Table 4~~Table 4 shows the acres of temporary and permanent impacts for the Carty Generating Station and associated mitigation acreage. For permanent impacts, the mitigation area shall include 2 acres for every acre of impacts to Category 2 habitat (a 2:1 ratio to provide no net loss and a net benefit of habitat quantity) and 1 acre for every acre of permanent impacts to Category 3 and 4 habitats (a 1:1 ratio to provide no net loss). Mitigation for temporary impacts shall include 1 acre for every acre of impacts to Category 2 habitat (a 1:1 ratio) and 0.5 acre for every acre of temporary impacts to Category 3 and 4 habitat (a 0.5:1 ratio) that have not previously been mitigated for temporary impacts (e.g., areas of temporary impacts that are mitigated as part of construction for Unit 1 that are reused for subsequent units will not result in additional mitigation acreage). Temporary impacts on grasslands typically do not require mitigation in the form of land acquisition and/or conservation.

The acreages of impact in this Amended Plan for Unit 1 are based on the final design layout of the facility submitted to ODOE and ODFW prior to beginning of Unit 1 construction and the revised final design layout of the facility and the associated impact acreages provided to ODOE and ODFW during construction. The construction of Unit 1 resulted in 45 acres of permanent disturbance and 55.4 acres of temporary disturbance, resulting in a total required mitigation area of 72.7 acres.

The acreages of impact for the Carty Solar Farm are based on preliminary design and will be updated based on final design layout of the amended facility. The acreages of impact will be submitted for approval to ODOE and ODFW prior to beginning construction to demonstrate that the HMA is appropriately sized. The calculated maximum habitat impact estimates of the Carty Generating Station construction associated with each unit are shown in the table below (Table 4).

The acreages of impact for the septic system and security guard station including associated plumbing and communication lines are based on preliminary design and will be updated based on the final design layout of the amended facility. The acreages of impact will be submitted for approval to ODOE and ODFW prior to beginning

construction to demonstrate that no new HMA is needed. The calculated maximum habitat impact estimates associated with the Second Amended site certificate are shown in Table 4.

Table 4. Estimated Habitat Impacts of the Carty Generating Station by Habitat Category

Habitat Type by Project Area	Temporary Impacts (acres)[1]	Permanent Impacts (acres)[2]	Calculated Mitigation Area (acres)[1,2]
Unit 1 and Supporting Facilities[3]			
Category 4	55.4	45	72.75
Total Unit 1 Area RequiringMitigation[1,2]	27.75	45	72.75
Proposed new Facility components of Request for Amendment 2[4]			
Category 4	0.8	0	0.4
Category 6	0	1.07	0
Total Area RFA2 Area Requiring Mitigation[1,2]	0.4	0	0.4
Carty Solar Farm and Related or Supporting Facilities in RFA4[5]			
Category 2	~~6.39~~3.8	~~259.32~~154.9	~~525.03~~313.6
Category 3	~~7.66~~1.1	~~42.84~~102.5	~~46.67~~103.1
Category 4	~~90.57~~3.0	~~18.79~~433.5	~~64.08~~435.0
Category 6	~~2.81~~29.3	~~0.19~~169.1	0.00
Total Solar Farm Area Requiring Mitigation[1,2]	~~55.51~~5.8	~~580.27~~845.8	~~635.78~~851.6
Mitigation Summary			
Mitigation Required to date (Unit 1)			72.75
Additional Mitigation Required under RFA2			0.9
Additional Mitigation Required under RFA 4 (Carty Solar Farm)			851.6
Total Mitigation for Amended Project			~~709.43~~925.3

Notes:

In all cases, impacts in a given project area will only be mitigated once.

[1]Temporary impact mitigation is based on a 1:1 ratio for Category 2, a 0.5:1 acre ratio of Category 3 and 4, and zero for Category 6.

[2] Permanent impact mitigation is based on a 2:1 ratio for Category 2, a 1:1 acre ratio of Category 3 and 4 and zero for Category 6.

[3] Unit 1 includes Unit 1 and all related or supporting facilities constructed as part of Unit 1.

[4] New facility components as proposed in RFA2 include the new security guard station, wastewater pipeline, septic system, water pipeline, office/warehouse building, and the Carty substation and associated distribution lines. Note that the septic system, substation, and office/warehouse were constructed so the acreage in Table 6 is for only components that have been constructed and does not match the amount originally estimated in the Second Amendment.

~~[5] The Carty Solar Farm includes the Carty Solar Farm energy facility site, the potential route for the Carty Solar Farm interconnection transmission line that would require the most mitigation acres (Route 1), the Grassland Switchyard buildout area if interconnection Option 1 is selected (along with potential interconnection Route 1), and temporary construction laydown and parking areas.~~

V. DESCRIPTION OF THE MITIGATION AREA

To comply with the mitigation criteria outlined in OAR 635-415-0025, the certificate holder shall mitigate for impacts to Category 2, 3, 4, and 5 habitats in a manner consistent with the ODFW habitat mitigation policy and subject to the approval of ODFW. The certificate holder will establish a HMA (or areas) that will be maintained, enhanced, and monitored throughout the life of the facility[6] through implementation of the habitat enhancement actions described in this Amended Plan. The certificate holder shall provide appropriate legal documentation to ODOE showing the legal right to create, maintain, and protect the HMA for the life of the facility. The certificate holder shall not undertake any development activities within the HMA throughout the life of the facility.

The 78-acre HMA for Unit 1 is located immediately east of the Site Boundary and comprises all or portions of map T3N R24E, tax lots 101, 113, and 116. The parcel is owned and has been placed under conservation easement by the certificate holder. It is adjacent to the existing PGE-owned natural habitat areas on the north and east sides, and a conservation area maintained by The Nature Conservancy along part of the west boundary. The vegetation in the HMA is dominated by Sandberg's bluegrass, bluebunch wheatgrass, and intermittent areas of needle-and-thread grass, as well as cheatgrass. There are also occasional green rabbitbrush (*Chrysothamnus viscidiflorus*), gray rabbitbrush, big sagebrush, fiddleneck (*Amsinckia menziesii*), and yarrow (*Achillea millefolium*). WGS burrows were identified within the HMA for Unit 1 in 2006. As of 2010, approximately 80 percent of the HMA for Unit 1 area was located within 785 feet of identified WGS burrows and was therefore considered Category 1 habitat. The remainder of the HMA for Unit 1 was included in the buffer area for previously occupied WGS habitat and was therefore designated as Category 2 habitat. Based on 2016–2017 WGS surveys, the majority of the HMA for the Carty Solar Farm (see below) would be located on Category 2 or Category 3 habitat based on the current habitat categorization for Amendment 1. The 78-acre HMA is 5.25 acres larger than required for temporary and permanent impacts associated with Unit 1 and supporting facilities. Therefore; the additional 1.10 acres of mitigation required for the septic system and security guard station included in the Second Amended Site Certificate are covered by this HMA.

The proposed HMA for the Carty Solar Farm and supporting facilities (the HMA for the Carty Solar Farm), estimated at approximately ~~636~~ 850 acres per Table 4, would be located within a portion of the PGE-owned, 880-acre natural habitat area that contains remnant stands of sagebrush. The parcel adjoins the HMA for Unit 1 to the north and east and is located in Section 26, T3N R24E tax lot 101 and the eastern half of Section 35, T3N R24E, tax lot 113). The certificate holder plans to mitigate for the habitats impacted by placing a conservation easement on the appropriate acreage and by providing habitat uplift through the habitat enhancement and monitoring activities described below. Final location of the HMA for the Carty Solar Farm will be delineated in coordination with ODFW prior to construction once final design layout and mitigation acreage is determined.

VI. HABITAT ENHANCEMENT ACTIONS

The objectives of habitat enhancement and restoration are to protect habitat within the mitigation area from degradation and improve the habitat quality of the mitigation area. The certificate holder shall initiate the habitat enhancement actions for the facility before beginning operation. The certificate holder shall restrict uses of the mitigation area that are inconsistent with the goal of no net loss and net benefit of Category 2 habitat and no net loss of Category 3 and 4 habitats. The certificate holder shall implement habitat enhancement actions as described in this Amended Plan and as specified in the amended Site Certificate.

[5] As used in this plan, "life of the facility" means continuously until the facility site is restored and the site certificate is terminated in accordance with OAR 345-027-0110.

A. Noxious Weed Prevention, Inventory, and Control within the Habitat Management Area

The certificate holder shall conduct comprehensive noxious weed inventories to identify patches of weed infestation within the HMA during year one, year three, and year five after construction of Unit 1 (i.e., 2017, 2019, and 2021), and then continue once every five years (in years divisible by five) for the life of the facility. Weed control and monitoring activities will be conducted more frequently (at least every two years) in areas prioritized based on the results of the comprehensive surveys and reported to ODOE and ODFW. Weeds will be controlled as needed to maintain and enhance habitat quality within the mitigation area, with the goal of working toward eradication of targeted noxious weeds or, if eradication is not practical, decreasing their abundance to minimize impacts on native plant communities. Weed management practices will be consistent with an integrated weed management approach, using an appropriate combination of inventory; prevention (such as best management practices to prevent weed establishment); and control methods (such as hand pulling, mowing, biological control, and/or herbicides). The certificate holder shall obtain ODFW's approval prior to the use of pesticides. Controlling weeds in the HMA should promote growth of native vegetation. If a substantial area of soil is left bare from weed control activities, the area will be seeded using the appropriate methods (as described in the Revegetation and Noxious Weed Control Plan) during the appropriate time of year and using an appropriate mixture of native grass and/or shrub seeds.

B. Fire Damage Revegetation

If vegetation in the HMA is damaged from fire or from fire suppression efforts (e.g., vehicular disturbance), the area would be seeded as necessary with the appropriate seed mix using the appropriate methods, as described in the Revegetation and Noxious Weed Control Plan.

C. Access Control and Wildlife-Compatible Fencing

The certificate holder will monitor and control access to the HMA and will post informative signs depicting the area(s) as "protected" and including natural resources information as appropriate for the life of the facility. Primary access to the PGE property is controlled by a gate off Tower Road north of the Carty Generating Station (currently used by PGE and The Nature Conservancy [TNC]), the gated entrance to the Boardman Plant, and a gated road from Ione to the south. TNC and Three Mile Canyon Farms may occasionally use the two-track access crossing PGE's property to access the Farm's conservation area. Approved access to the site is currently limited to such occasional approved use of access roads and PGE's general operational needs. Any fences within or bordering the mitigation area(s) will be removed or modified to wildlife-friendly specifications as appropriate. No livestock grazing is currently occurring on the site, and grazing would not be allowed in the future. Periodic monitoring (at least annually but typically more frequently concurrent with other site activities) will be conducted to evaluate effectiveness of access control measures and signage maintenance needs.

D. Enhancement and Sagebrush Habitat

To mitigate for permanent impacts to Category 3, and 4 sagebrush habitat affected at the Carty Solar Farm (see acreage in Table 4), the certificate holder will plant sagebrush and/or bitterbrush seedlings in the HMA for the Carty Solar Farm, focusing on enhancing and expanding remnant stands of shrubs that were impacted by past wildfires. Sagebrush and/or bitterbrush seedlings will be planted at a density of 450 plants per acre (approximately 10 feet on center). Planted shrubs will be monitored annually for a period of five years, with a performance goal of 60% survival at the end of the five-year monitoring period. Methods and performance criteria to be finalized through consultation with ODFW.

E. Provide Additional Raptor Nesting Opportunities

As recommended by ODFW, to mitigate for removal of juniper trees and potential raptor nesting sites in

the Carty Solar Farm permanent footprint, the certificate holder will plant up to one tree per 10 acres (roughly 660-foot spacing on center) based on the final size of the HMA for the Carty Solar Farm. Initial planting will be conducted in the October/November or February/March time period during the first year following start of construction. Planted juniper trees will be monitored annually for a period of five years, with a performance goal of 60% survival at the end of the five-year monitoring period. Methods and performance criteria to be finalized through consultation with ODFW.

VII. MITIGATION AREA MONITORING

The certificate holder shall use a qualified investigator (botanist, wildlife biologist, or revegetation specialist) to conduct a comprehensive monitoring program for the HMA. The purpose of this monitoring is to evaluate on an ongoing basis the protection of habitat quality, the results of enhancement actions, and the use of the area by avian and mammal species, especially during the wildlife breeding season.

The investigator shall visit the HMA as necessary to complete the required monitoring during the first, third, and fifth year after Unit 1, and the Carty Solar Farm construction (i.e., 2017, 2019, 2021) and every fifth year thereafter (in years divisible by five, unless otherwise specified for specific measures) for the life of the Project. Monitoring activity shall include an assessment of the following:

General quality of vegetation cover (dominant species, structural age, etc.), as determined by ocular estimates and photo points (see below);

1) Success of weed control efforts;
2) Success of remedial actions to restore habitat quality in damaged areas (such as managed weed infestations and any necessary seeding/planting areas), as determined by vegetation cover (ocular estimate) and photo points (see below). Areas where remedial actions involve soil disturbance and reseeding would be monitored consistent with the revegetation monitoring methods and schedule as described in the Amended Carty Generating Station Revegetation and Noxious Weed Plan. See Section VI for schedule and performance criteria for habitat enhancements involving shrub and juniper plantings.
3) Photos taken from established photo points within the HMA, including 1) a minimum of five permanent photo points distributed to show general vegetation status throughout the HMA, and 2) additional photo points as needed to monitor success of significant enhancement activities, such as managed weed infestations and/or any necessary seeding/planting areas;
4) Incidental wildlife occurring within the HMA (counts concurrent with all other monitoring work);
5) Environmental factors found on site during monitoring activities and annual summary records (such as precipitation);
6) Surveys of resident special status wildlife species (WGS) that have been documented during previous monitoring or survey efforts within the HMA, using existing protocols approved by ODFW; and
7) Avian point counts during the breeding season at existing point count stations, formerly monitored under the Boardman Plant Ecological Monitoring Program, in the vicinity of the HMA(s). Four point-count stations are located in the immediate vicinity of the HMA for Unit 1, and an additional ~~four sites~~ six point-count stations are located in the immediate vicinity of the proposed HMA for the Carty Solar Farm.

VIII. DATA REPORTING

The certificate holder shall submit a report including wildlife and habitat monitoring data and analysis to ODOE and ODFW during each monitoring year according to the schedule in Table 5. The certificate

holder shall notify USFWS and ODFW within one business day if any federal or state endangered or threatened species are killed or injured on the facility site or within the HMA. The certificate holder may include the reporting of wildlife monitoring data and analysis in the report required under OAR 345-026-0080 or submit this information as a separate document concurrent with the submittal of the report. In addition, the certificate holder shall provide ODOE with any data or record generated by the investigators in carrying out this Amended Plan upon request by ODOE.

Table 5. Schedule of Wildlife Mitigation and Monitoring Programs

Task	Schedule
Post-construction Washington Ground Squirrel Survey Monitoring	Year one, three and five after operation of Unit 1 has begun and in year one, three and five after operation of Carty Solar Farm has begun, and otherwise at least every five years (in years divisible by five) for the life of the facility.
Raptor Nest Monitoring	
Post-construction Avian and Bat Mortality Monitoring	A full year of formal post construction avian and bat monitoring in the year following start of Carty Solar Farm operation. N/A for Unit 1.
General HMA Monitoring	During the first, third, and fifth year after Unit 1 HMA, (i.e., 2017, 2019, 2021) and during the first, third, and fifth years after Carty Solar Farm construction for Carty Solar Farm HMA, and otherwise every fifth year thereafter for the life of the facility for entire applicable HMA.
Noxious Weed Inventory for HMA	
General Weed Control and Monitoring Activity for HMA	At least every two years (in priority areas based every-five-year comprehensive inventory results) starting from the completion of construction.
HMA Sagebrush Habitat Monitoring	Annually for a period of five years, with a performance goal of 60% survival at the end of the five-year monitoring period, for the Carty Solar Farm. N/A for Unit 1.
Additional Raptor Nest Opportunities (juniper plantings) Monitoring for HMA	Annually for a period of five years, with a performance goal of 60% survival at the end of the five-year monitoring period for Carty Solar Farm. N/A for Unit 1.

IX. AMENDMENT OF THE PLAN

This Wildlife and Habitat Monitoring and Mitigation Plan may be periodically amended and updated to include current and best available practices by agreement of the certificate holder and ODOE. Such amendments may be made without amendment of the Site Certificate. The Energy Facility Siting Council (Council) authorizes ODOE to agree to amendments to this plan and to mitigation actions that may be required under this Plan. ODOE shall notify the Council 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.

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Exhibit Q

Threatened and Endangered Species

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Attachments

Acronyms and Abbreviations

AC	alternating current
ASC	Application for Site Certificate
BESS	battery energy storage system
Certificate Holder / PGE	Portland General Electric Company
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
GPS	Global Positioning System
kV	kilovolt
MW	megawatt
NLCD	National Land Cover Database
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
OESA	Oregon Endangered Species Act
ORBIC	Oregon Biodiversity Information Center
RFA	Request for Amendment
WAGS	Washington ground squirrel

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1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

Exhibit Q provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(q) in support of RFA 4. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate (ASC), previous RFAs, and Oregon Department of Energy Final Orders to demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate conditions and the standard in OAR 345-022-0070. OAR 345-022-0070 requires that:

> *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.

In the Final Orders for the original Site Certificate and previous RFAs, the Oregon Energy Facility Siting Council (Council) found that the CGS complies with the Threatened and Endangered Species standard, with the inclusion of Site Certificate Conditions 10.1-10.21.[1] No new conditions are needed for protection of listed species. Note that PGE is recommending modification of Conditions 10.7 and 10.14 to clarify requirements; this is intended as clarification and is not intended to materially change the original intent of the conditions (refer to Section 6.0 of the RFA 4's Division 27 document [Request for Amendment 4 for the Carty Generating Station]).

1.1 Analysis Area

The analysis area for the state-listed threatened and endangered species identified in Exhibit Q is defined as the Amended Site Boundary plus a 5-mile buffer, per OAR 345-001-0010(35)(a). The Amended Site Boundary is defined in detail in Section 4.1.1.2 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station). The threatened and endangered species analysis area is shown on Figure Q-1.

As described below in Section 3.1, the desktop review in support of this exhibit was conducted for the entire threatened and endangered species analysis area. The field surveys in support of this exhibit were conducted across a smaller portion of the analysis area, referred to as the Biological Study Area, where permanent and temporary disturbance for RFA 4 is proposed and as required for compliance with field survey protocol (see Section 3.2). The Biological Study Area encompasses approximately 1,213 acres.

2.0 Agency Coordination

PGE has consulted with the Oregon Department of Fish and Wildlife (ODFW) regarding the appropriate protocols for documenting the presence of state sensitive species. AECOM is the consulting firm that conducted the 2023 biological surveys for the Amended Carty Solar Farm described in this exhibit. Tetra Tech is the consulting firm that prepared this exhibit and its attachments. A summary of this consultation process is provided below.

- April 17, 2023. PGE and AECOM held a meeting to discuss level of survey intensity within the former BCP areas, use of The Nature Conservancy data, and level of effort expected for other sensitive species surveys.

[1] Final Order on Request for Amendment 1 to the Site Certificate for the Carty Generating Station, p. 103 (December 2018).

- April 20, 2023. AECOM met with ODFW biologists to review survey protocols and to visit active WAGS colonies.
- June 23, 2023. AECOM met with ODFW to obtain guidance on WAGS identification based on scat photos.
- December 1, 2023. PGE, AECOM, and Tetra Tech met with ODFW biologists to discuss the results of the 2023 biological surveys.
- January 16, 2024. PGE and Tetra Tech met with ODFW biologists to discuss habitat impacts and mitigation, as well as Site Certificate conditions.

3.0 Identification of Species – OAR 345-021-0010(1)(q)(A)

OAR 345-021-0010(1)(q) Information about threatened and endangered plant and animal species that may be affected by the proposed facility, providing evidence to support a finding by the Council as required by OAR 345-022-0070. The applicant must include:

OAR 345-021-0010(1)(q)(A) Based on appropriate literature and field study, identification of all threatened or endangered species listed under ORS 496.172(2) and ORS 564.105(2) that may be affected by the proposed facility.

State threatened and endangered plant and animal species that might be affected by the Amended Carty Solar Farm were identified through an initial desktop review in 2011 (PGE 2011), in 2016 (PGE 2018), in 2022 (PGE 2022), and then again in 2023. The 2023 desktop review was then followed by 2023 field surveys within a portion of the analysis area as described below. All investigations within the analysis area determined that Lawrence's milkvetch (*Astragalus collinus var. laurentii*), a threatened species, is the only Oregon Department of Agriculture (ODA) listed plant species with potential to occur (AECOM 2023a), and the Washington ground squirrel (*Urocitellus washingtoni,* WAGS), an endangered species, is the only wildlife species with the potential to occur.

3.1 Desktop Review

In 2023, Tetra Tech conducted a desktop review to verify and revise the status and occurrences of threatened and endangered species that were identified during other Council-permitting efforts for the Facility. Tetra Tech reviewed the results of a query to the Oregon Biodiversity Information Center (ORBIC), which provided locations of rare species and habitats within the analysis area (ORBIC 2023) as well as aerial imagery to identify suitable habitat for special status plants and wildlife. The ODFW list of threatened and endangered fish and wildlife species was reviewed to identify state-listed species with the potential to occur within the analysis area (ODFW 2021). ODA's list of threatened, endangered, and candidate plant species was also examined (ODA 2023).

Consistent with previous efforts, the 2023 desktop review resulted in the identification of two state-listed species as having potential to occur within the analysis area: the Washington ground

squirrel (state endangered) and Lawrence's milkvetch (state threatened). This identification was based on the known range of the species, presence of suitable habitat in the analysis area, and known/historical occurrences within the analysis area from the ORBIC database (Table Q-1). The ORBIC database query returned a total of five records (two historical records and three verified extant) for WAGS within the analysis area (Figure Q-2). No state-listed fish have the potential to occur within the analysis area (ORBIC 2023; StreamNet 2023).

Table Q-1. State Listed Species with Potential to Occur within the Analysis Area

Scientific Name[1]	Common Name	Federal Status[2]	State Status	Occurrence within Analysis Area[3]	Potential Habitat within Analysis Area[4]
Mammals					
Urocitellus washingtoni	Washington ground squirrel	-	Endangered	Yes	Yes
Plants					
Astragalus collinus var. laurentii	Lawrence's milkvetch	SOC	Threatened	No	Yes

1. Species shown include only those that are listed as T&E species in Oregon. Oregon state sensitive species are addressed in Exhibit P.
2. SOC = Species of Concern
3. ORBIC 2023
4. Dewitz 2019

3.1.1 Washington Ground Squirrel

The Washington ground squirrel is a small rodent associated with shrub-steppe habitat of the Columbia Basin Ecoregion (Verts and Carraway 1998). WAGS occur only in the Columbia Basin of eastern Washington and north-central Oregon. In Oregon, the species range extends from Umatilla County, west through Gilliam and Morrow counties, to the John Day River. Concern for the long-term viability of WAGS populations led to ODFW listing the species as endangered in January 2000. The desktop review of potential WAGS habitat within the analysis area included a review of the National Land Cover Database (NLCD; Dewitz 2019) and Natural Resources Conservation Service geographic information systems soil data (NRCS 2006). Areas considered unsuitable habitat for WAGS include active agricultural areas and developed areas. Suitable WAGS habitat consists of native shrub-steppe or grassland cover.

Current and potential threats to the continued survival of the species include habitat loss from the conversion of habitat to agricultural use, residential use, infrastructure project development and other forms of development; as well as habitat fragmentation, recreational shooting, genetic isolation and drift, predation, disease, drought and invasive weeds on forage quality and quantity (USFWS 2010).

3.1.2 Lawrence's Milkvetch

Lawrence's milkvetch is endemic to Oregon. It is a 4- to 20-inch tall tap-rooted perennial in the pea (*Fabaceae*) family that occupies sandy or rocky soils overlying basalt on dry slopes of the Columbia Plateau in northern Oregon and can be found at elevations ranging from 2,000 to 3,400 feet, although the species has been reported at elevations as low as 400 feet. Lawrence's milkvetch blooms from May to August and develops pendulant seed pods from late May to August that are required for identification (ODA 2023). Current threats to Lawrence's milkvetch include habitat loss due to agricultural development, grazing, road maintenance activities, competition from exotic weeds, and seed predation by insects (ODA 2022).

3.2 Field Surveys

As described below, field surveys were conducted in 2023 to evaluate the potential presence of the state-listed species within a portion of the analysis area where permanent and temporary disturbance is proposed as part of RFA 4.

3.2.1 Washington Ground Squirrel Surveys

Surveys to determine the presence and location of WAGS colonies were conducted by AECOM in spring 2023 within a portion of the analysis area. The methodology and procedures for the surveys were derived from the Status and Habitat Use of the Washington Ground Squirrel (*Spermophilus washintoni*) on State of Oregon Lands, South Boeing, Oregon in 1999 (Morgan and Nugent 1999). Survey methodology and procedures also followed ODFW's recommended and approved WAGS survey protocols for eastern Oregon.

WAGS surveys occurred in April and May 2023 within the portion of the Amended Site Boundary where permanent and temporary disturbance is proposed (the Biological Study Area; 1,213 acres), plus all suitable habitat within 1,000-feet (approximately 300 meters) of the Biological Study Area (WAGS Survey Area, Figure Q-2). This 1,000-foot buffer was included to cover typical shifts in seasonal home ranges of WAGS colonies that may be active directly outside the Biological Study Area and could shift inside the Biological Study Area in future years.

Note that all permanent and temporary disturbance associated with RFA 4 are proposed within the Biological Study Area; however, not all of the study area will be disturbed. Figure Q-2 shows that the northeast corner of the Biological Study Area is outside the Amended Site Boundary, as this specific area has been removed from consideration for permanent and temporary disturbance.

WAGS typically inhabit shrub-steppe and grassland habitats within the Oregon portion of the Columbia Plateau; therefore, the status of the dominant vegetation in the WAGS Survey Area was verified and updated and suitable habitat delineated using electronic tablets. Areas devoid of suitable habitat, riparian areas, and developed areas were omitted from the survey efforts. Furthermore, the status of active agricultural and developed areas identified during the desktop review were verified during surveys and updated in order to exclude them from field survey efforts.

Following the Morgan and Nugent (1999) protocol, as well as to comply with ODFW survey requirements, two phases of surveys were conducted to increase the likelihood of detecting the presence of the species within the WAGS Survey Area and prior to the species going into aestivation. The first phase of surveys occurred from April 19 through April 25, 2023. This survey phase corresponded with the time when juvenile squirrels emerge from the burrows and are most active; as a result, alarm calls are most frequent (Morgan and Nugent 1999). The second phase of surveys occurred from May 22 through May 26, 2023. Although these surveys followed the same methods as the first phase, there were slight differences to allow for greater likelihood of detection. These modifications included orienting the transects 90-degrees to the first phase transects and approaching a potential borrow perpendicular to that of the first phase.

WAGS colonies were identified either auditorily (vocalizations), visually (observation of an individual or signs of fresh activity) or by identifying droppings (scat) associated with burrows. For the purposes of the survey, colonies were defined as the observation of one or more of these three observation types along with burrows of the appropriate size and shape for the species (Morgan and Nugent 1999). If a colony was identified, a sub-meter Global Positioning System (GPS) unit was used to record the location of the activity center and the colony boundary. Detailed survey methodology is described in the AECOM (2023b) survey report included as Attachment Q-1.

3.2.2 Lawrence's Milkvetch Surveys

Surveys to categorize vegetation and habitat within a portion of the analysis area were conducted in April, May, and June 2023 (Exhibit P, Attachment P-1). Efforts to document the occurrence of Lawrence's milkvetch within the Biological Study Area took place during this period.

4.0 Occurrence and Potential Adverse Effects – OAR 345-021-0010(1)(q)(B)

> *OAR 345-021-0010(1)(q)(B) For each species identified under (A), a description of the nature, extent, locations and timing of its occurrence in the analysis area and how the facility might adversely affect it;*

4.1 Washington Ground Squirrels

WAGS are listed as a state endangered species under the Oregon Endangered Species Act (OESA). The desktop review identified five ORBIC (2023) records for WAGS within the analysis area (Figure Q-2). Of the five occurrences within the analysis area, two are considered historical records and three are considered verified extant (existing) by ORBIC.

Surveys conducted in April and May 2023 confirmed the presence of three active colonies within the WAGS Survey Area. The first confirmed colony consisted of multiple burrows in big sage shrubland and was detected west of Tower Road and north and west of the Carty Generating

Station, Unit 1 natural gas-fired power plant. The second confirmed colony consisted of several burrows as well and was detected along a dirt access road at the northeast corner of the WAGS Survey Area. The third confirmed colony consisted of one burrow and was detected in rubber rabbitbrush shrubland east of the Carty Reservoir; this colony may extend east outside the WAGS Survey Area. The three WAGS colonies that were active during 2023 surveys are shown on Figure Q-3 as Category 1 habitat.[2] Category 1 habitat includes active WAGS colonies and their associated 785-foot buffers in suitable habitat. Note that PGE also obtained 2023 WAGS survey data from The Nature Conservancy for land adjacent to the WAGS Survey Area. There was one WAGS colony located south of the WAGS Survey Area, which informs the Category 2 habitat categorization shown on Figure Q-3.

Potential adverse effects during construction and operation could result from vehicles and equipment causing injury or mortality to the species from collisions, particularly during the species' active aboveground season. Given that no construction or ground-disturbing activities would occur within Category 1 habitat associated with active colonies, the likelihood of vehicle collision is minimized.

Ground-disturbing activities that result in temporary and permanent loss and modification of unoccupied Category 2 habitat would cause decreased cover, decreased food availability, and reduce dispersal opportunities for WAGS. Category 2 WAGS habitat is identified as an additional 4,136-foot buffer of suitable ground squirrel habitat on Category 1 WAGS habitat, except where there are habitat barriers to dispersal. The fenced solar areas and associated temporary construction areas may pose a barrier to dispersal for WAGS. Although WAGS are likely to pass through or burrow under the perimeter fencing and utilize areas not occupied by permanent facilities, the presence of roads, solar modules, BESS, associated infrastructure and construction areas may cause WAGS to avoid the RFA 4 operational area altogether. Given the uncertainty of the functionality of habitat within the fenced areas and whether the fenced area would be a barrier to WAGS movement, all development within a fenced area is considered a permanent impact on habitat.

The temporary impacts (less than one year) to most Category 2 WAGS habitat will be minimal and short term due to the revegetation and noxious weed control measures described in the Amended Revegetation and Noxious Weed Control Plan (Exhibit P, Attachment P-2). Temporary impacts to Category 2 sagebrush habitat will take longer than five years to recover as described in Exhibit P. Table Q-2 quantifies temporary and permanent impacts on Category 2 WAGS habitat.

[2] Category 1 habitat is considered irreplaceable, limited, and essential habitat and includes WAGS burrow complexes and adjacent habitat for WAGS survival; therefore, PGE will avoid impacts to Category 1 habitat based on results of current surveys at the time of construction (Site Certificate Conditions 10.7 and 10.14).

Table Q-2. Temporary and Permanent Impacts on Category 2 WAGS Habitat

Habitat Type	Temporary Impacts (Acres)[1]	Permanent Impacts (Acres)[1]
Big Sage Shrubland	0.3	15.3
Big Sage/Juniper Woodland	0.1	7.8
Broom Snakeweed Shrubland	0.9	126.6
Rabbitbrush Shrubland	2.5	5.2
TOTAL	**3.8**	**154.9**
Note: numbers may not sum correctly due to rounding. "-" means no impact while <1 means greater than zero but less than 0.5 acres impact.		

WAGS within and adjacent to the Amended Site Boundary may experience slightly increased raptor predation pressure as a result of increased perching and nesting structures provided by the Amended Carty Solar Farm's 1-mile proposed aboveground collector line. However, this effect does not appear to be large enough to cause long-term effects resulting in abandonment of colonies as thriving colonies have been found adjacent to existing transmission lines (Tetra Tech 2011, 2014).

4.2 Lawrence's Milkvetch

Lawrence's milkvetch is listed as a state threatened species under OESA. The desktop review revealed that the range of the species overlaps north-central Oregon in Morrow, Umatilla, Gilliam, and Sherman counties. However, no ORBIC (2023) records for Lawrence's milkvetch were identified within the analysis area. Additionally, of the vegetation and habitat surveys conducted within the Biological Survey Area, only two milkvetch species were present: woolypod milkvetch (*Astragalus purshii*) and stalked-pod milkvetch (*Astragalus sclerocarpus*). Lawrence's milkvetch was not present during surveys based on flower and fruit morphology and is not known to currently occur within the analysis area; no potential adverse effects to this species are anticipated.

5.0 Avoidance and Minimization – OAR 345-021-0010(1)(q)(C)

OAR 345-021-0010(1)(q)(C) For each species identified under (A), a description of measures proposed by the applicant, if any, to avoid or reduce adverse impact;

5.1 Washington Ground Squirrels

The Council has imposed numerous Site Certificate conditions (Condition 10.7, 10.14, 10.15, 10.16, 10.17, 10.18, and 10.20) to avoid and minimize potential direct and indirect impacts to WAGS and their habitat. The Certificate Holder will implement measures to avoid or reduce adverse impact to WAGS in compliance with these Site Certificate conditions as described below.

Based on the results of the 2023 WAGS survey, PGE sited infrastructure proposed with RFA 4 primarily on moderately to highly disturbed habitat in a relatively developed landscape in order to

avoid active WAGS Category 1 habitat, consistent with Conditions 10.7 and 10.14. PGE also minimized impacts to Category 2 habitat where feasible.

The Certificate Holder will conduct pre-construction surveys at known WAGS colonies consistent with Conditions 10.7 and 10.14 and protocols approved by ODFW. The Certificate Holder will provide a written report of the surveys to ODOE and ODFW. Based on consultation with ODOE and ODFW, the Certificate Holder will implement appropriate measures to avoid impacts to WAGS and any Category 1 habitat.

During each year in which construction will occur, the boundaries of Category 1 WAGS habitat will be marked by a qualified professional biologist with high-visibility flagging or markers, consistent with Condition 10.14. Special emphasis will be placed on flagging areas where Category 1 WAGS buffers overlap existing roads to ensure no vehicles or construction equipment inadvertently travel off the roads and damage Category 1 habitat. No access road improvements or new access roads are proposed in Category 1 WAGS habitat. The Certificate Holder shall not begin construction until the identified boundaries of Category 1 WAGS habitat have been approved by ODOE.

Consistent with Condition 10.15, the Certificate Holder will enforce speed limits for personnel and contractors to minimize the risk of vehicle collisions with WAGS during construction and through operations and maintenance activities near Category 1 habitat. A speed limit of 20 miles per hour will be enforced throughout the CGS and, during the active squirrel season (February 1 to June 30), a speed limit of 10 miles per hour will be enforced from one hour before sunrise to one hour after sunset on private roads near known WAGS colonies. The Certificate Holder will ensure that all construction and operations personnel are instructed to watch out for and avoid WAGS and other wildlife while driving through CGS.

As described in Exhibit P and consistent with Condition 10.17, the Certificate Holder will provide environmental awareness training for all project personnel and construction contractors before such contractors or personnel enter the site to perform construction-related activities. The training program will discuss Washington ground squirrel issues as well as other environmental issues related to the Facility site, and include handouts with identification information and reporting procedures. Additional training sessions will be conducted as needed for personnel that start after the beginning of construction.

The Certificate Holder will immediately report to ODFW any new WAGS burrows that become established within 785 feet of the Amended Site Boundary (per Condition 10.20). If this occurs, the Certificate Holder will coordinate with ODFW to establish additional mitigation measures or to obtain an Incidental Take Permit, as appropriate.

5.2 Lawrence's Milkvetch

No state-listed plant species were observed within the Biological Survey Area, including Lawrence's milkvetch; thus, state-listed plants are not expected to be affected by the Amended Carty Solar Farm. However, PGE will comply with Condition 10.14 and use a qualified professional biologist to conduct a pre-construction survey for Lawrence's milkvetch within areas proposed for disturbance

during construction based on final design. This pre-construction survey will occur during the blooming season (May through August). If the species is found, the Certificate Holder will install protection flagging around the plant population and avoid any ground disturbance within this zone, and its location will be presented on construction constraint maps showing restricted work areas.

6.0 Protection and Conservation Program Compliance/Impacts – OAR 345-021-0010(1)(q)(D)

> *OAR 345-021-0010(1)(q)(D) For each plant species identified under (A), a description of how the proposed facility, including any mitigation measures, complies with the protection and conservation program, if any, that the Oregon Department of Agriculture has adopted under ORS 564.105(3);*

There are no plant species with the potential to occur within the analysis area for which ODA has adopted a protection and conservation program. As a result, the Amended Carty Solar Farm will not impact any of ODA's recovery efforts, nor will the Amended Carty Solar Farm cause a significant reduction in the likelihood of survival or recovery of plants with a protection or conservation program under ORS 564.105(3).

7.0 Potential Impacts to Plants, Including Mitigation Measures – OAR 345-021-0010(1)(q)(E)

> *OAR 345-021-0010(1)(q)(E) For each plant species identified under paragraph (A), if the Oregon Department of Agriculture has not adopted a protection and conservation program under ORS 564.105(3), a description of significant potential impacts of the proposed facility on the continued existence of the species and on the critical habitat of such species and evidence that the proposed facility, including any mitigation measures, is not likely to cause a significant reduction in the likelihood of survival or recovery of the species.*

No state-listed plant species are known to occur within the analysis area; therefore, the Amended Carty Solar Farm is not likely to cause a significant reduction in the likelihood of survival or recovery of any state listed or candidate plant species. However, the Certificate Holder will conduct pre-construction surveys for Lawrence's milkvetch as described in Section 5.2.

8.0 Potential Impacts to Animals, Including Mitigation Measures – OAR 345-021-0010(1)(q)(F)

> *OAR 345-021-0010(1)(q)(F) For each animal species identified under (A), a description of significant potential impacts of the proposed facility on the continued existence of such species*

and on the critical habitat of such species and evidence that the proposed facility, including any mitigation measures, is not likely to cause a significant reduction in the likelihood of survival or recovery of the species; and

The Certificate Holder will avoid impacts to WAGS colonies and associated Category 1 WAGS habitat identified during the 2023 field surveys, as well as any additional colonies identified prior to construction, as previously described in Section 5.1. Per Conditions 10.1, 10.2, and 10.3, Certificate Holder will consult with ODFW and ODOE to finalize the Amended Wildlife and Habitat Monitoring and Mitigation Plan (Exhibit P, Attachment P-3), including agreement on the total acreage of WAGS mitigation required. PGE will acquire the legal right to a habitat mitigation area where habitat enhancement actions and monitoring will take place to account for the mitigation needs for the temporary and permanent impacts on WAGS from the Amended Carty Solar Farm.

As a result, construction, operation, and maintenance of the Amended Carty Solar Farm is not expected to result in a significant reduction in the likelihood of survival or recovery of WAGS.

9.0 Monitoring – OAR 345-021-0010(1)(q)(G)

OAR 345-021-0010(1)(q)(G) The applicant's proposed monitoring program, if any, for impacts to threatened and endangered species.

The Certificate Holder will conduct pre-construction surveys to determine if the boundaries of WAGS colonies that were mapped during the 2023 surveys are still in the vicinity of the proposed disturbance for the Amended Carty Solar Farm. Consistent with Condition 10.14, these surveys will be conducted in the active squirrel season (February 1 to June 30) at least once every three years in suitable habitat until the beginning of construction. The surveys will encompass all areas of suitable habitat where permanent components will be located or where construction disturbance could occur. The Certificate Holder will provide written reports of the surveys to the ODOE and ODFW and will identify the boundaries of Category 1 WAGS habitat. In addition, the Certificate Holder will implement a WAGS post-construction monitoring program consistent with Condition 10.21 and as described in the Amended Wildlife and Habitat Monitoring and Mitigation Plan (Exhibit P, Attachment P-3). Monitoring will include returning to known colonies in the vicinity of Amended Carty Solar Farm impact areas to determine occupancy and the extent of each colony over time.

10.0 Conclusion

The Certificate Holder will comply with the following conditions related to threatened or endangered species from the Third Amended Site Certificate: Conditions 10.7, 10.14, 10.15, 10.16, 10.18, 10.20 and 10.21 (Council 2022). The Certificate Holder proposes revisions to Conditions 10.7, 10.14, and 10.15 to clarify requirements; this is intended as clarification and is not intended to materially change the original intent of the conditions (refer to Section 6.0 of the RFA 4's Division 27 document [Request for Amendment 4 for the Carty Generating Station]). Based on the

information provided above, the Council may conclude that the Amended Carty Solar Farm will not cause a significant reduction in the likelihood of survival or recovery of state-listed threatened or endangered plant and animal species and therefore meets the Threatened and Endangered Species standard under OAR 345-022-0070.

11.0 References

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Figures

(Figure Q-2 is Confidential and provided under separate cover)

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Carty Generating Station Request for Amendment 4

Figure Q-1 Analysis Area for Threatened and Endangered Species

MORROW COUNTY, OR

- Amended Site Boundary
- Analysis Area (5-mile Buffer)
- County Boundary
- State Highway
- Local Roads
- Biological Study Area
- WAGS Study Area (1,000 foot Offset from Study Area)

Tower Rd

Carty Reservoir

74

Gilliam County

Morrow County

TETRA TECH

PGE

Reference Map

1:85,000

WGS 1984 UTM Zone 11N

0 1 2 4 6 8 Miles

NOT FOR CONSTRUCTION

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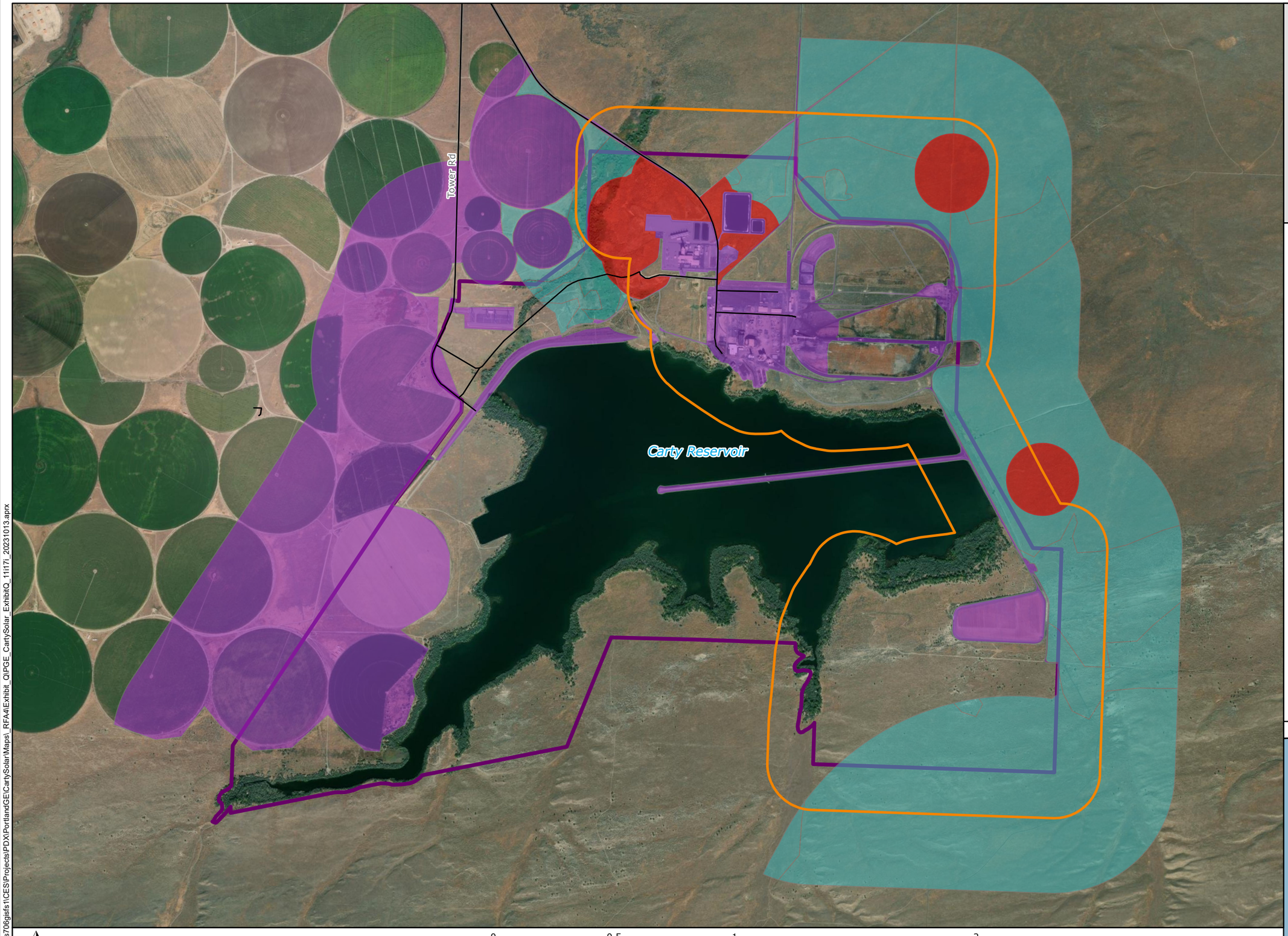
Carty Generating Station Request for Amendment 4

Figure Q-3 Washington Ground Squirrel Colonies Observed During 2023 Surveys

MORROW COUNTY, OR

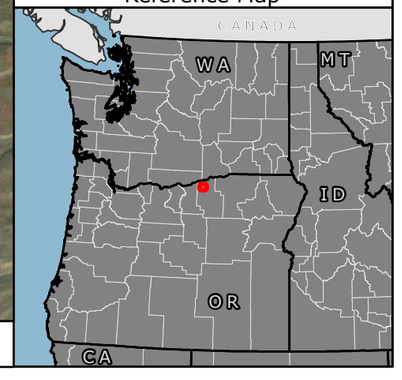


- Amended Site Boundary
- Local Roads
- WAGS Study Area (1,000 foot Offset from Study Area)
- Category 1 Habitat Buffer (785 feet) around WAGS Colonies
- Category 2 Habitat Buffer (1,500 meter) around WAGS Colonies
- Category 6 Habitat

TETRA TECH

PGE

Reference Map



1:24,000

WGS 1984 UTM Zone 11N

0 0.5 1 2 Miles

NOT FOR CONSTRUCTION

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Attachment Q-1. Washington Ground Squirrel Survey Report (November 2023)

(Confidential and provided under separate cover)

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Exhibit R

Scenic and Aesthetic Values

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Acronyms and Abbreviations

AC	alternating current
ASC	Application for Site Certificate
BCP	Boardman Coal Plant
BESS	battery energy storage system
BLM	Bureau of Land Management
CCP	Comprehensive Conservation Plan
Certificate Holder / PGE	Portland General Electric Company
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
kV	kilovolt
MW	megawatt
NPS	National Park Service
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
ONHT	Oregon National Historic Trail
RFA	Request for Amendment
TNC	The Nature Conservancy
USFWS	U.S. Fish and Wildlife Service
ZVI	zone of visual influence

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1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

Exhibit R provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(r)(A)(B) in support of RFA 4. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate (ASC), previous RFAs, and Oregon Department of Energy (ODOE) Final Orders to demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate Conditions and the approval standard in OAR 345-022-0080.

The Oregon Energy Facility Siting Council (Council) previously found in the Final Order on RFA 1 that the Carty Solar Farm would comply with the Council's Scenic Resources standard.[1] The Council reaffirmed that the Carty Solar Farm would comply with the Council's Scenic Resources standard in the Final Order on RFA 3.[2]

2.0 Analysis Area

In accordance with OAR 345-001-0010(35)(b), the analysis area for scenic resources is the area within and extending 10 miles from the Amended Site Boundary (Figure R-1). The Amended Site

[1] Final Order on Request for Amendment 1 to the Site Certificate for the Carty Generating Station, p. 106 (December 2018).
[2] Final Order on Request for Amendment 3, p. 59 (July 2022).

Boundary is defined in detail in Section 4.1.1.2 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station). The Amended Site Boundary used for analysis in RFA 4 is almost identical to the Approved Site Boundary. The proposed modifications to the Approved Site Boundary as described in Section 4.1 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station) do not result in an expansion of the Approved Site Boundary's outer limits, and in fact retract the site boundary in the northeast corner.

3.0 Identification of Significant or Important Scenic Resources – OAR 345-021-0010(1)(r)(A)(B)

OAR 345-021-0010(1)(r) An analysis of potential visual impacts of the proposed facility, if any, on significant or important scenic resources within the analysis area, providing evidence to support a finding by the Council under OAR 345-022-0080, including:

OAR 345-021-0010(1)(r)(A) An inventory of the scenic resources identified as significant or important in a land use management plan adopted by one or more local, tribal, state, or federal government or agency applicable to lands within the analysis area for scenic resources. The applicant must provide a list of the land management plans reviewed in developing the inventory and a copy of the relevant portion of the plans;

OAR 345-021-0010(1)(r)(B) A map or maps showing the location of the scenic resources described under paragraph (A). in relation to the site of the proposed facility;

This section inventories scenic resources identified as significant or important in local, state, Tribal, and federal land use plans within the analysis area, as required to demonstrate compliance with the approval standard in OAR 345-022-0080. As previously approved by the Council in previous RFAs, the 10-mile analysis area includes parts of two Oregon counties (Morrow and Gilliam), one Oregon municipality (Boardman), state land administered by the Oregon Department of Fish and Wildlife (ODFW), highway right-of-way administered by the Oregon Department of Transportation (ODOT), the Oregon National Historic Trail (ONHT) managed by the National Park Service (NPS), and federal land administered by the Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (USFWS).

Table R-1 provides an inventory of the scenic resources identified by land management plans within the analysis area and indicates the proximity and viewing direction of each scenic resource relative to the Amended Site Boundary. Figure R-1 shows the scenic resources.

The Certificate Holder did not identify new land use management plans that were not previously evaluated for the Facility. Corresponding with the analysis area in RFA 3, the Certificate Holder evaluated eight land use management plans listed in Table R-1 to determine whether scenic resources were identified as significant or important. See Attachment R-1 for excerpts of the relevant plans that were reviewed for scenic resources.

Table R-1. Important Scenic Resources Inventory

Jurisdiction	Plan	Scenic Resources Specified in Plan	Important or Significant Scenic Resources Identified in Analysis Area	Name of Scenic Resource(s) in Analysis Area	Scenic Resource Description	Distance from Amended Site Boundary (miles)	Direction from Amended Site Boundary
Counties							
Gilliam County	Gilliam County Comprehensive Plan (Gilliam County 2022), updated from 2017	Portions of the John Day River classified as Scenic or Natural River areas	None identified in analysis area	N/A	N/A	N/A	N/A
Morrow County	Morrow County Comprehensive Plan (Morrow County 2019), updated from 2013	None identified	N/A	N/A	N/A	N/A	N/A
Incorporated Cities and Towns							
City of Boardman	City of Boardman Comprehensive Plan (City of Boardman 2003), not updated since submission of RFA 3	None identified	N/A	N/A	N/A	N/A	N/A
State							
Oregon Department of Transportation (ODOT)	Oregon Highway Plan (ODOT 2023), updated from 2015	Six National Scenic Byways, nine Oregon State Scenic Byways, and ten Oregon Tour Routes	A small portion of Blue Mountain Scenic Byway traverses the western side of the analysis area	Blue Mountain Scenic Byway	Passes Oregon National Historic Trail and winds through rolling fields and hillsides	5	West
Oregon Department of Fish and Wildlife (ODFW)	Columbia Basin Wildlife Area Management Plan (ODFW 2021), updated from 2008	None identified, scenic resources not addressed in plan	N/A	N/A	N/A	N/A	N/A
Federal							
Bureau of Land Management (BLM)	John Day Basin Resource Record of Decision and Resource Management Plan (BLM 2015), not updated since submission of RFA 3	Segments of the John Day River as Scenic River.	N/A	N/A	N/A	N/A	N/A
National Park Service (NPS)	Oregon Trail Comprehensive Management and Use Plan (NPS 1999), not updated since submission of RFA 3	The Oregon National Historic Trail was one of the main overland migration routes on the North American continent, leading from locations on the Missouri River to the Oregon Country. A "high-potential" historic trail segment has been identified, extending from the eastern boundary of the Boardman Bombing Range westward to Immigrant Road. The Well Springs Interpretive Site is associated with this segment of the trail as a "high-potential" historic site. Additionally, the Fourmile Canyon Interpretive Site (also a high-potential historic site) is located southwest, within the analysis area. None of the above are specifically identified as scenic resources.	Oregon National Historic Trail traverses the southcentral portion of the analysis area. Not specifically identified as a scenic resource.	N/A	N/A	2.1	South

Table R-1. Important Scenic Resources Inventory

Jurisdiction	Plan	Scenic Resources Specified in Plan	Important or Significant Scenic Resources Identified in Analysis Area	Name of Scenic Resource(s) in Analysis Area	Scenic Resource Description	Distance from Amended Site Boundary (miles)	Direction from Amended Site Boundary
U.S. Fish and Wildlife Service (USFWS)	Umatilla National Wildlife Refuge Comprehensive Conservation Plan (USFWS 2008), not updated since submission of RFA 3	None identified, scenic resources not addressed in plan	N/A	N/A	N/A	N/A	N/A

3.1 Counties

3.1.1 Gilliam County

Amendments to the Gilliam County Comprehensive Plan (Gilliam County 2022) and/or the Gilliam County Zoning and Land Development Ordinance are made in accordance with periodic review requirements set forth by ORS 197.640. Amendments to the Gilliam County Comprehensive Plan since the Final Order on RFA 3 can be found on the Gilliam County website.[3]

The only specific scenic resources identified in the most current version of the Gilliam County Comprehensive Plan are portions of the John Day River, none of which are within the Facility analysis area.

3.1.2 Morrow County

The Morrow County Comprehensive Plan (Morrow County 2019) was reviewed for designated resources or sites. In the Natural Resources Element, under the heading "Scenic Views; Sites" is the statement, "Addressed in plan (p. 69) but none identified." No information on scenic views or sites is found in the indicated location. In the Goal 5 Resources section of the plan is the statement, "Morrow County contains a variety of landscapes, many of which may be considered to be scenic. The County has not, however, designated any sites or areas as being particularly high in scenic-resources value." Therefore, the Morrow County Comprehensive Plan does not identify any scenic resource of value for inclusion in this exhibit.

3.2 Municipalities

3.2.1 City of Boardman

The Boardman Comprehensive Plan (City of Boardman 2003) has not changed or been amended since it was evaluated in the Final Order on RFA 3. This plan does not identify specific scenic resources as significant or important.

3.3 State

3.3.1 Oregon Department of Transportation

The 1999 Oregon Highway Plan (ODOT 2023) includes amendments through January 2023. The January 2023 amendment involved updating Goal 6 of the plan in its entirety. This amendment to Goal 6 (Tolling and Congestion Pricing Policy Amendment) addresses the implementation of road pricing on the Oregon interstate system. No new scenic resources are identified in the 2023 plan

[3] Gilliam County 2023
https://www.co.gilliam.or.us/government/planning_department/public_hearing_documents/index.php

amendment. As summarized in Table R-1, the 1999 Oregon Highway Plan identifies six National Scenic Byways, nine Oregon State Scenic Byways, and 10 Oregon Tour Routes. A small portion of Blue Mountain Scenic Byway traverses the western side of the analysis area. This 145-mile route stretches from the Willow Creek intersection of Interstate 84 and State Highway 74 through Ione, Lexington and Heppner. From Heppner the byway travels south along Willow Creek Road until it exits Morrow County into Umatilla County in the Umatilla National Forest. The byway passes through ranching communities up into the forests and wilderness areas of the Blue Mountains.

A specified action of the 1999 Oregon Highway Plan is to develop management priorities for scenic byways in management plans and corridor plans. ODOT does not currently have a management plan for the Blue Mountain Scenic Byway.[4]

3.3.2 Oregon Department of Fish and Wildlife

The Columbia Basin Wildlife Area Management Plan (ODFW 2021) was updated in 2021. The management plan guides the management of Columbia Basin Wildlife Areas, focused on maintaining and enhancing key habitats and providing significant wildlife-oriented public use. The nearest Columbia Basin Wildlife Area is the Willow Creek Wildlife Area, located at the outer edge of the analysis area. The goals, objectives, and strategies (implementation actions) described in the 2021 plan are focused on maintaining and enhancing key habitats and providing significant wildlife-oriented public use, and do not identify specific scenic resources as significant or important.

3.4 Federal Lands

3.4.1 Bureau of Land Management

The John Day Basin Resource Management Plan (BLM 2015) provides management for approximately 456,600 acres of BLM-administered public land dispersed throughout eight counties in central and eastern Oregon. The management plan identifies segments of the John Day River as a Wild and Scenic River. However, the John Day Basin Resource Management Plan Area is located outside of the analysis area. This plan has not changed or been amended since it was evaluated in the Final Order on RFA 3.

3.4.2 National Park Service

The focus of the Oregon Trail Comprehensive Management and Use Plan (NPS 1999) is to identify, preserve, and interpret the sites, route, and history of the ONHT for all people to experience and understand. The Oregon Trail Comprehensive Management and Use Plan identifies a 12-mile

[4] ODOT, Scenic Byway Management Plan Library, https://www.oregon.gov/odot/Programs/Pages/Scenic-Byway-Management-Plan-Library.aspx, 2023.

Boardman segment of the ONHT in Morrow County as a high-potential historic segment.[5] This trail segment extends from the eastern edge of the Boardman Bombing Range (Figure R-1) in a southwest direction to Immigrant Road and then parallels the road to the western edge of the bombing range and continues to the west. The Oregon Trail Comprehensive Management and Use Plan also identifies the Boardman segment as inclusive of the Oregon Trail Well Springs Interpretive Site, which is a high-potential historic site.[6] Additionally, the Fourmile Canyon Interpretive Site, also a high-potential historic site, is located within the analysis area but not within the Boardman high-potential historic segment of the ONHT.

The ONHT is managed to maintain historic value (i.e., view of visible trail remnants and ruts, along with the immediate surroundings), rather than scenic qualities; there is no management direction for preservation of views or scenic quality related to the lands on which this segment and historic sites of the ONHT are located (NPS 1999). This plan has not changed or been amended since it was evaluated in the Final Order on RFA 3.

3.4.3 U.S. Fish and Wildlife Service

The Umatilla National Wildlife Refuge Comprehensive Conservation Plan (CCP; USFWS 2008) for the Umatilla National Wildlife Refuge sets forth management guidance for improving the refuge's shrub-steppe, riparian, wetland, and cliff-talus habitats, for the long-term conservation of native plants and animals and migratory birds. The plan does not identify any specific scenic resources. The Umatilla National Wildlife Refuge is located approximately 9.1 miles north of the Amended Site Boundary. This plan has not changed or been amended since it was evaluated in the Final Order on RFA 3, and it does not identify specific scenic resources as significant or important.

4.0 Methods – *OAR 345-021-0010(1)(r)(C)*

Existing Visual Character within the Analysis Area

Since the Final Order on RFA 1 was issued, there has been one change in conditions within the Facility: the demolition of the Boardman Coal Plant (BCP). Commercial operation of the coal plant ceased in October 2020 and demolition was completed at the end of 2023. The Northern Solar Area, battery energy storage system (BESS), and collector substation are all proposed in former BCP areas. Other Facility conditions have not changed. The Facility includes numerous existing

[5] High-potential 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 sites are specific locations with similar attributes. The ONHT is managed to maintain historic value (i.e., view of visible trail remnants and ruts, along with the immediate surroundings), rather than scenic qualities. See Section 4.4.2.1 of the Oregon Trail Comprehensive Management Plan for additional background on this management July 18, 2022, designation.

[6] Note that the Oregon Trail Wells Spring Interpretive Site and Fourmile Canyon Interpretive Site are part of the ONHT, and thus they are analyzed together. The interpretive sites were not considered in previous amendments of the Facility but are included for the purposes of this updated analysis.

aboveground transmission lines including the existing 500-kilovolt (kV) transmission line and dead-end structure where the proposed collector substation will connect. Other existing transmission lines that support the Facility include the 500-kV Grassland to Slatt transmission line (approximately 17 miles long) and 230-kV BCP to Dalreed transmission line (approximately 16 miles long). In addition, the CGS Unit 1 was constructed and placed into service in 2016. Unit 1 is located directly adjacent to the Northern Solar Area, BESS, and proposed collector substation. Adjacent lands outside the Facility continue under habitat conservation to the north, east, and south, and farm use to the west. The Boardman Bombing Range is also located further north and east.

OAR 345-021-0010(1)(r)(C) A description of the methodology the applicant used to identify and assess potential visual impacts to the scenic resources identified in paragraph (A);

The potential for visual impacts from the Facility as amended by RFA 4 are primarily related to the components that will be the most prominent in terms of size and scale. The two most prominent components in terms of height off the ground and overall surface area include the Northern and Southern solar areas, and the 1-mile segment of aboveground 34.5-kV collector line proposed along the eastern shore of the Carty Reservoir. Thus, these two components were the main focus of the visual impact assessment.

A zone of visual influence (ZVI) analysis, also known as a viewshed analysis, was performed using Esri geographic information system software and a bare-earth 30-meter digital elevation model to identify those areas from which the Northern and Southern solar areas and the 1-mile segment of aboveground 34.5-kilovolt (kV) collector line might be visible (Figures R-2 and R-3). The ZVI analysis assumed a maximum height of 12 feet for the solar modules and a maximum height of 70 feet for the aboveground collector line. All other components proposed with RFA 4 were deemed less visually impactful (due to height, being dispersed throughout the Amended Site Boundary, or adjacent to taller infrastructure, etc.) and addressed by the assessment of the solar areas and aboveground collector line. A typical viewing height of 1.8 meters (6 feet) was assumed. Visibility of the two components was defined by visible or not visible, indicated by color coding (see Figures R-2 and R-3), and by proximity, i.e., foreground (less than 0.5 mile), middleground (0.5 to 5 miles), or background distances (more than 5 miles).

It should be noted that this bare-earth modeling approach (based only on the effects of terrain on visibility) results in a highly conservative assessment of potential visibility for several reasons. First, a bare-earth analysis does not take into account the effects of vegetation or buildings, which will in practice block or screen views in some places. Finally, the model does not account for distance, lighting, weather, and atmospheric attenuation factors that diminish visibility under actual field conditions.

The solar modules will be the most visible components within the solar areas and will consist of solar module strings, the vast majority of which will be mounted on single-axis tracker systems. The visibility of the solar modules within the solar areas will depend primarily on topographic or other view obstructions and the distance from the viewer to the solar areas. With a maximum height of 12 feet to the top edge of the solar module when fully tilted, the modules will not be visible from sites

lower in elevation than the area on which the solar modules are constructed. From sites that are similar in elevation to the solar modules, viewers will see only a line on the horizon and not individual solar panels. Depending on the viewing distance, viewers at sites higher in elevation may have views of the modules, especially if the view direction is toward the angle at which the module is tilted toward the sun. To the extent practicable, reflectivity of solar modules will be minimized. Antireflective coating will be used to reduce glare, and the surface of the modules will have high transmittance to increase the amount of light reaching the photovoltaic cells. With these methods, the modules will be less reflective than a natural water body or a coated glass surface that is not antireflective.

5.0 Impact Assessment – OAR 345-021-0010(1)(r)(D)(E)

OAR 345-021-0010(1)(r)(D) Identification of potential visual impacts to the scenic resources identified in paragraph (A), including, but not limited to:

(i) Loss of vegetation or alteration of the landscape as a result of construction or operation;

(ii) Visual impacts of facility structures or plumes, including but not limited to, changes in landscape character or quality; and

(iii) Loss of visibility due to air emissions or other pollution resulting from the construction or operation of the proposed facility;

OAR 345-021-0010(1)(r)(E) An assessment of the significance of the visual impacts described under paragraph (D);

The analysis area for RFA 4 incorporates the same jurisdictions and land management plans identified and evaluated previously for the Facility. Only four of the previously evaluated land use management plans have been amended or changed since the Certificate Holder's submission of RFA 3; however, none of these plans included identification of new scenic resources. Accordingly, no new resources are identified or discussed as a result of RFA 4.

The Council previously found that the Blue Mountain Scenic Byway is not identified in a land use plan as a significant or important scenic resource, and not specifically managed for its scenic qualities.[7] Therefore, the Council determined it did not need to make findings related to potential significant adverse impacts to this resource as it was not protected under Council's Scenic Resources standard. However, the Certificate Holder included an analysis of potential visual impacts on the scenic byway as part of the ZVI modeling. The Blue Mountain Scenic Byway lies about 5 miles west of the Amended Site Boundary at its closest point. Based on the results of the ZVI analysis, the amended Facility would not be visible from the Blue Mountain Scenic Byway (see Figures R-2 and R-3).

[7] Final Order on Request for Amendment 1, p. 105 (December 2018).

As noted above, "high-potential segments" of the ONHT are those that may have "greater than average scenic values." However, the Boardman segment of the ONHT and the associated Well Springs Interpretive Site, as well as the Fourmile Canyon Interpretive Site, do not have a specific management plan for scenic resources or values and, as such, the Council did not need to make findings related to potential significant adverse impacts from the Facility on the ONHT resources as they are not protected under the Council's Scenic Resources standard.[8] Nonetheless, the Certificate Holder provided an assessment of potential visual impacts to these resources for the changes proposed with RFA 4. Since neither of these resources are addressed by new management plans and the existing plans have not been altered in their analysis of these resources, the Certificate Holder takes the same position that neither are protected under the Scenic Resources standard. However, an updated analysis for RFA 4 is still provided below for them collectively.

5.1 Loss of Vegetation

The changes proposed to the Facility with RFA 4 will result in temporary and permanent vegetation loss. Temporary vegetation loss will be restored through the Certificate Holder's implementation of a final Revegetation and Noxious Weed Control Plan, to be reviewed and approved by ODOE prior to construction, in accordance with Site Certificate Condition 5.5. The operation of the amended Facility will result in permanent vegetation loss from the footprint of the proposed components. Of the resources identified, the Boardman segment of the ONHT is the closest to the Amended Site Boundary, at 2.1 miles. Based on this distance, visibility of temporary and permanent vegetation loss is not expected. There are no changes in fact or law since the Final Order on RFA 3 that would change those findings.

5.2 Facility Structures

The 12-mile Boardman segment of the ONHT extends from the eastern edge of the Boardman Bombing Range (Figure R-1) in a southwest direction to Immigrant Road and then parallels the road to the western edge of the bombing range and continues to the west. 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 Springs Interpretive Site. The remainder of the high-potential historic segment is on private lands to the west of the Bombing Range (most of which is managed by The Nature Conservancy [TNC] as part of the Boardman Conservation Area and Boardman Research Natural Area) and is also not open to the public (Kelly Wallis, TNC, pers. comm., July 18, 2022; see Exhibit L and Attachment L-1). The Fourmile Canyon Interpretive Site is located on public (BLM) and private land over nine miles southwest of the Amended Site Boundary, and is thus mostly accessible to the public.

RFA 4 does not propose to alter the southern portion of the Approved Site Boundary, nearest the ONHT, Well Springs Interpretive Site, and Fourmile Canyon Interpretive Site. The proposed changes to the Amended Site Boundary occur in the northeast corner of the Facility. The ONHT lies at a middleground distance of approximately 2.1 miles from the nearest segment of the Amended Site

[8] Final Order on Request for Amendment 1, p. 105 (July 2018).

Boundary. The nearest solar modules in the Southern Solar Area and the nearest point of the aboveground collector line are at middleground distances of at least 2.1 and 3.1 miles, respectively. Where visible, the nearest solar area will introduce dark gray color, geometric shapes, and horizontal lines into the landscape setting; however, at this viewing distance, the shapes and lines and any contrast to the existing landscape would be difficult to distinguish. Based on the results of the ZVI analysis, potential visibility of the solar areas and aboveground collector line would be intermittent from the ONHT.

The overall visual impact from the solar areas and aboveground collector line on the ONHT would be negligible. The ZVI analysis demonstrates only intermittent visibility along the high-potential ONHT segment and no visibility from the Well Springs Interpretive Site or Fourmile Canyon Interpretive Site. In addition, access to the trail where it is south of the Facility is extremely limited and the existing viewshed contains wind turbines, numerous aboveground transmission lines, and other industrial infrastructure. The high-potential ONHT segment within the Boardman Bombing Range is not accessible to the public. Potential visibility occurs intermittently along ONHT segments west of the Bombing Range, located on private lands, which are also not accessible to the general public.

The ONHT is managed to maintain historic value (i.e., view of visible trail remnants and ruts, along with the immediate surroundings), rather than scenic qualities; as noted in Section 3.4.2, there is no management direction for preservation of views or scenic quality related to the lands on which the 12-mile Boardman segment (inclusive of the Well Springs Interpretive Site) and the Fourmile Canyon Interpretive Site of the ONHT in Morrow County are located (NPS 1999). Although the relatively undeveloped viewshed is said to provide an experience that enables visitors to relate to the emigrants, the viewshed is no longer in the nearly pristine condition that it was during the emigrants' time. Existing roads are visible, much of the landscape is farmed and fenced, little of the tallgrass native prairie remains, and existing wind turbines and transmission lines from other projects are visible to the northwest, west, southwest, and southeast.

5.3 Plumes and Air Emissions

As a renewable energy resource, the changes proposed with RFA 4 will not generate any significant plumes or air emissions with the potential to result in significant visual impacts. Potential visual impacts due to dust created during construction will be largely prevented by following best management practices for erosion and sediment control as described in Exhibit I.

5.4 Conclusion

The Council also previously imposed Site Certificate Condition 5.5, as well as Conditions 6.12 through 6.14 which include measures to reduce potential visual impacts from construction equipment, to paint facility buildings and structures with low-reflectivity neutral colors to blend with the surrounding landscape, and to limit nighttime lighting. RFA 4 does not change the ability of the Certificate Holder to comply with the existing Site Certificate conditions imposed to reduce potential visual impacts.

Therefore, the Council may conclude that the Facility, as amended by RFA 4, will continue to comply with OAR 345-022-0080.

6.0 Avoidance and Mitigation – OAR 345-021-0010(1)(r)(F)

OAR 345-021-0010(1)(r)(F) A description of the measures the applicant proposes to avoid, reduce or otherwise mitigate any potential significant adverse visual impacts;

The changes proposed to the Facility with RFA 4 will have no significant adverse impacts on identified scenic resources. Therefore, no additional measures would be necessary to avoid or minimize impacts.

7.0 Monitoring – OAR 345-021-0010(1)(r)(F)

OAR 345-021-0010(1)(r)(G) The applicant's proposed monitoring program, if any, for impacts to scenic resources.

No significant adverse impacts will occur to identified scenic resources; therefore, the Certificate Holder does not propose a monitoring program.

8.0 References

BLM (Bureau of Land Management). 2015. John Day Basin Record of Decision and Resource Management Plan. Prineville District. https://www.blm.gov/sites/blm.gov/files/pdo_rodrrmp_John_Day_Basin_ROD-RMP_06102015.pdf. Accessed September 2023.

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Figures

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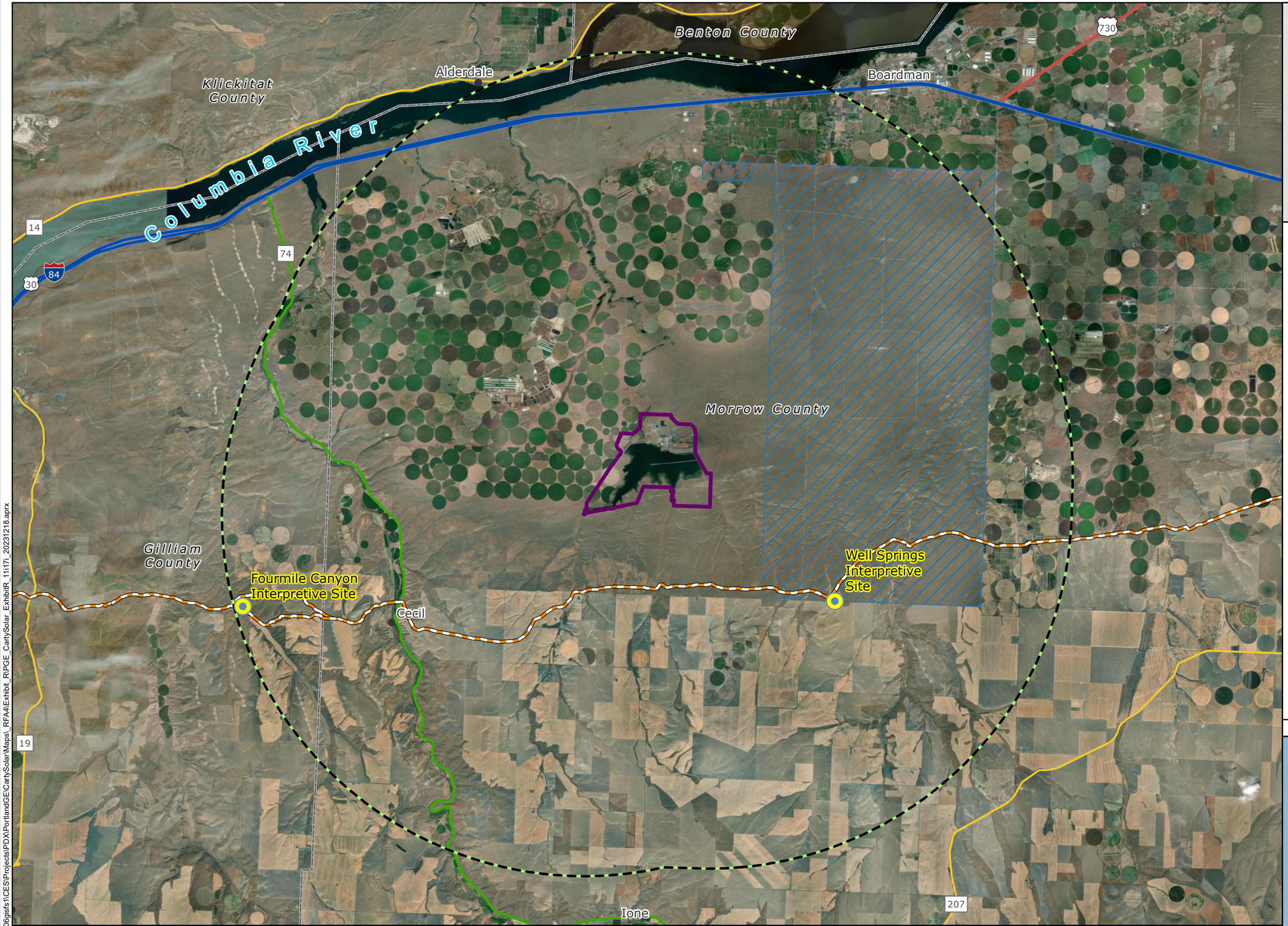
Carty Generating Station Request for Amendment 4

Figure R-1
Scenic Resources

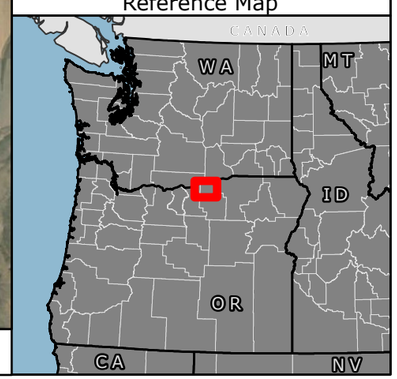
MORROW COUNTY, OR



- Amended Site Boundary
- Analysis Area (10-mile Buffer)
- Boardman Naval Bombing Range
- City/Town
- County Boundary
- Interstate Highway
- US Highway
- State Highway
- National Register Historic Place
- Oregon Trail
- Oregon State Scenic Byway

TETRA TECH PGE

Reference Map



1:160,000 WGS 1984 UTM Zone 11N 0 2 4 8 12 16 Miles

NOT FOR CONSTRUCTION

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Carty Generating Station Request for Amendment 4

Figure R-2
Zone of Visual Influence for Solar Areas

MORROW COUNTY, OR

Benton County
Klickitat County
Alderdale
Boardman
730
Columbia River
14
84
30
74
Morrow County
Gilliam County
Fourmile Canyon Interpretive Site
Cecil
Well Springs Interpretive Site
19
207
Ione

- Amended Site Boundary
- Analysis Area (10-mile Buffer)
- Boardman Naval Bombing Range
- Proposed Solar Areas Fence Line
- City/Town
- County Boundary
- Interstate Highway
- US Highway
- State Highway
- National Register Historic Place
- Oregon Trail
- Oregon State Scenic Byway

Viewshed Results*

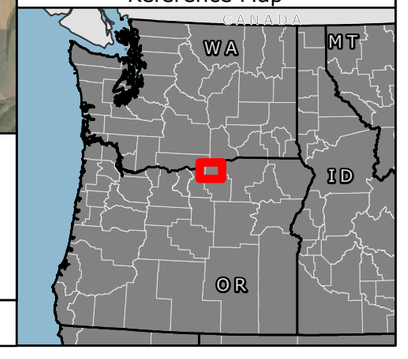
- Solar Areas Line Not Visible
- Solar Areas Potentially Visible

*Potential solar array visibility calculated using a 30 meter bare-earth digital elevation model with array heights of 12 feet (3.66 meters)and a viewing height of 6 feet (1.8 meters).

TETRA TECH

PGE

Reference Map



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WGS 1984 UTM Zone 11N

0 2 4 8 12 16 Miles

NOT FOR CONSTRUCTION

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Carty Generating Station Request for Amendment 4

Figure R-3
Zone of Visual Influence for Aboveground 34.5kV Collector Line

MORROW COUNTY, OR

Klickitat County
Benton County
Alderdale
Boardman
Columbia River
Morrow County
Gilliam County
Fourmile Canyon Interpretive Site
Cecil
Well Springs Interpretive Site
Ione
14
84
30
74
730
19
207

- Amended Site Boundary
- Analysis Area (10-mile Buffer)
- Boardman Naval Bombing Range
- Proposed Aboveground 34.5kV Collector Line
- City/Town
- County Boundary
- Interstate Highway
- US Highway
- State Highway
- County Highway
- National Register Historic Place
- Oregon Trail
- Oregon State Scenic Byway

Viewshed Results*

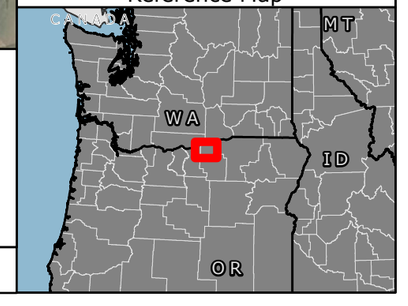
- Aboveground Collector Line Not Visible
- Aboveground Collector Line Potentially Visible

*Potential Aboveground 34.5kV Collector Line visibility calculated using a 30 meter bare-earth digital elevation model with collector line heights of 70 feet (21.34 meters)and a viewing height of 6 feet (1.8 meters).

TETRA TECH

PGE

Reference Map



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WGS 1984 UTM Zone 11N

0 2 4 8 12 16 Miles

NOT FOR CONSTRUCTION

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Attachment R-1. Land Use Management Plan Excerpts

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Gilliam County

GOAL 5: NATURAL RESOURCES, SCENIC AND HISTORIC AREAS, AND OPEN SPACES

Goal: To conserve open space and protect natural and scenic resources.

Statewide planning Goal 5 requires the county to inventory the following resources:

1. Riparian corridors, including water and riparian areas and fish habitat;
2. Wetlands;
3. Wildlife Habitat (including bird sites);
4. Federal Wild and Scenic Rivers;
5. State Scenic Waterways;
6. Groundwater resources;
7. Approved Oregon Recreation Trails;
8. Natural Areas;
9. Wilderness Areas;
10. Mineral and Aggregate Resources;
11. Energy sources;
12. Cultural areas.

Counties are also encouraged to maintain current inventories of historic resources, open space, and scenic views and sites.

The policies adopted in this Comprehensive Plan focus on issues related to the conservation of open space and natural and scenic resources. They are intended to comply with statewide planning goals and guidelines concerning Open Spaces, Scenic and Historic Areas, and Natural Resources (Goal 5).

FINDINGS

1. Open space is characteristic of Gilliam County, and no effort exclusively directed toward acquisition of additional open space is necessary. As provided in this Comprehensive Plan, stream beds, drainage ways and proven landslide areas generally will be maintained in a open state as a matter of prudent development practice.

2. 1985 Atlas of Oregon Lakes: No Lakes are identified in Gilliam County

3. The rock outcroppings marking the rim and walls of steep canyon slopes are an important characteristic of the County's landscape.

4. The entire Columbia River waterfront, including related fish and wildlife habitat, is within the jurisdiction of the United States Army Corps of Engineers; the Corps has prepared and adopted a plan for the development of the river shore land, which plan encompasses

preservation of fish and wildlife habitat and the development of water-oriented park and recreation facilities.

5. In the matter of fishery resources, the Gilliam County area is reported (John Day River Basin Plan of 1986-SWR) as serving primarily as a migration corridor for anadromous fish using more upstream areas of the subject River Basin. The majority of habitat in the Gilliam County area is reported as only marginally productive for anadromous fish, with the most productive steelhead streams being Rock Creek and Thirty Mile Creek. Other fishery resources reported within the County include a small fall Chinook run and limited cold-water and warm-water resident fish populations. Rehabilitation work in potentially productive Rock Creek and Thirty Mile Creek and tributaries are noted as a need to improve fishery resources

6. The Oregon Department of Fish and Wildlife has recommended development of a number of access sites on the John Day River. The commission also has established two wildlife areas; one at the mouth of Willow Creek and the other consisting of that portion of the John Day River from the mouth of Thirty-Mile Creek to the Columbia River.

7. There are no inventoried wetlands within the County.

8. Hunting for deer and upland game birds area also noted as popular activities; relative thereto, the Oregon Department of Fish & Wildlife (ODFW) has identified areas for Big Game Winter Habitat and Upland – Waterfowl Habitat. Maps of these areas were set forth in the 1977 Plan.

9. Portions of the John Day River from the Wheeler County line to Tumwater Falls have been classified as Scenic or Natural River areas by the State of Oregon under provisions of ORS 390.805 through 390.925. Also, within this area of the John Day River, from the mouth up river for about 84 miles to Thirty Mile Creek, is the John Day State Wildlife Refuge which provides a resting area for ducks and geese and provides habitat for various raptor species and other wildlife. Land uses, including structures, are regulated within this area by the provisions of the Scenic Waterway designation. No additional regulations on behalf of the County are deemed necessary.

    A) The State Scenic Waterway designation applicable to this area of the County was enacted by ORS 390.825 (6) and the authority for the regulation of uses within said area is vested with the State Department of Transportation by ORS 390.845. Pursuant to ORS 390.845, said state agency has adopted and enforces regulations governing all uses within said area; said regulations set forth in OAR Chapter 736, Division 40. Said regulations are intended fully to protect and enhance those values which caused such scenic waterway area to be so designated; i.e. esthetic, scenic, fish & wildlife, scientific and recreation features. The adequacy of such regulations to fully protect the subject resource is attested to in the 1979 Wild and Scenic River Report & Environmental Assessment for the subject area as conducted by the

National Park Service. In compliance with OAR 660-16-005 and 660-16-010, said NPS Report and Environmental Assessment is hereby adopted by reference as though set forth in full herein, and is concluded to fully comply the County's responsibilities relative to inventory requirements, Goal 5 process requirements, identification of conflicting uses, ESEE analysis requirements, and resource protection requirements. The NPS Report for the Natural & Scenic River areas complies with Goal 5 because no new structures or improvements which are visible from the river, other than those erected and made in connection with agricultural uses, or those needed for public recreation or resource protection will be permitted. Additional dwellings and commercial public service facilities, including resorts and motels, lodges and trailer parks, which are visible from the river, will not be permitted.

B) Natural River Area. The segment of the scenic waterway beginning at the intersection of West to East Centerline of Section Fife (5), Township Five South, Range Nineteen East of the Willamette meridian (T 5S, R 19E, W.M.), Sherman County, extended easterly from the center of said section to its intersection with the John Day River, near the mouth of Thirty mile Creek; thence downstream approximately 31 miles to the North Boundary of the Southwest Quarter (SW 14) for the Southeast Quarter (SE ¼) of Section Twenty-four (S 24), Township Two South, Range Eighteen East of the Willamette Meridian (T 2S, R 18E, W.M.), Sherman and Gilliam Counties, near East Ferry Canyon, is classified as a Natural River Area.

   Within this area, no new structures or improvements, which are visible from the river, other than those, erected or made in connection with agricultural uses, or those needed for public recreation or resource protection will be permitted. Additional dwellings and commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river will not be permitted

C) Scenic River Areas. The segments of the scenic waterway upstream and downstream from the designated Wild River Area are classified as Scenic River Areas.

   Within these areas, no new structures or improvements which are visible from the river, other than those erected or made in connection with agricultural uses, or those needed for public recreation or resource protection will be permitted. Additional dwellings, other than those necessary to existing agricultural uses, and commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, will not be permitted.

10. John Day River Basin Plan of 1995 (SWR): A review of this adopted document concurs that Gilliam County is not located within an area that is subject to a critical groundwater study or designation. Nor are there any storage facilities deemed feasible or any hydroelectric value.

11. There are no inventoried of approved Oregon Recreation Trails located in Gilliam County

12. Only three (3) natural resource sites are reported of any significance by the nature Conservancy under the Oregon Natural Heritage Program. These three (3) sites are listed below, but beyond the brief listing, no site-specific information is available, nor has the Nature Conservancy presented even a Site Report on said resources:

    A) Pullen Pasture-Vegetative Resources Only - Sec 28 of T5S, R24E – No acreage figure given.

    B) Lone Rock Creek Area Natural Grasslands – Vegetative Resources Only – Sections 29, 30 & 32 of T4S, R23E and Sec 5 of T5S, R23E – No acreage figure given.

    C) Horn Butte – Vegetative Resources Only – Sections 11 & 12 of T2N, R22E – No acreage figure given.

    There is insufficient information concerning the purported resources and resource site for the County to initiate any action concerning the afore-referenced sites. Without "any" specific information, the extent, condition, impacts and protection measures necessary are undeterminable. In accordance with the provisions of OAR 660-16-000 (5)(b), these resource sites will be addressed in the future as sufficient information for site identification becomes available.

13. Pursuant to the requirements of compliance with State Planning Goal 5, the County must complete an Economic, Social, Environment and Energy (ESEE) Analysis for all identified "Natural" Resources in the County. Said Analysis has been completed and is hereby adopted as though set forth in full herein. However, with the exception of the aggregate resource sites, riparian habitat areas, and historic resources, no such resources have been identified as needing County protection.

14. There are no inventoried Wilderness Areas within Gilliam County.

15. The County is not heavily mineralized and there is no record of production. Although there are references to limited deposits of volcanic ash, semiprecious gems, bauxite and coal, none are assigned any significance in value. Lastly, some exploratory oil and gas wells have been drilled in the vicinity of Condon, but no known findings are evident.

16. All active aggregate sources in the County are being inventoried and are identified by site location in the inventory set forth as an Attachment hereto. A comparison of the estimated total volume of aggregate from these sources to the estimated needs of committed or projected construction projects requiring such material clearly indicates that sufficient quantities are available to meet such needs.

17. It is the policy of Gilliam County to fully protect significant mineral and aggregate resource sites by determining the Economic, Social, Environmental and Energy (ESEE) consequences of not allowing conflicting uses to occur within the 1500-foot impact area.

18. Since the last update of the Comprehensive Plan in 2000, the county has seen a major change in the demand for wind energy projects. Since 2003, the county has approved several projects that are in operation and there are several more projects that have been approved by the County Planning Commission.

19. In the matter of Historic Resources, a comprehensive Countywide Historic Resource Inventory was completed in 1988. Existing identified resources are considered significant resources and should be subject to applicable protection measures. In 1988 a list of Historic Sites, Gilliam County was included in the comprehensive plan, the list contains 125 sites.

POLICIES

In consideration of the above Findings, the Gilliam County Court adopts the following policies:

1. Because of the limited resources identified as fishery resources in the County, specific protection of riparian habitat along those streams, which are identified as important for such habitat will be instituted.

2. The Department of Fish and Wildlife (ODFW) will be consulted when proposed land use actions may affect fish or wildlife habitats.

3. Land use categories, such as the Exclusive Farm Use (EFU) zone with its 160 acres minimum parcel size, which preserve the integrity of wildlife habitats will be established.

4. Gilliam County will publicize provisions of state law relative to Scenic Waterways, to render all possible assistance in enforcement of laws, rules, and regulations pertaining to State designated Scenic Waterways and to otherwise aid in the implementation of the declared policy of the State of Oregon with respect to such waterways. Conflicts between agricultural and recreational uses in this area should be resolved in favor of agriculture.

5. Gilliam County will notify and consult with appropriate state agencies during review of development proposals when such proposals might affect surface or ground water quality.

6. As funds are made available, Gilliam County will conduct a study of groundwater resources.

7. There are no state designated trails in the County at this time. However, if the State proposes any new trails, the County will cooperate in reviewing any new proposal.

8. At such time as additional and sufficient information is made available concerning the three (3) identified natural resource sites, the County shall complete the required ESEE Analysis and provide for any identified necessary protection measures as may be appropriate.

9. It shall be the County Policy that when new information is available on Natural Resource Sites, such information shall be reviewed to comply with Goal 5 in the County's subsequent periodic review.

10. In the past, extractive industrial activities of some magnitude have operated in the County, and although no such concerns are presently in operation, it is reasonable to expect that they, or others like them, will become active as heavy construction activity in the area commences. The policy of Gilliam County is to encourage development of the County's mineral resources, consistent with other objectives and policies of this Comprehensive Plan, and under conditions that will not result in permanent destruction of the natural beauty of the County's landscape. Basalt outcroppings characteristic of the area generally should be left in their natural state and only under particularly justifiable circumstances will County approval of mining of potentially scenic hillsides be given. The County's policy on mining of potentially scenic hillsides may require a search for suitable alternate sites for mining operations should any major construction project, not foreseen at this time, occur. Therefore, the County shall support, cooperate, and coordinate with any efforts by the Oregon Department of Geology and Mineral Industries (DOGMI) to carry out a Mineral & Aggregate Inventory of the County, and when such inventory is completed it shall be adopted as a component of this Plan and appropriate protection measures adopted to protect identified needed sites.

11. Because of the identification of limited mineral and aggregate resources in the County, appropriate protection measures for such identified resource sites shall be adopted to insure the continued availability of such sites for the purpose intended.

12. Gilliam County will continue to encourage the development of alternative sources of energy.

13. The areas in which most Indian petroglyphs and other evidence of Indian habitation are known to exist are not easily accessible to the general public. Even so, a number of these sites have been substantially destroyed due to intensive unsupervised visitation and not infrequently by deliberate exploitation and vandalism. Until such time as access to these valuable sites can be fully controlled and adequately supervised, the County suggests that landowners use whatever lawful means are necessary to discourage general visitation and that their location be not generally publicized. The County shall adopt specific zoning provisions designed to provide a level maximum level of protection for those limited natural and scenic resources identified within the County. Such provisions shall ensure a maximum level of review by the appropriate resource agencies and organizations for any development proposal identified as possible affecting an identified resource, and shall be applied as an overlay or combining zone with the primary applied Zone.

14. Gilliam County will remove all names from the Historic Sites list, unless a property owner states in writing that they desire the designation to remain on their property.

15. The requirements of OAR 660-023 will be used to consider the significance of Goal 5 resources.

16. The County will continue to process applications for Post Acknowledgement Plan Amendments to add sites to Goal 5 inventories when site-specific information on location, quality and quantity is submitted by individuals or agencies.

Findings in Support of Goal 5:

1. Gilliam County has conducted a valid inventory of the Goal 5 resources listed in Statewide Planning Goal 5.

2. The inventories include a determination of the location, quality and quantity of each of the resource sites.

3. The site-specific resources have been mapped or described as well as the attendant impact areas affected.

4. Gilliam County has identified existing and potential land uses which might negatively impact a specific Goal 5 resource site.

5. For those sites for which conflicting uses have been identified, the economic, social, environmental and energy (ESEE) consequences has been determined.

6. Based on the determination of the economic, social, environmental and energy consequences, Gilliam County has developed a program to achieve the goal of protecting these significant resources.

Morrow County

Three-Mile Island	26	Habitat for a variety of birds. Public ownership (Army Corps of Engineers)	2A
WA Ground Squirrel	26	Specific area. Located on federal land. (Boardman Bombing Range). Designated Research Natural Area by Nature Conservancy.	2A
Furbearers	27	Principal habitat near streams. Conflicting uses; furbearers also within protected wildlife areas (federal/state).	2A/3C
Fish Habitat	28	Sensitive ponds and streams identified. Riparian Habitat.	3C
Ecological/ Scientific Natural Areas	29		
Umatilla Natl. Wildlife Ref.		Owned and managed by federal government.	2A
Coyote Springs WMA		Owned by federal government. Long-term lease to state.	2A
Irrigon WMA		Owned by federal government. Long-term lease to state.	2A
Boardman Bombing Range		Owned and managed by federal government.	2A
Plant fossils		Geologic formation within national forest (public land).	2A
Sand Hollow		Natural Grassland. Identified by The Nature Conservancy. Additional information needed.	1B
Eight-mile Grassland		Natural Grassland. Identified by The Nature Conservancy. Additional information needed.	1B
Three Mile Island		Federal ownership. Sea bird colony.	2A
LaFevre Prairie		Private ownership. Wildflower area. Additional information needed.	1B
Boardman Slough		Federal ownership. Wildlife habitat.	2A
Service Canyon Grassland		Private ownership. Identified by The Nature Conservancy. Additional information needed.	1B

Gene Wood Creek	Private ownership. Natural Grassland. Additional information needed.	1B
Houselog Creek	Private ownership. Natural Grassland. Additional information needed.	ZZ
Rhea Creek	Sensitive stream. Western brook lamprey. Additional information needed.	1B
Scenic Views; 32 sites	Addressed in plan (p. 69) but none identified.	1B
Water Areas, 32 Watershed, Wetlands and Groundwater	Area specific (groundwater). Applicable policies: 3A, B, C (p. 81); E (p. 82). Critical groundwater area identified (Butter Creek area on Water Resource map).	3C/2A
Wilderness Areas	County does not contain wilderness areas.	N/A
Historic Sites, 36 Structures & Objectives		
Archeological	Information available for some sites (Map); other sites exist but not recorded. Applicable policies: 7A, B, C, D (p. 83); 7E F (p. 84).	3A;1B
Historical Oregon Trail	Wells spring segment. Public land. National Register. Bombing Range (Note discussion of Boardman Bombing Range).	2A
Willow Creek Campground	Private property. EFU zone.	2A
Cayuse Battlefield	Fenced monument and plaque. Public land.	2A
Willow Creek Bridge	Co. Rd. 546. Eligible for National Register (5-2-85).	3A
Rhea Creek Bridge	Co. Rd. 705. Eligible for National Register (5-2-85). Applicable Historic Resource policies: 1A, B, E (p. 79); 11 (p. 80); 7A, F (pp. 83-84).	3A
Emigrant Graveyard	Protected within Boardman Bombing Range.	2A
Stage Station Ruin	Range (Public land).	

Cecil General Store	Private property.	3C
Hardman Townsite	Additional information needed.	1B
Cultural Areas	Morrow County does not contain unique cultural area.	N/A
Potential/Approved Recreation Trails	Morrow County does not contain potential or approved recreation trails.	N/A
Potential/Approved Federal Wild and Scenic Waterways; State Scenic Waterways	Morrow County does not contain potential or approved state/federal wild or scenic waterways.	N/A

Boardman Bombing Range - 2A

References: County resource maps.

Location; Quality/Quantity: The 73 square mile Boardman Bombing Range is unique in several respects: (1) The range contains relict grassland communities (i.e., native grasses undisturbed by agricultural practices); (2) The range contains the only known colony of Washington Ground Squirrels in Oregon; and (3) The range contains a portion of the Oregon Trail and an historic cemetery. The US Navy administers the range; part is used for bombing practice, part leased for grazing and part (3 separated parcels; A, B and C) managed as a Natural Research Area (NRA).

Goal 5 Designation: The Boardman Bombing Range is administered by the federal government. It has been accorded a 2A designation (no conflicting use).

Federal/State Wildlife Areas - 2A

References: Plan, p. 76; Map of Wildlife Resources; Map of Identified Natural Areas (The Nature Conservancy); Morrow County Natural Resources (The Nature Conservancy). Applicable plan policies: (General Policies) pp. 79-80; (Fish and Wildlife) pp. 82-83.

Location; Quality/Quantity: There are three protected wildlife areas in Morrow County: Umatilla National Wildlife Refuge, Coyote Springs WMA and Irrigon WMA. Coyote Springs and Irrigon wildlife management areas are owned by the federal government but leased to the Oregon State Department of Fish and Wildlife. All three areas provide a habitat for waterfowl. In addition, the Umatilla National Wildlife Refuge contains a Great Blue Heron rookery and a variety of raptors, including bald and golden eagles.

Goal 5 Designation: The three wildlife areas are administered by federal or state government. They have been accorded a 2A designation (no conflicting use).

Scenic Views and Sites - 1B: Morrow County contains a variety of landscapes, many of which may be considered to be scenic. The County has not, however, designated any sites or areas as being particularly high in scenic-resource value.

Water Resources (General)

Morrow County's water resources include groundwater (3C), streams (3C), and ponds (2A). These resources are utilized for domestic, industrial, and agricultural purposes. In addition, streams and ponds are fish and wildlife habitats. Water requirements often result in conflicts. Problems which must be addressed by governing bodies include quality and quantity. Efforts to resolve or alleviate the problems are usually approached in the form of a project. Two projects would enhance the county's water resources: Snipe Creek and Stanfield-Westland.

The Snipe Creek and Stanfield-Westland projects are proposals to augment water resources in specific areas of Morrow and Umatilla counties. The Snipe Creek project would transmit water from John Day basin streams to the Butter Creek critical groundwater area. Stanfield-Westland is comprised of several projects designed to replenish water now

City of Boardman

While the freeway, railroad and BPA easements are all deterrents to Boardman's development in certain ways, their presence, combined with the Columbia River, are vital to Boardman's present status and are a prerequisite for the area's potential development as a major Eastern Oregon agri-industrial and commercial center.

In this Chapter, titled " Natural Resources", we want to emphasize that our citizens are always our greatest natural resource. We wish to personally honor some who have ably represented us in the past. We accept the risk of overlooking deserving citizens; however, we also note that many of those cited are also numbers among the 22 who have served as Mayors of Boardman.

GOAL 5 RESOURCES FINDINGS

Statewide Planning Goal 5 identifies 15 natural resources include the following:

1. Riparian corridors
2. Wetlands
3. Wildlife habitat
4. Federal Wild and Scenic Rivers
5. State Scenic Waterways
6. Groundwater Resources
7. Natural Areas
8. Oregon Recreational Trails
9. Wilderness Areas
10. Mineral and aggregate deposits
11. Energy resources
12. Cultural areas
13. Historic Resources
14. Open Space
15. Scenic Views and Sites

As per Goal 5, OAR 660-015-0000(5), the natural resources identified above as 1-12 are required to be inventoried according to the provisions in OAR 660-023-0030. Although these resources are listed separately, they often overlap, for example wetlands and riparian areas are often part of the same natural resource area. Natural resources including Historic Resources, Open Space and Scenic Views and Sites should be identified by the jurisdiction on a voluntary basis and are not required by OAR 660-023-0030 to be inventoried.

Riparian Areas

Riparian areas provide numerous and complex functions that affect both aquatic and terrestrial systems. Many ecological functions of riparian areas are also provided by wetlands, flood plains, and vegetated upland areas. Riparian areas provide a buffer zone between upland uses and water resources, protecting or enhancing water quality, preventing erosion, and moderating flood flows. Riparian areas often provide important wildlife habitat and contribute to in-stream habitat for fish. The City's riparian areas are defined by the Safe Harbor standards pursuant to OAR 660-023-0090 (5)(a) through (d), Riparian Corridors.

Federal Wild and Scenic Rivers
As per OAR 660-023-0120, the City is required to identify any areas designated as a federal Wild and Scenic River (WSR). No waterways located in the City of Boardman are identified as a Wild and Scenic River and therefore, this Chapter does not contain any policies pertaining to the preservation of this natural resource.

Oregon Scenic Waterway
As per OAR 660-023-0130, the City is required to identify any areas designated as an Oregon Scenic Waterway (OSW). The Columbia River, which extends along the north boundary of the City has not been included in the State's list of potential scenic waterways, nor has it been identified under the federal program. There are no other waterways within the City's Urban Growth Boundary. Therefore, no waterways located in the City of Boardman are identified as Oregon Scenic Waterways and therefore, this Chapter does not contain any policies pertaining to the preservation of this natural resource.

Groundwater Resources
As per OAR 660-023-0140, groundwater is any water, except capillary moisture, beneath the land surface or beneath the bed of any stream lake, reservoir, or other body or surface water. This OAR identifies local jurisdictions to protect areas defined as significant groundwater resources defined in OAR 660-023-0140 (5). The City of Boardman's delineated wellhead protection area does not meet this definition. However, the City will protect this resource through the provisions in Chapter 3.4 through Chapter 3.7 and Chapter 4.2 of the City's Development Code as well as in accordance with OAR 340-040.

The Wellhead Protection Delineation Study was completed in 1992 by the City of Boardman with a US Environmental Protection Agency Wellhead Protection Demonstration Project Grant. This delineation was reviewed by the Oregon health Division, Oregon Department of Environmental Quality and Oregon Water Resources Department for technical validity. US Army Corps of Engineers. This study is incorporated into the Comprehensive Plan by reference. The Study indicates areas within the City of Boardman as wetlands or those containing aggregate/mineral resources and are noted on the City of Boardman Natural Resources Map. The City will mitigate any land use impacts associated with development on these sites.

Groundwater resources are protected using several different management tools. Included in these tools are, Source Water Protection strategies through the numerical model delineation of a Wellhead Protection Area of the City's existing sources of water, Stormwater Management strategies using natural conditions while being in compliance with federal and state regulations. Chapter 3.4 of the City's Development Code contains Public Facilities Standards supporting protection of groundwater resources, Chapter 3.5 contains the Stormwater Management regulations and standards, Chapter 3.6 contains Environmental Performance regulations and standards, and Chapter 3.7 of the City's Development Code contains regulations and standards to guide protection of those areas defined on the Natural Resource Map as "Sensitive Lands" areas. In addition, the City's ~~plan~~ policies are requiring

generation facilities. These turbines produce 550 mega-watts of electricity and the steam by-product is used as a resource by the Port of Morrow industrial tenants. Within the Urban Growth Boundary, an additional natural gas fired turbine produces an additional 32 mega-watts of electricity. These resources are addressed and protected through other elements of the Comprehensive Plan.

Cultural Resources

Through the review of different cultural resource studies, conducted as part of construction or development, there has been only two identified sites containing Native American resources. One is located within the Urban Growth Boundary and one identified site within the City limits. These studies, conducted by the Confederated Tribes of the Umatilla Indian Reservation Cultural Resources Preservation Program identified sites 35MW13 which is located within the Urban Growth Boundary on land owned by the Port of Morrow and JDRS 79(1) which is an abandoned portion of the old US Highway 730.

Historic Resources

After discussions with the State Parks Division of the Oregon Department of Transportation and a review conducted by the City, it has been determined that no historic areas or sites, structures or objects exist within the City and/or its UGB, as the City was relocated in the mid 1960's and the old city is inundated by the Columbia River.

Open Space

OAR 660-023-0220 defines open space as parks, forests, wildlife preserves, natural reservations or sanctuaries and public or private golf courses. The City's most desirable area for open space preservation is the Corps of Engineers waterfront property. The area extends for a distance of more than a mile along the Columbia River with an average property depth of 1,000 feet. Preservation in its natural state would severely restrict its full potential. Preserving the area for open space and recreational activities would be a more fitting land use. A multi-million dollar marina and park site is situated on 74 acres on the west end of the property. The park site is equipped with campsites, windbreaks, utilities, restrooms, picnic facilities with shelters, petroglyph display, landscaping, parking, boat launch and dock, and a swimming area. The facility presently serves both tourist and Boardman area residents alike. Further development of the remainder of the property, about 75 acres, into recreational uses such as playfields, beaches, campsites and swimming, is encouraged. The City's horizontal collector wells, for its domestic water are placed adjacent the Columbia River at two locations within the area defined above. Due to the rural nature of Morrow County, the City has not designated any open space lands other than what is noted for the Bonneville Power Administration easement and other public ownership, including US Army Corps of Engineers property adjacent to the Columbia River, which is administered by several federal agencies including the US Fish and Wildlife Service, Bureau of Indian Affairs, the US Army Corps of Engineers and one local agency, the Boardman Parks and Recreation District.

Scenic Views and Sites

Due to the City's topography, vegetation, and existing infrastructure development, the City believes there are limited scenic views, none of which could be considered outstanding.

Oregon Department of Transportation

SCENIC BYWAYS

Background

While every state highway has certain scenic attributes (see Policy 5B), the Oregon Transportation Commission has designated Scenic Byways throughout the state on federal, state, and local roads which have exceptional scenic value (see map, Figure 11). In 1998, the federal government designated two of these routes as All- American Roads and four as National Scenic Byways. The Oregon Transportation Commission may designate additional state byways. To protect the scenic assets of its Scenic Byways, ODOT will develop guidelines for aesthetic and design elements within the public right-of-way that are appropriate to Scenic Byways. The Scenic Byways Policy recognizes that safety and performance issues may cause the need for physical improvements to Scenic Byways, and seeks to balance these needs with the preservation of scenic values.

Policy 1D: Scenic Byways

It is the policy of the State of Oregon to preserve and enhance designated Scenic Byways, and to consider aesthetic and design elements along with safety and performance considerations on designated Byways.

Action 1D.1

Develop and apply guidelines for appropriate aesthetic and design elements within the public right-of-way on Scenic Byways. The purpose of these guidelines is to preserve and enhance the scenic value while accommodating critical safety and performance needs. The elements should include guidelines for turnouts, overlooks, signage, and visual treatment of the highway infrastructure.

The Historic Columbia River Highway is both a State Scenic Byway and an All American Road

Action 1D.2

With guidelines in place, develop management priorities for Scenic Byways in management plans and corridor plans.

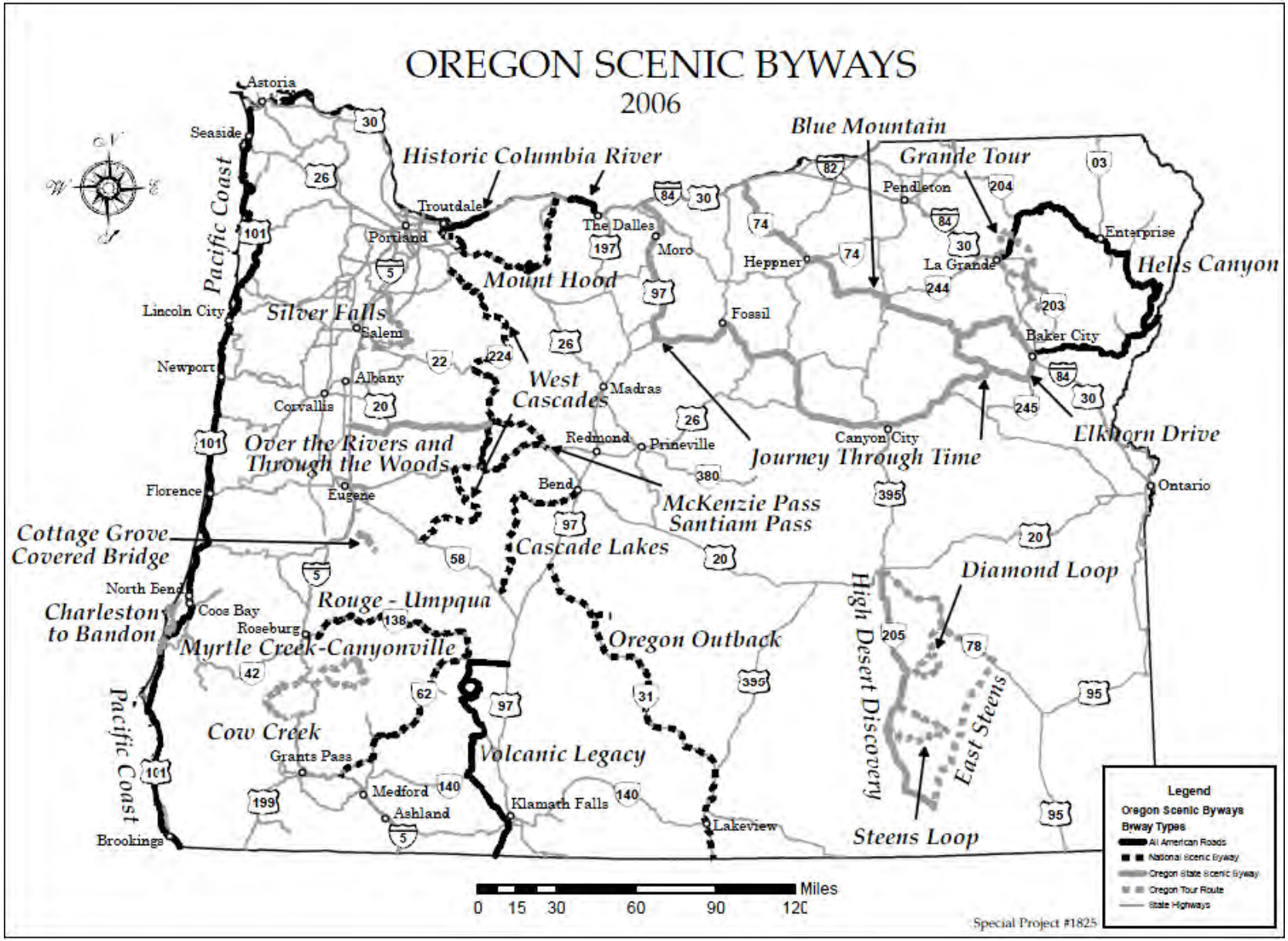


Figure 11: Designated Scenic Byways

Action 1D.3

Consider impacts to the scenic qualities of Scenic Byways when designing plans and projects.

Action 1D.4

Develop resource management plans and maps that describe ODOT's maintenance actions for roads which are designated Oregon Scenic Byways, including restricted activity zones, property to be used for disposal of slide debris and other material, and unsold state properties to be considered for ODOT retention. Identify scenic resources and existing vista opportunity locations on the maps. Include guidelines for maintenance activities where scenic resources are a factor. Ensure that ODOT highway maintenance activities are compatible with Scenic Byway management plans.

LIFELINE ROUTES

Background

Earthquakes, flooding, landslides, wild fires, and other natural and man-made disasters may destroy or block key access routes to emergency facilities and create episodic demand for highway routes into and out of a stricken area. ODOT's investment strategy should recognize the critical role that some highway facilities, particularly bridges, play in emergency response and evacuation. In some cases, the most cost-effective solution to maintaining security in these lifeline routes involves investment in roads or bridges owned by local jurisdictions. To the extent feasible, investments should be made without regard to roadway jurisdiction in order to provide the greatest degree of lifeline security for the available resources. ODOT will work with local governments to further define and map a network of lifeline routes. The lifeline network will focus on serving those communities which are particularly susceptible to isolation by virtue of their limited highway access.

Policy 1E: Lifeline Routes

It is the policy of the State of Oregon to provide a secure lifeline network of streets, highways, and bridges to facilitate emergency services response and to support rapid economic recovery after a disaster.

Action 1E.1

Define the criteria for lifeline routes to respond to short and long-term needs and, working with local jurisdictions, agencies, and emergency service providers, designate the lifeline network for the State of Oregon.

SCENIC RESOURCES

Background

The introduction to the Oregon Historic and Scenic Highway Program developed in 1985 is still true: "Oregonians have long recognized that preservation of the state's historic and scenic resources plays a vital role in the enhancement of the state's economic base, and in maintaining its citizens' pride in and respect for its historic and natural resources. Oregon's immense wealth of history and diverse scenery provide unlimited recreation potential for residents and visitors alike…" Even early efforts to develop a state transportation system foresaw the importance of preserving the state's scenic and historic values. Construction of the Columbia River Highway in the Columbia Gorge in the 1910s "focused on the need to construct a scenic highway that would complement the beauty of the area."

Since then, a number of state and federal efforts have directed ODOT to preserve or protect historic and scenic features of the state highway system. For example, the 1987 Oregon Legislature declared that it is the state's policy to "preserve and restore the continuity and historic integrity of the remaining segments of the Historic Columbia River Highway." This highway is included in the Columbia River Gorge National Scenic Area, and the Historic Columbia River Highway Master Plan guides its management. Federal, state and local policies and regulations also recognize the need to balance protection of scenic resources with economic development.

The Scenic Resources Policy is intended to guide project planning, development, construction and maintenance for state highways in a consistent manner with regard to scenic resources and aesthetics. This policy applies to all state highways, not only designated Scenic Byways.

Scenic resources, as addressed in this policy, include the combination of structural, historic, cultural, and natural features within highway rights-of-way. Where appropriate, ODOT may coordinate with other agencies and property owners to address scenic resources that lie beyond the rights-of-way. In addition to views from the highway, views of the highway from other areas should be considered, particularly on designated Scenic Byways.

Policy 5B: Scenic Resources

It is the policy of the State of Oregon that scenic resources management is an integral part of the process of creating and maintaining the state highway system. The State of Oregon will use best management practices to protect and enhance scenic resources in all phases of highway project planning, development, construction, and maintenance.

Action 5B.1

Coordinate scenic and cultural resources management with appropriate federal, state and local agencies, tribal governments and special interest groups.

Action 5B.2

Coordinate with federal and state agencies, tribal governments, local governments and property owners to encourage aesthetic considerations outside the state highway rights-of-way, such as land use controls for signs, urban design, rural development, utilities and vegetation.

Action 5B.3

Design transportation facilities that consider visual quality with functional requirements, including safety and other transportation needs.

Action 5B.4

Use best management practices to minimize impacts to scenic resources, and preserve and/or enhance visual quality within the state highway right-of-way when improving and maintaining the state highway system.

Action 5B.5

Identify criteria, and measure and evaluate scenic resources management performance on a regular basis.

Action 5B.6

Develop an inventory system that identifies scenic resources on unsold state lands that may be used for visual mitigation on designated Oregon Scenic Byways and Wild and Scenic Rivers adjacent to state highways.

Action 5B.7

Inventory and map historic resources within the state highway right-of-way including archaeological sites, trails, stone walls, buildings, bridges and other significant antiquities.

Action 5B.8

In project designs, include aesthetic elements that enhance the quality of system improvements. Examples of aesthetic elements include plantings and attractive finishes on poured concrete structures.

Bureau of Land Management

Guidelines

1. 1 Existing guidance outside the scope of this plan includes the Federal Cave Resources Protection Act of 1988 (P.L. 100-691; 16 U.S.C. 4301), which directs federal agencies to inventory reported cave locations, prepare and maintain a list of significant caves, and protect cave resources determined to be significant. Procedures for determining the significance of caves are in 43 CFR Part 37. Significance is determined based on criteria for biotic, cultural, geologic, mineralogical, hydrologic, recreational, educational, or scientific values, features, or characteristics as defined in 36 CFR, Part 290.3 (c) and (d).
2. 1 Conduct appropriate surveys to determine significance of all newly identified caves.

Visual Resources

Land Use Allocation

See Map 5.

Objective VR1

Maintain the scenic quality of river canyons, open space landscapes, cultural landscapes, and other areas having high quality visual resources. Manage visual resource values in accordance with Visual Resource Management (VRM) objectives:

- 1 Preserve the existing character of VRM Class I landscapes (Wilderness and Wilderness Study Areas). This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and should not attract attention.
- 1 Retain the existing character (low change) of VRM Class II landscapes (WSR segments, most non-designated segments of the river, and portions of some tributaries). Management activities in VRM Class II may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- 1 Partially retain the existing character of VRM Class III landscapes (moderate level of change). VRM Class III allows management activities that may attract attention, but their results should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- 1 VRM Class IV allows management activities that may require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, attempts should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of the landscape.

Management Actions

1. 1 Before initiating or permitting any major surface-disturbing activities on public land, the BLM will complete an analysis using the Visual Contrast Rating Process to determine adverse effects on visual qualities.
2. 1 Do not permit activities that would result in significant, long-term, adverse effects on the visual resources of the John Day River Canyons in areas normally seen from these rivers.
3. 1 All BLM resource uses, management activities, and other implementation decisions will meet VRM objectives and be consistent with VRM classifications. Use visual resource design techniques and Best Management Practices to mitigate short-term and long-term impacts within VRM Class objectives [43 U.S.C. 1701, Section 102 (a) (8)].
4. 1 Generally maintain the existing “footprint” of cultural landscapes (facilities, projects, and improvements) [43 U.S.C. 4321, Section 101 (b)].

5. 1 The existing level of road maintenance may be continued, but any road improvements or realignments will conform to the VRM classification.
6. 1 Manage existing recreation developments in Wild and Scenic River segments with a VRM Class II designation as VRM Class III "islands." New recreational development under this plan will be required to meet VRM Class III standards.
7. 1 Manage land according to VRM classifications shown on Map 5 and in Table 1, with the following exception:

   The area within a designated utility or transportation corridor (as identified in Objective LR2-Actions of this document) will be managed to VRM IV. Project design elements must minimize the long-term visual impacts to public land users. Manage for VRM Class I in the Spring Basin Wilderness Area, and the following Wilderness Study Areas (WSAs): Aldrich Mountain, Strawberry Mountain, North Pole Ridge, Thirtymile, Lower John Day, Sutton Mountain, and Pat's Cabin.
8. 1 Manage Fourmile Canyon tract as VRM Class II consistent with the provisions of the Oregon Trail Management Plan: Prineville District (1993).
9. 1 Manage the North Fork John Day WSR; the North Fork John Day River, Armstrong Canyon, and Ferry Canyon ACECs; most of JV Ranch, and lands managed to protect wilderness characteristics as VRM Class II (see Map 5).
10. In the event the existing WSAs are released from Wilderness Study by Congress, the VRM classification associated with these lands will be changed from VRM Class I to Class II.

Special Management Designations

Wild and Scenic Rivers

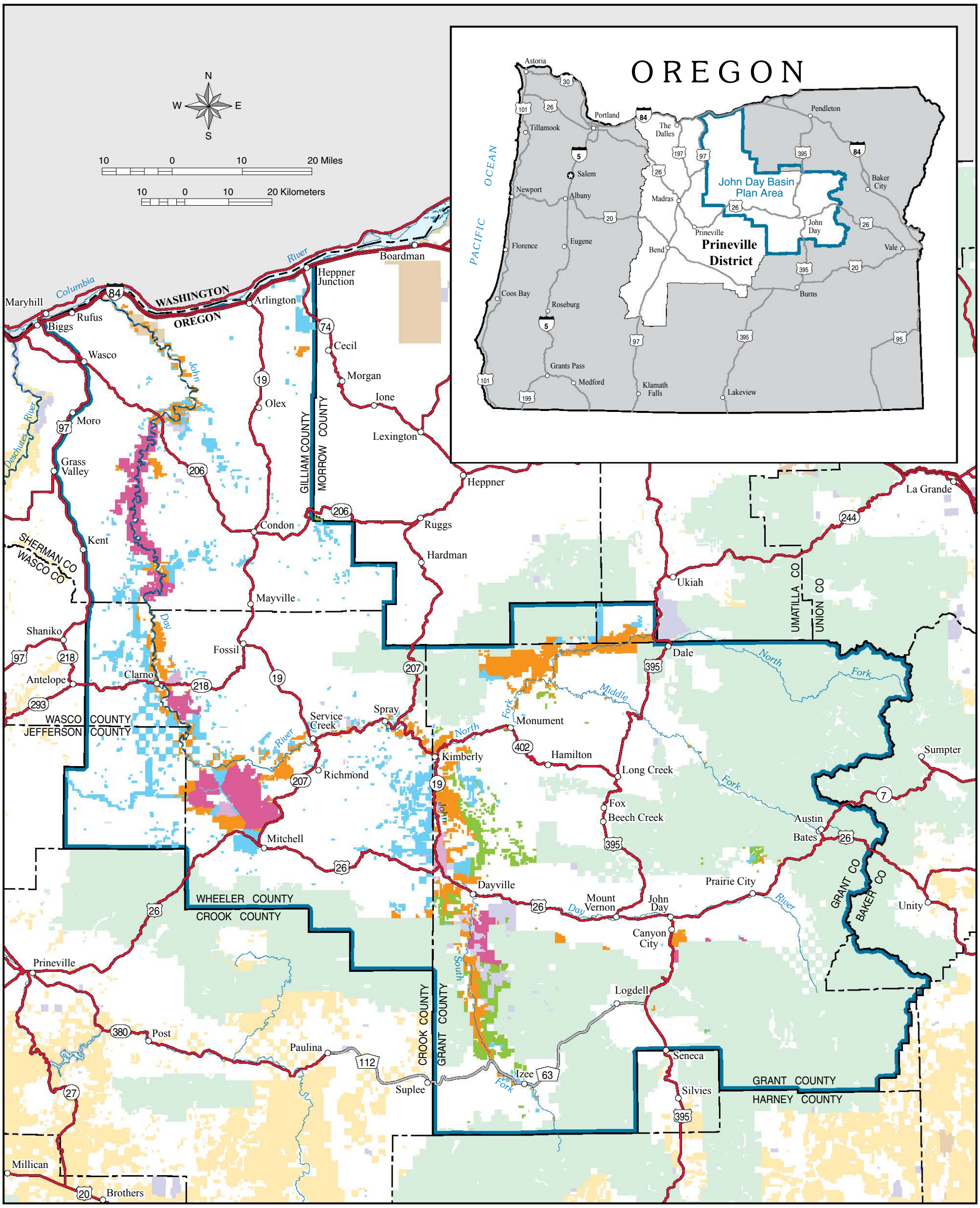
Land Use Allocation

See Map 1.

Objective WSR1

Protect and enhance the free flowing nature and Outstandingly Remarkable Values (ORV) of designated Wild and Scenic Rivers (Map 1). Also protect and enhance values on rivers suitable for WSR designation, regardless of final outcome on designation.

- 1 The National Wild and Scenic Rivers System was created by Congress in 1968 with the passage of the Wild and Scenic Rivers Act (PL 90-542). It requires WSRs be managed to "protect and enhance" the "outstandingly remarkable and significant values" that Congress lists. Congress also encourages managing agencies to assess the designated river segment to identify any additional outstandingly remarkable and/or significant values. While Congress gives ORVs a higher status than significant values, there is little management distinction between them on the river. Both are to be protected and enhanced.
- 1 The designated WSR segments in the plan area include 148 miles of the John Day River (main stem, Tumwater Falls to Service Creek) and 47 miles of the South Fork John Day River (entire fork). The values on the main stem John Day River are: Scenery, Recreational Opportunities and Fish (Congressionally identified ORVs); Geological, Paleontological, Archaeological and Historical (Congressional significant values and BLM ORVs); Wildlife (BLM ORV); and Botanical and Ecological (BLM significant values). The identified values for the South Fork John Day River are: Scenery, Recreational Opportunities (Congressional ORVs); Fish, Wildlife and Botanical (BLM ORVs); Geological, Prehistoric and Traditional uses (BLM significant values). These two segments of river were added to the WSR system by the 1988 Oregon Omnibus Wild & Scenic Rivers Act, which amended the 1969 WSR Act.
- 1 In 2005 the BLM contracted an inventory of potential WSR (in addition to those already designated) across the plan area (Final Report in Appendix I-1, JDB PRMP/FEIS), and determined that one river segment, 36.24 miles of the north fork of the John Day River, was eligible for WSR designation



LEGEND

Visual Resource Management on BLM Administered Land

- Class 1: Highest Scenic Value
- Class 2
- Class 3
- Class 4: Lowest Scenic Value

- Plan Area Boundary

Administered Land

- Bureau of Land Management
- Forest Service
- John Day Fossil Beds National Monument
- Other Federal
- State
- Private or Other

Map 5: Visual Resource Management

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

PRINEVILLE DISTRICT

John Day Basin Resource Management Plan Record of Decision

2015

M11-08-03:8-12-13

(Documentation of WSR Eligibility, Appendix I-2, JDB PRMP/FEIS). This segment is 36.24 miles long, passing through 25.55 miles of public land, from River Mile 55 (Camas Creek) to River Mile 20.4 (roughly three miles northeast of Monument). The BLM completed a WSR Suitability Study (Appendix G) and has determined that the segment is suitable for inclusion in the National WSR System for the ORVs of Scenery, Recreational Opportunities and Fish. Suitability takes into account the characteristics of the river, other current and future uses and rights in the area, public interest, and administrative costs.

Management Actions

1. 1 Direction in this RMP will serve as the river plans for the WSR segments of the main stem and South Fork of the John Day River (as listed above), and as the river plan for the "suitable" segment of the North Fork of the John Day River if it is so designated by Congress (see Map 1).
2. 1 Manage 148 miles of the Lower John Day and 47 miles of the South Fork John Day WSRs according to management direction carried forward (actions below) from the 2001 John Day River Plan, which was developed with interagency partners.
3. 1 Disseminate information through information boards at major access points, responses to written and telephone information requests, outfitter and guide meetings, and visitor contact with BLM employees and volunteers stationed in the office, on public lands, and on the river. Presentations to schools and interest groups will be conducted by request.
4. 1 Continue to install information boards at public access points; make on-site contacts with visitors; and create new user brochures, detailed land ownership maps, and interpretive signs. The BLM will also increase cooperative efforts with state agencies, counties, local businesses, and others to provide river users with consistent information. Construct an information kiosk on the South Fork John Day Back Country Byway to educate the public about wildlife, riparian, wilderness, and weed management programs. Where trespass is a problem, install ownership identification markers between BLM, state, and private lands to clearly identify land ownership and reduce trespass potential.
5. 1 Seek additional funding and improve coordination with state and local agencies by organizing a work group comprised of representatives of agencies providing law enforcement and emergency services along the John Day River. The BLM will encourage joint emergency training exercises for agencies, fire districts, outfitters, and private individuals.
6. 1 Continue to use a Limits of Acceptable Change (LAC) study process to determine appropriate use levels in all areas where visitor use has potential to adversely impact the desired future condition of resource values, protect and enhance the Outstandingly Remarkable values, and/or the quality of visitor experience. Design implementation-level actions to be consistent with the findings of LAC studies.
7. 1 Implement a limited entry permit system for all river segments where LAC studies indicate boater use needs to be controlled in order to meet desired future condition of resource values and/or the quality of visitor experience. One option for adjusting use levels is through a mandatory, limited-entry permit system, such as the one implemented in 2011 on Segments 2 and 3 of the John Day River:
    a. Trip permits would be allocated through a first-come, first-serve common pool reservation system to all users in the same manner.
    b. The applicable use fee would be due in advance to hold a reservation.
    c. Any canceled trip permits would again become available for reservation.
8. 1 Base management decisions on resource conditions, social preferences, and maintaining the desired future condition of these river segments. Resource indicators, standards, and management actions will be developed through an environmental assessment process (see Appendix B - Monitoring). Continue to monitor LAC in future years to track resource changes over time, provide feedback on the effectiveness of the management actions employed, alert managers to the need to consider further management actions. The Confederated Tribes of Warm Springs have indicated an interest in being involved in the LAC study. Other planning partners will also be invited to participate, as will private and commercial recreation users and other interested publics.
9. 1 Existing state regulations will continue to prohibit the use of personal watercraft upstream of Tumwater Falls.

10. Existing state regulations will continue to seasonally close Segment 1 to motorized boating from May 1 to October 1.
11. Segment 3 will be closed to motorized boating between May 1 and October 1, except use of one small electric motor (40 pounds thrust or less) per boat will be permitted during this period.
12. Segments 2, 10 and 11 will be closed to motorized boating year-round.
13. To protect riparian resources, dispersed use will be managed in areas that can best sustain impacts of camping.
14. Future actions (not described in this document) designed to protect dispersed river campsites will be based on recommendations of a LAC study.
15. Identify preferred dispersed camping areas in Segments 10 and 11, and install signs and parking barriers to protect riparian vegetation.
16. Regulate vehicle traffic by installing signs and vehicle barriers, and provide an area suitable for camping on the west bank of the river near Clarno.
17. Actions to protect resources, such as campsite rehabilitation or closure, may be taken in any segment at any time, if necessary.
18. Prior to placement of vehicle barriers, the ODFW will be requested to provide input on appropriate locations.
19. Improve or upgrade existing facilities, where needed, or to replace those that are permanently closed (but do not develop additional recreation sites) to better meet the needs of the recreational user. Included in this direction:
    a. *Segment 1:* The BLM will: (1) maintain Cottonwood and Rock Creek recreation sites, improve parking facilities, add a primitive boat ramp, and add a boater registration station at Rock Creek; (2) add picnic tables, plant shade trees, and provide water for a dump station at Cottonwood; and (3) re-establish a Cooperative Management Agreement (CMA) with the Sherman County Historical Society to manage and maintain the Oregon Trail interpretive site and John Day Crossing (west side), develop a small parking area, install access signing, and implement regular maintenance at this interpretive site.
    b. The BLM will periodically evaluate use patterns along the South Fork and, if necessary to protect resources, develop a campground near Ellingson Mill including a vault toilet, tables, information board, signs, and parking barriers. Prior to developing a campground near Ellingson Mill, the appropriate level of NEPA analysis will be completed and necessary permits obtained.
20. Prior to implementing site-specific implementation actions, the BLM will coordinate with Oregon Parks and Recreation Department (OPRD) to ensure that proposed projects are consistent with State Scenic Waterway regulations, where applicable (see Appendix H). Further coordination with OPRD will take place prior to implementation of actions on state land (Clarno and Cottonwood). Coordination will also take place with ODFW, Division of State Lands, Army Corp of Engineers, Confederated Tribes of Warm Springs, affected counties, and others depending on permit requirements and interest.
21. Maintain public access at existing levels, except as noted below:
    a. Grade, surface, or widen roads as needed, including the BLM road on the west bank from Clarno to Clarno Homestead, and the road to Priest Hole.
    b. Improve ditches and culverts, and apply gravel to surface of the South Fork Road.
    c. Seasonally close the BLM road north of Clarno Homestead during the first 10 days of pheasant season.
    d. The BLM will coordinate with local governments and landowners to clarify legal public access to the Oregon Trail interpretive site (west side) and McDonald Crossing prior to developing parking areas and signing legal access routes to these sites.
22. Continue to consolidate public land ownership patterns through purchase or exchange, acquisition of easements, and through partnership agreements with willing landowners to resolve public access issues and provide access to high value recreation opportunities. Seek to acquire a river access point on public land at Twickenham from a willing seller, to replace the current private access.

23. The BLM will consult with the Oregon Department of Fish and Wildlife about road maintenance procedures and the placement of ditches and culverts along the South Fork Road, prior to beginning this work.
24. To protect and enhance river values and to provide safe reliable service to the outfitted public, the BLM established the following criteria for awarding commercial permits. When determining whether to accept new commercial permit applications, the BLM will continue to adhere to Bureau policy that considers the following:
    a. Type of public service to be provided by the permittee or applicant, and consistency with management goals and objectives.
    b. Ability of permittee/applicant to provide the service and make a business profit.
    c. Safety of commercial customers.
    d. The BLM workload in administering and monitoring permits.
25. Additional measures to be taken by the BLM in administering John Day River permits are listed below:
    a. New and transfer applicants will pay a non-refundable application fee to cover the cost of verifying that application requirements are met.
    b. The BLM will conduct independent random audits of permit records.
    c. The BLM will issue new permits at the discretion of the Authorized Officer, if a needs assessment identifies a need for a particular service. Permits will be issued by competitive prospectus among those applicants meeting specific criteria identified by the needs assessment.
    d. Permit transfers will be processed in accordance with BLM transfer policies.
26. Concession permits will be considered based on the results of a needs assessment.
27. Contact the Confederated Tribes of Warm Springs regarding their interest to provide input into the needs assessment process.
28. Implement and enforce "Rules of Conduct for Designated and Suitable River Corridors" (see Appendix I of this RMP).
29. The BLM developed water quality restoration plans consistent with the ACS objectives and actions identified in this RMP to guide restoration actions, meet BLM's portion of the TMDLs, fit into a multi-jurisdictional water quality management plan, and restore water quality in the plan area. The water quality management plan will be used to direct priorities, to identify site specific projects, and is incorporated by reference as part of this River Plan.
30. WSR recommended flows are identified in Appendix E - Instream Flow Reservations.
31. Recommend for designation by Congress the 37-mile segment of the North Fork John Day River determined suitable as WSR with a Scenic classification and ORVs of fishery, scenery, and recreation. The suitability determination will apply to lands within 0.25 mile of both sides of the 37-mile segment.
    a. Upon formal designation or release by Congress, review the management direction to ensure compatibility with future Congressional direction. If Congress releases the segment of river determined to be suitable and does not provide additional management direction, this segment and surrounding lands will continue to be managed consistent with direction in this Record of Decision and Approved Resource Management Plan for the John Day Basin, which was designed to address Congress's management objectives identified in the Oregon Land Exchange Act of 2000.

Wilderness and Wilderness Study Areas

The BLM Manual 6340 (Management of Designated Wilderness Areas) provides national guidance on wilderness management. The BLM incorporated this guidance into the Spring Basin Interim Wilderness Management Plan (see Appendix J in this RMP). Managing Spring Basin Wilderness Area in accordance with the interim management plan in the short-term will assure that the area's wilderness values are protected until a management plan can be completed for long-term protection.

Appendix H:
Oregon State Scenic Waterway

June 2, 2000

TO THE READER:

The John Day River system is fortunate to have designation under two important river preservation programs; the National Wild and Scenic Rivers Act and the Oregon Scenic Waterways Act. Together, these two Acts, one a federal program and one a state program, provide the best protection available today for the natural, scenic, and recreational values of our river environments.

The Oregon Parks and Recreation Department administers the Oregon Scenic Waterways Program. The department has participated with the Bureau of Land Management, the Tribes, state agencies, local government and the public in the development of the John Day River Management Plan and Environmental Impact Statement and the Rules of Land Management for the John Day River Scenic Waterway system. We deeply appreciate the opportunity offered by the BLM to include this chapter on the State Scenic Waterway Program and the state Rules of Land Management in the federal John Day River Management Plan. It is our sincere desire that displaying the state program side by side with the federal program in this manner, will give the public a clearer picture and more complete understanding of how these two programs will work together to preserve and protect the outstanding values of the John Day River system.

The rules contained in this chapter were adopted by the Oregon Parks and Recreation Commission on May 31, 2000. When they become effective later this year, these rules will be used by the Parks and Recreation Department in evaluating proposals for development, improvement or alteration of private and non-federal, public lands within the John Day River Scenic Waterway system.

For more information on the State Scenic Waterways Program or the Rules of Land Management for the John Day Scenic Waterway, please contact the Oregon Parks and Recreation Department Rivers Program at 1115 Commercial St. NE, Salem, Oregon, 97301-1002, or call (503) 378-4168.

Sincerely,
Laurie A. Warner
Acting Director Oregon Parks and Recreation Department

Background

The Oregon Scenic Waterways System was created by ballot initiative in 1970. The original Act designated 496 free-flowing miles of six different rivers. Designation of the John Day River main stem accounted for about 147 of these miles. Scenic waterways are defined as including the designated river and related adjacent lands within one-fourth of one mile of the bank on either side of the river.

In 1988, Oregon voters passed a second scenic waterways initiative, the Oregon Rivers Initiative (Ballot Measure #7). This measure added 573 river miles to the Oregon Scenic Waterways System, including 167 additional miles to the John Day River Scenic Waterway. The John Day River addition was divided among four new segments. These segments are: an 11 mile addition to the John Day River Scenic Waterway on the main stem extending upstream from Service Creek to Parrish Creek; a 56 mile addition on the North Fork, from approximately three miles upstream from Monument to the North Fork John Day Wilderness Area; a 71 mile addition on the Middle Fork, from its confluence with the North Fork to its confluence with Crawford Creek; and a 29 mile addition on the South Fork, from the north boundary of the Phillip W. Schneider Wildlife Area (formerly Murderer's Creek Wildlife Area) to the Post-Paulina Road crossing. There are now segments of 19 rivers (1,148 river miles) and one lake (Waldo Lake) in the Oregon Scenic Waterways System.

Rivers can also be added to the system by the state legislature or through administrative act of the Governor. Such actions have added segments of five rivers and the entirety of Waldo Lake to the scenic waterway system.

Administration

Scenic waterways are administered by the Oregon Parks and Recreation Commission in accordance with Oregon Revised Statutes (ORS) 390.805 to 390.925. Oregon Administrative Rules (OAR) have been adopted to govern the program. General rules set forth generic standards that apply to all scenic waterways. Specific rules are also developed for each river during the management planning process. These rules are designed to manage development within the scenic waterway corridor to maintain the natural beauty of the river.

The Scenic Waterways Act and rules require evaluation of proposed land development, improvement or alteration relative to the scenic and aesthetic beauty of the waterway as viewed from the river. This review and evaluation apply to all related adjacent lands within one-fourth of one mile of the banks of the scenic waterway. Landowners wanting to build houses or roads, cut timber, mine, or pursue other similar projects, must make written notification to the Oregon Parks and Recreation Department (OPRD). OPRD reviews the proposal in coordination with other jurisdictions and determines if the proposal will substantially impair the natural beauty of the scenic waterway. When a project is inconsistent with scenic waterway goals, OPRD works with the landowner to resolve conflicts. The Commission has one year from the date of initial notification in which to reach accommodation with the landowner. This may include revising the project or compensating the landowner by purchasing the land or resource or negotiating a scenic easement. If satisfactory resolution is not reached within one year, the landowner may proceed with the initial development proposal.

Local and state agencies must comply with the scenic waterway law and rules. Federal land managing agencies are encouraged to coordinate with OPRD to insure their own land management actions are compatible with scenic waterway management prescriptions.

Management Plans

Scenic waterway management plans (administrative rules) are developed to protect or enhance the aesthetic and scenic values of scenic waterways while allowing compatible agriculture, forestry and other land uses. The plans are composed of management principles, standards and prescriptions applicable to scenic waterway shorelines and related adjacent lands. The rules establish varying intensities of protection or development based on the special attributes of each river segment. This is done through the use of river classifications.

In addition to developing formal management rules, the scenic waterway planning process may also identify other management tools. These may take the form of prescribed agency actions, interagency agreements, agency commitments, and cooperative arrangements with a variety of other parties, all designed to more effectively preserve and protect the natural values and special attributes of scenic waterways.

Scenic Waterway Classification

A scenic waterway may be divided into multiple segments with each segment having its own classification. Scenic waterway segments are assigned one of six possible classifications according to the character of the landscape and the amount and type of development present within the corridor at the time of designation.

The following describes each of the six classifications and the management goals each represents.

Natural River Areas are generally inaccessible, except by trail or river, with primitive or minimally developed shorelines. Preservation and enhancement of the primitive character of these areas are the goals of this classification.

1. 1 Accessible Natural River Areas are readily accessible by road or railroad but otherwise possess the qualities of Natural or Scenic River Areas. Preserving or enhancing the primitive scenic character while allowing compatible recreation use are the goals of this classification.
2. 1 Scenic River Areas are accessible by roads in places but contain related adjacent lands and shorelines still largely primitive and undeveloped except for agriculture and grazing. Scenic River Areas are administered to preserve their undeveloped character, maintain or enhance their high scenic quality, recreation, fish and wildlife values while allowing continued agriculture use.
3. 1 Natural Scenic View Areas possess the qualities of Natural or Scenic River Areas except that one shore and the related adjacent lands have development or access that only qualify for a lesser classification. Protecting or enhancing the primitive scenic character while allowing compatible recreation use are the goals of this classification.
4. 1 Recreational River Areas are readily accessible by road or railroad, may have some development along their shoreline and on related adjacent lands and may have undergone impoundment or diversion in the past. Allowing compatible existing uses and a wide range of river-oriented recreation use while protecting the natural beauty, fish and wildlife values are the management goals of this classification.
5. 1 River Community Areas are river segments where the density of existing structures (residential tract or platted subdivision), or other development precludes a more restrictive classification.
6. 1 River Community Areas are managed to allow development that is compatible with county zoning and blends into the natural character of the surrounding landscape. This also means protecting riparian vegetation and encouraging activities that enhance the landscape.

The rules established for each river classification generally do not affect development existing at the time of scenic waterway designation. None of the classifications are designed as absolute prohibitions of new development. Though some types of improvements require notification, review, and approval, others do not.

Mining, road building, new structures, mobile home placement, land clearing and timber harvest typically must go through the notification process. River classifications and the administrative rules for each scenic waterway determine what proposals may be approved and how they must be conditioned to protect the natural and scenic beauty of the waterway.

Notification and approval is generally not needed for new fences, farm building maintenance, irrigation lines, crop rotation, danger tree removal, residential maintenance and remodeling, homesite landscaping, minor road maintenance and firewood cutting. However, landowners are generally advised to contact OPRD before making any changes to their land within a scenic waterway corridor, especially if it is visible from the river.

Classification for the John Day River Scenic Waterway (Main Stem)

The John Day River main stem from Tumwater Falls to the confluence with Service Creek was designated as a state scenic waterway in 1970. In 1988, an additional 11 miles of river extending upstream from the confluence of Service Creek to the confluence of Parrish Creek was designated as scenic waterway.

Oregon Administrative Rules divide the John Day River Scenic Waterway (main stem) into four reaches. The upstream most reach is classified as a Recreational River Area, followed by a Scenic River Area, a Natural River Area and then another Scenic River Area at the downstream end of the scenic waterway. Amendments to the John Day River Scenic Waterway rules adopted by the Oregon Parks and Recreation Commission in May 2000, lengthened the reach of the Natural River Area segment along the lower John Day River, added more definitive land management rules to the segments of the John Day River between Tumwater Falls and Service Creek, and established management rules for the new scenic waterway segment from Service Creek to Parrish Creek.

The 11.3 mile segment of the John Day River from river mile 168.7, at the confluence with Parrish Creek near Spray, to river mile 157.4, at the confluence with Service Creek, runs parallel to Oregon State Highway 19. Along most of this segment, the highway can be seen from the river. OPRD has classified this scenic waterway segment as a Recreational River Area. The management goal for this segment is to ensure that the view of any new development along the river is unobtrusive as seen from the river.

The 62.4 mile segment of the John Day River from Service Creek, at river mile 157.4, to the Wasco County-Sherman County line, at river mile 95, is fronted mainly by private agricultural lands. Public access along this segment is less prominent than the upstream reach. The management goal for this segment is to allow the continuation of existing farm, rural residential and recreation uses while protecting the scenic character of the river. OPRD has classified this segment of river as a Scenic River Area.

The 51.7 mile segment of the John Day River from the Wasco County-Sherman County line, at river mile 95, downstream to river mile 43.3, about three and one-half miles upstream from Cottonwood Bridge, is largely inaccessible by road. This segment of river is remotely located between steep-walled canyons where very little sign of structures or human settlement exists. River frontage in this segment is mainly Bureau of Land Management administered public land. The management goal for this segment is to preserve and protect the primitive, undeveloped character of the river corridor. OPRD has classified this segment as a Natural River Area.

The lower 33.3 mile segment of the John Day River Scenic Waterway begins at river mile 43.3, upstream from Cottonwood Bridge, and terminates at river mile 10 at Tumwater Falls. This segment is fronted mostly by private agriculture and range lands. The management goal for this segment is to allow the continuation of existing farm, rural residential and recreation uses while protecting the scenic character of the river corridor. The classification for this segment is Scenic River Area.

Land Management Rules for the John Day River Scenic Waterway (Main Stem)

736-040-0065

John Day River Scenic Waterway

1. 1 Natural River Area:

    a. 1 That segment of the scenic waterway beginning at the intersection of the John Day River with the township line between Township 5 South and Township 6 South, Willamette Meridian, at about river mile 95, thence downstream approximately 51.7 miles to the intersection of the John Day River

with the southern section line of Section 30, Township 1 South, Range 19 East, Willamette Meridian, (Section 30, T 1S, R 19E, W.M.) at about river mile 43.3, is classified as a Natural River Area;

b. 1 This Natural River Area shall be administered consistent with the standards set by OAR 736-040¬0035 and OAR 736-040-0040(1) (a) (C). In addition to these standards, all new development in resource zones (i.e. farm-related dwellings) shall comply with Gilliam County or Sherman County land use regulations.

c. 1 New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation, except as provided under OAR 736-040-0030(5), and except those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on the site, the structure or improvement may be permitted if native vegetation can be established to provide total screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "total screening," as used in Section (1) of this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally obscure (100%) the subject improvement.

d. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.

e. 1 New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed mining site, the mining operation may be permitted if native vegetation can be established to provide total screening of the proposed mining site within a reasonable time (4-5 years).

f. 1 New roads may be permitted only when totally screened from view from the river by topography and/ or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created or road design techniques used to totally screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4-5 years).

g. 1 Where existing roads are visible from the river, major extensions, realignments, or upgrades to existing roads shall not be permitted. Necessary minor road improvements shall be substantially screened from view from the river. If inadequate topography or vegetation exists to substantially screen the road improvement, the road improvement may be permitted if acceptable topography can be created or road design techniques used to substantially screen the road at the time of construction or native vegetation can be established to provide substantial screening of the road improvement within a reasonable time (4-5 years). The condition of "substantial screening," as used in Section (1) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75%) the subject improvement. When an existing road is regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

h. 1 Visible tree harvest or other vegetation management may be permitted provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest and management methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

i. 1 Improvements needed for public recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

j. 1 Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

k. 1 Whenever the standards of OAR 736-040-0035 and Section (1), Subsections (a) through (j) of this rule, are more restrictive than the Gilliam and Sherman County Land Use and Development Ordinances, the above Oregon Administrative Rules shall apply.

2. 1 Scenic River Areas: two segments of the John Day River main stem are designated as Scenic River Areas:

a. That segment of scenic waterway beginning at the confluence of Service Creek at about river mile 157.4 and extending downstream approximately 62.4 miles to the intersection of the John Day River with the township line between Township 5 South and Township 6 South, Willamette Meridian, at about river mile 95, is classified as a Scenic River Area;

b. 1 That segment of scenic waterway beginning at the intersection of the John Day River with the southern section line of Section 30, Township 1 South, Range 19 East, Willamette Meridian, (Section 30, T 1S, R 19E, W.M.) at about river mile 43.3 and extending approximately 33.3 miles downstream to Tumwater Falls, at about river mile 10, is classified as a Scenic River Area.

c. 1 These Scenic River Areas shall be administered consistent with the standards set by OAR 736-040¬0035 and OAR 736-040-0040(1)(b)(B). In addition to these standards, all new development in resource zones (i.e. farm related dwellings) shall comply with Sherman County, Gilliam County, Wasco County, Wheeler County, or Jefferson County land use regulations, whichever applies.

d. 1 New structures and associated improvements shall be substantially screened by topography and/ or native vegetation, except as provided under OAR 736-040-0030(5), and except for those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on a site, the structure or improvement may be permitted if native vegetation can be established to provide substantial screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "substantial screening," as used in Section (2) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75%) the viewed structure or improvement.

e. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.

f. 1 New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists on a site, mining and similar forms of development may be permitted if native vegetation can be established to provide total screening of the affected area within a reasonable time (4-5 years). The condition of "total screening," as used in Section (2) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to totally obscure (100%) the subject improvement.

g. 1 New roads may be permitted only when totally screened from view from the river by topography and/ or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created or road design techniques used to totally screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4-5 years).

h. 1 Where existing roads are visible from the river, extensions, realignments, upgrades, or other improvements, shall only be permitted when substantially screened from view from the river. If inadequate topography or vegetation exists to provide substantial screening, the road improvement may be permitted if acceptable topography can be created or road design techniques used to substantially screen the road at the time of construction or native vegetation can be established to provide substantial screening of the subject improvement within a reasonable time (4-5 years). When an existing road is improved or regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

i. 1 Visible tree harvest or other vegetation management may be allowed provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest and management methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

j. 1 Improvements needed for public recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

k. 1 Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

l. 1 Whenever the standards of OAR 736-040-0035 and Section (2), Subsections (a) through (k) of this rule are more restrictive than the applicable County Land Use Development Ordinances, the above Oregon Administrative rules shall apply.

3. 1 Recreational River Area:

a. 1 That segment of scenic waterway beginning at the confluence of Parrish Creek, at about river mile 168.7, about one mile west of Spray and extending downstream approximately 11.3 miles to the confluence of Service Creek, at about river mile 157.4, is classified as a Recreational River Area.

b. 1 This Recreational River Area shall be administered consistent with the standards set by OAR 736¬040-0035 and OAR 736-040-0040(1)(c)(B). In addition to these standards, all new development in resource zones (i.e. farm and forest related dwellings) shall comply with Wheeler County land use regulations.

c. 1 New structures and associated improvements shall be moderately screened from view from the river by topography and/or vegetation, except as provided by OAR 736-040-0030(5) and except those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on a site, the structure or improvement may be permitted if native vegetation can be established to provide moderate screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "moderate screening," as used in Section (3) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to moderately obscure (at least 50%) the viewed improvement or structure.

d. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.

e. 1 New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists on a site, mining and similar forms of development may be permitted if native vegetation can be established to provide total screening of the affected area within a reasonable time (4-5 years). The condition of "total screening," as used in Section (3) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to totally obscure (100%) the altered improvement site.

f. 1 New roads constructed for agricultural use, mining or residential use shall be moderately screened with vegetation and/or topography. If inadequate topographic or vegetative screening exists, the road may be permitted if acceptable topography can be created or road design techniques used to moderately screen the road at the time of construction or native vegetation can be established to provide moderate screening of the road within a reasonable time (4-5 years).

g. 1 Where existing roads are visible from the river, extensions, realignments, upgrades, or other improvements, shall only be permitted when partially screened from view from the river. If inadequate topography or vegetation exists to provide partial screening, the road improvement may be permitted if acceptable topography can be created or road design techniques used to partially screen the road at the time of construction or native vegetation can be established to provide partial

screening of the subject improvement within a reasonable time (4 -5 years). The condition of "partial screening," as used in Section (3) of this rule shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to partially obscure (at least 30%) views of the road improvement. When an existing road is improved or regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

h. 1 Visible tree harvest or other vegetation management may be allowed provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest and management methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

i. 1 Improvements needed for public recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

j. 1 Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

k. 1 Whenever the standards of OAR 736-040-0035 and Section (3), Subsections (c) through (j) of this rule are more restrictive than Wheeler County Land Use and Development Ordinances, the above Oregon Administrative Rules shall apply.

Classification for the North Fork John Day River Scenic Waterway

The North Fork John Day River was designated a scenic waterway in 1988. The designated reach extends approximately 56.2 miles from the North Fork John Day Wilderness boundary at about river mile 76.7, downstream to about river mile 20.3 approximately three miles upstream from Monument. OPRD divides the North Fork John Day River Scenic Waterway into three segments.

The upper segment begins at the North Fork John Day Wilderness boundary at about river mile 76.7 and extends downstream approximately 16.7 miles to the State Highway 395 Bridge crossing at about river mile 60, just north of Dale. A primitive road, intermittently visible from the river runs along the north side of the river for most of this segment. Publicly owned National Forest land borders the river for most of this segment. Cattle grazing and timber harvest is common on the privately owned parcels along this reach of river. The impact of these activities as viewed from the river has, for the most part, been minimal. Dwellings, ranch buildings and public campground structures are lightly distributed making the overall impression one of primitiveness and isolation. The management goal is to preserve the primitive character of the landscape throughout this portion of the river corridor. OPRD classifies this segment of scenic waterway as an **Accessible Natural River Area**.

The next scenic waterway segment extends from about river mile 60, at the State Highway 395 Bridge crossing, downstream approximately three miles to the confluence of Camas Creek at about river mile 57. State Highway 395 closely parallels the north bank of the river throughout this segment and is readily visible from the river. River frontage on both banks is primarily privately owned. The management goal for this section is to ensure that the view of any new developments is unobtrusive as seen from the river. OPRD classifies this segment of scenic waterway as a **Recreational River Area**.

The third North Fork scenic waterway segment extends approximately 36.7 miles from the confluence with Camas Creek downstream to about river mile 20.3 approximately three miles north of Monument. Landownership in this reach is a patchwork of private holdings and public lands managed by the Bureau of Land Management. The upstream half of this segment is closely paralleled by a road which is visible from the river. The lower half of the reach is essentially unroaded. As with the upstream most segment of this scenic waterway, range and timber practices provide the economic base and evidence of settlement is minimal. The management goal is to maintain the primitive character of the river corridor. OPRD classifies this segment as an **Accessible Natural River Area**.

Land Management Rules for the North Fork John Day River Scenic Waterway

736-040-0066

North Fork John Day River Scenic Waterway

1. 1 Accessible Natural River Areas: two segments of the North Fork John Day River are designated Accessible Natural River Areas:

    a. 1 That segment of scenic waterway beginning at the west boundary of the North Fork John Day Wilderness in the Umatilla National Forest as that boundary was constituted on December 8, 1988, being at about river mile 76.7, where the North Fork John Day River intersects the western section line of Section 18, Township 7 South, Range 34 East, Willamette Meridian, (Section 18, T 7S, R 34E, W.M.) and extending downstream approximately 16.7 miles to the State Highway 395 Bridge crossing, at about river mile 60, is classified as an Accessible Natural River Area;

    b. 1 That segment of scenic waterway beginning at the confluence of Camas Creek, at about river mile 57, and extending downstream approximately 36.7 miles to the intersection with the northern boundary of the south one-half of Section 20, Township 8 South, Range 28 East, Willamette Meridian, (Section 20, T 8S, R 28E, W.M.) at about river mile 20.3, is classified as an Accessible Natural River Area.

    c. 1 These Accessible Natural River Areas shall be administered consistent with the standards set by OAR 736-040-0035 and OAR 736-040-0040(1)(e)(B). In addition to these standards, all new development in resource zones (i.e. farm and forest related dwellings) shall comply with Grant or Umatilla County land use regulations.

    d. 1 New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation, except as provided under OAR 736-040-0030(5), and except those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on the site, the structure or improvement may be permitted if native vegetation can be established to provide total screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "total screening," as used in Section (1) of this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally obscure (100%) the subject improvement.

    e. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.

    f. 1 New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed mining site, the mining operation may be permitted if native vegetation can be established to provide total screening of the proposed mining site within a reasonable time (4-5 years).

    g. 1 New roads may be permitted only when totally screened from view from the river by topography and/ or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created or road design

techniques used to totally screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4-5 years).

h. 1 Where existing roads are visible from the river, major extensions, realignments, or upgrades to existing roads shall not be permitted. Necessary minor road improvements shall be substantially screened from view from the river. If inadequate topography or vegetation exists to substantially screen the road improvement, the road improvement may be permitted if acceptable topography can be created or road design techniques used to substantially screen the road at the time of construction or native vegetation can be established to provide substantial screening of the road improvement within a reasonable time (4-5 years). The condition of "substantial screening," as used in Section (1) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75%) the subject improvement. When an existing road is regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

i. 1 Visible tree harvest or other vegetation management may be permitted provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest and management methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

j. 1 Improvements needed for public recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

k. 1 Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

l. 1 Whenever the standards of OAR 736-040-0035 and Section (1), Subsections (c) through (k) of this rule are more restrictive than Grant County's or Umatilla County's Land Use and Development Ordinance, the above Oregon Administrative Rules shall apply.

2. 1 Recreational River Area:

a. 1 That segment of scenic waterway beginning at the State Highway 395 Bridge crossing, at about river mile 60, and extending downstream approximately three miles to the confluence of Camas Creek, at about river mile 57, is classified as a Recreational River Area.

b. 1 This Recreational River Area shall be administered consistent with the standards set by OAR 736¬040-0035 and OAR 736-040-0040(1)(c)(B). In addition to these standards, all new development in resource zones (i.e. farm and forest related dwellings) shall comply with Grant County or Umatilla County land use regulations.

c. 1 New structures and associated improvements shall be moderately screened from view from the river by topography and/or vegetation, except as provided by OAR 736-040-0030(5), and except those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on a site, the structure or improvement may be permitted if native vegetation can be established to provide moderate screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "moderate screening," as used in Section (2) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to moderately obscure (at least 50%) the viewed improvement or structure.

d. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.

e. 1 New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists on a site, mining and similar forms of development may be permitted if native vegetation can be established to provide total screening of the affected area within a reasonable time (4-5 years). The condition of "total screening," as used in Section (2) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to totally obscure (100%) the altered improvement site.

f. 1 New roads constructed for agricultural use, mining or residential use shall be moderately screened with vegetation and/or topography. If inadequate topographic or vegetative screening exists, the road may be permitted if acceptable topography can be created or road design techniques used to moderately screen the road at the time of construction or native vegetation can be established to provide moderate screening of the road within a reasonable time (4-5 years).

g. 1 Where existing roads are visible from the river, extensions, realignments, upgrades, or other improvements, shall only be permitted when partially screened from view from the river. If inadequate topography or vegetation exists to provide partial screening, the road improvement may be permitted if acceptable topography can be created or road design techniques used to partially screen the road at the time of construction or native vegetation can be established to provide partial screening of the subject improvement within a reasonable time (4-5 years). The condition of "partial screening," as used in Section (2) of this rule shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to partially obscure (at least 30%) views of the road improvement. When an existing road is improved or regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

h. 1 Visible tree harvest or other vegetation management may be allowed provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest and management methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

i. 1 Improvements needed for public outdoor recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

j. 1 Whenever the standards of OAR 736-040-0035 and Section (2), Subsections (c) through (i) of this rule are more restrictive than Grant County or Umatilla County Land Use and Development Ordinances, the above Oregon Administrative Rules shall apply.

Classification for the Middle Fork John Day River Scenic Waterway

The Middle Fork John Day River was designated a scenic waterway in 1988. The designated reach begins at about river mile 71, at the confluence with Crawford Creek, and extends approximately 71 miles to the confluence of the Middle Fork with the North Fork John Day River. OPRD divides the Middle Fork John Day River into two scenic waterway segments.

The first segment extends from Crawford Creek downstream approximately 60 miles to about river mile 11 approximately four miles downstream from Ritter. The upper 30 miles of this segment flows through an interspersed ownership of private parcels and public lands managed by the Malheur National Forest. The lower 30 miles is bounded mostly by private lands. This river segment is paralleled by a paved but lightly traveled road that provides access to thinly distributed ranches and rural dwellings. The road and development in the area is not obtrusive on the view from the river. The management goal is to allow continuation of existing farm, forest, rural residential and recreational uses while protecting the scenic character of the river corridor. OPRD classifies this segment of the river as a **Scenic River Area**.

The second scenic waterway segment extends from about river mile 11 to the confluence with the North Fork John Day River. While this segment of river is bordered by mostly private lands, it flows through a steep walled canyon, is inaccessible by road and exhibits little sign of settlement or development. The management goal is to preserve and protect the primitive undeveloped character of the river corridor. OPRD classifies this segment of scenic waterway as a **Natural River Area**.

Land Management Rules for the Middle Fork John Day River Scenic Waterway

736-040-0067

Middle Fork John Day River Scenic Waterway

1. 1 Natural River Area:
    a. 1 That segment of scenic waterway beginning at the intersection of the Middle Fork John Day River with the eastern section line of Section 11, Township 8 South, Range 29 East, Willamette Meridian, (Section 11, T 8S, R 29E, W.M.), at about river mile 11, and extending downstream approximately 11 miles to its confluence with the North Fork John Day River is classified as a Natural River Area.
    b. 1 This Natural River Area shall be administered consistent with the standards set by OAR 736-040¬0035 and OAR 736-040-0040(1)(a)(C). In addition to these standards, all new development in resource zones (i.e. farm and forest related dwellings) shall comply with Grant County land use regulations.
    c. 1 New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation, except as provided under OAR 736-040-0030(5), and except those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on the site, the structure or improvement may be permitted if native vegetation can be established to provide total screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "total screening," as used in Section (1) of this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally obscure (100%) the subject improvement.
    d. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.
    e. 1 New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed mining site, the mining operation may be permitted if native vegetation can be established to provide total screening of the proposed mining site within a reasonable time (4-5 years).
    f. 1 New roads may be permitted only when totally screened from view from the river by topography and/ or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created or road design techniques used to totally screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4-5 years).

g. 1 Where existing roads are visible from the river, major extensions, realignments, or upgrades to existing roads shall not be permitted. Necessary minor road improvements shall be substantially screened from view from the river. If inadequate topography or vegetation exists to substantially screen the road improvement, the road improvement may be permitted if acceptable topography can be created or road design techniques used to substantially screen the road at the time of construction or native vegetation can be established to provide substantial screening of the road improvement within a reasonable time (4-5 years). The condition of "substantial screening," as used in Section (1) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75%) the subject improvement. When an existing road is regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

h. 1 Visible tree harvest or other vegetation management may be permitted provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest and management methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

i. 1 Improvements needed for public outdoor recreation or resource protection may be visible from the river but shall be primitive in character and designed to blend with the natural character of the landscape.

j. 1 Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

k. 1 Whenever the standards of OAR 736-040-0035 and Section (1), Subsections (c) through (j) of this rule are more restrictive than the Grant County Land Use and Development Ordinance, the above Oregon Administrative Rules shall apply.

2. 1 Scenic River Area:

a. 1 That segment of scenic waterway beginning at the confluence with Crawford Creek at about river mile 71, being in the Northwest 1/4 of Section 25, Township 11 South, Range 35 East, Willamette Meridian, (NW 1/4, Section 25, T 11S, R 35E, W.M.) and extending downstream approximately 60 miles to the intersection of the Middle Fork John Day River with the eastern section line of Section 11, Township 8 South, Range 29 East, Willamette Meridian, (Section 11, T 8S, R 29E, W.M.), at about river mile 11, is classified as a Scenic River Area.

b. 1 This Scenic River Area shall be administered consistent with the standards set by OAR 736-040-0035 and OAR 736-040-0040(1)(b)(B). In addition to these standards, all new development in resource zones (i.e. farm and forest related dwellings) shall comply with Grant County land use regulations.

c. 1 New structures and associated improvements shall be substantially screened by topography and/or native vegetation, except as provided under OAR 736-040-0030(5), and except for those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on a site, the structure or improvement may be permitted if native vegetation can be established to provide substantial screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "substantial screening," as used in Section (2) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75%) the viewed structure or improvement.

d. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.

e. 1 New mining operations, except recreational placer mining and recreational prospecting, as those

terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists on a site, mining and similar forms of development may be permitted if native vegetation can be established to provide total screening of the affected area within a reasonable time (4-5 years). The condition of "total screening," as used in Section (2) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to totally obscure (100%) the subject improvement.

f. 1 New roads may be permitted only when totally screened from view from the river by topography and/ or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created or road design techniques used to totally screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4-5 years).

g. 1 Where existing roads are visible from the river, extensions, realignments, upgrades, or other improvements, shall only be permitted when substantially screened from view from the river. If inadequate topography or vegetation exists to provide substantial screening, the road improvement may be permitted if acceptable topography can be created or road design techniques used to substantially screen the road at the time of construction or native vegetation can be established to provide substantial screening of the subject improvement within a reasonable time (4-5 years). When an existing road is improved or regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

h. 1 Visible tree harvest or other vegetation management may be allowed provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

i. 1 Improvements needed for public outdoor recreation use or resource protection may be visible from the river but shall be primitive in character and designed to blend with the natural character of the landscape.

j. 1 Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

k. 1 Whenever the standards of OAR 736-040-0035 and Section (2), Subsections (c) through (j) of this rule are more restrictive than the Grant County Land Use and Development Ordinance, the above Oregon Administrative Rule shall apply.

Classification for the South Fork John Day River Scenic Waterway

The South Fork John Day River was designated a scenic waterway in 1988. The designated reach extends from the Post-Paulina Road crossing near river mile 35, downstream approximately 29 miles to the northern border of the Phillip W. Schneider Wildlife Area (formerly Murder's Creek Wildlife Area) at about river mile six. OPRD divides this reach into two segments.

The first segment extends from the Post-Paulina Road crossing downstream approximately five miles to Ellingson Mill. This section of river is paralleled by a gravel road which crosses from the east bank to the west bank at Ellingson Mill and can be seen frequently from the river. The road is lightly traveled and provides access to a few ranch dwellings. Utility lines also follow the road and river in this segment. In this segment, the river flows through public lands, managed by the Bureau of Land Management, interspersed with private holdings. The management goal is to allow the continuation of existing ranch, forest and recreation uses while protecting the scenic character of the river corridor. OPRD classifies this segment as a **Scenic River Area**.

The remaining segment of the South Fork extends from Ellingson Mill approximately 24 miles downstream to about river mile six at the north boundary of the Phillip W. Schneider Wildlife Area. The river is paralleled by an all season road which begins on the west river bank, crosses the river shortly downstream from Izee Falls, follows the east bank to the end of the segment and is visible from the river at numerous locations. River frontage in this segment includes state owned lands as well as private parcels and BLM managed lands. While there is access to the river in this segment, there is little evidence of development or settlement. The management goal for this reach is to preserve and protect the fairly primitive and undeveloped character of the river corridor. OPRD classifies this segment as an **Accessible Natural River Area**.

Land Management Rules for the South Fork John Day River Scenic Waterway

736-040-0068

South Fork John Day River Scenic Waterway

1. 1 Accessible Natural River Area:
    a. 1 That segment of scenic waterway beginning at Ellingson Mill at about river mile 30, being at the intersection of the South Fork John Day River with the northern section line of Section 29, Township 16 South, Range 27 East, Willamette Meridian, (Section 29, T 16S, R 27E, W.M.) and extending downstream approximately 24 miles to the north boundary of the Murder's Creek Wildlife Area as constituted on December 8, 1988, at about river mile six, being in the Southeast 1/4 of Section 24, Township 13 South, Range 26 East, Willamette Meridian, (SE1/4, Section 24, T 13S, R 26E, W.M.) is classified as an Accessible Natural River Area.
    b. 1 This Accessible Natural River Area shall be administered consistent with the standards set by OAR 736-040-0035 and OAR 736-040-0040(1)(e)(B). In addition to these standards, all new development in resource zones (i.e. farm and forest related dwellings) shall comply with Grant County land use regulations.
    c. 1 New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation, except as provided under OAR 736-040-0030(5), and except those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on the site, the structure or improvement may be permitted if native vegetation can be established to provide total screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "total screening," as used in Section (1) of this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally obscure (100%) the subject improvement.
    d. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.
    e. 1 New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed mining site, the mining operation may be permitted if native vegetation can be established to provide total screening of the proposed mining site within a reasonable time (4-5 years).

f. 1 New roads may be permitted only when totally screened from view from the river by topography and/ or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created or road design techniques used to totally screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4-5 years).

g. 1 Where existing roads are visible from the river, major extensions, realignments, or upgrades to existing roads shall not be permitted. Necessary minor road improvements shall be substantially screened from view from the river. If inadequate topography or vegetation exists to substantially screen the road improvement, the road improvement may be permitted if acceptable topography can be created or road design techniques used to substantially screen the road at the time of construction or native vegetation can be established to provide substantial screening of the road improvement within a reasonable time (4 -5 years). The condition of "substantial screening," as used in Section (1) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75%) the subject improvement. When an existing road is regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

h. 1 Visible tree harvest or other vegetation management may be allowed provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest and management methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

i. 1 Improvements needed for public outdoor recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

j. 1 Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

k. 1 Whenever the standards of OAR 736-040-0035 and Section (1), Subsections (c) through (j) of this rule are more restrictive than the Grant County Land Use and Development Ordinance, the above Oregon Administrative Rules shall apply.

2. 1 Scenic River Area:

a. 1 That segment of scenic waterway beginning at the Post -Paulina Road crossing at about river mile 35, being in the Northwest 1/4 of Section 9, Township 17 South, Range 27 East, Willamette Meridian, (NW1/4, Section 9, T 17S, R 27E, W.M.) and extending downstream approximately five miles to Ellingson Mill at about river mile 30, being at the intersection of the South Fork John Day River with the northern, section line of Section 29, Township 16 South, Range 27 East, Willamette Meridian, (Section 29, T 16S, R 27E, W.M.) is classified as a Scenic River Area.

b. 1 This Scenic River Area shall be administered consistent with the standards set by OAR 736-040-0035 and OAR 736-040-0040(1)(b)(B). In addition to these standards, all new development in resource zones (i.e. farm and forest related dwellings) shall comply with Grant County land use regulations.

c. 1 New structures and associated improvements shall be substantially screened by topography and/ or native vegetation, except as provided under OAR 736-040-0030(5), and except for those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on a site, the structure or improvement may be permitted if native vegetation can be established to provide substantial screening of the proposed structure or improvement within a reasonable time (4-5 years). The condition of "substantial screening," as used

in Section (2) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75%) the viewed structure or improvement.

d. 1 Commercial public service facilities, including resorts and motels, lodges and trailer parks which are visible from the river, shall not be permitted.

e. 1 New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in ORS 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists on a site, mining and similar forms of development may be permitted if native vegetation can be established to provide total screening of the affected area within a reasonable time (4-5 years). The condition of "total screening," as used in Section (2) of this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to totally obscure (100%) the subject improvement.

f. 1 New roads may be permitted only when totally screened from view from the river by topography and/or vegetation. If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created or road design techniques used to totally screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4-5 years).

g. 1 Where existing roads are visible from the river, extensions, realignments, upgrades, or other improvements, shall only be permitted when substantially screened from view from the river. If inadequate topography or vegetation exists to provide substantial screening, the road improvement may be permitted if acceptable topography can be created or road design techniques used to substantially screen the road at the time of construction or native vegetation can be established to provide substantial screening of the subject improvement within a reasonable time (4-5 years). When an existing road is improved or regraded, no side cast into or visible from the river shall be permitted. Excess material shall be hauled to locations out of view from the river.

h. 1 Visible tree harvest or other vegetation management may be allowed provided that:

A. The operation complies with the relevant Forest Practices Act rules;

B. Harvest and management methods with low visual impact are used;

C. The harvest or vegetation management does not degrade the riparian buffer of any waterway; and

D. The harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5-10 years). For the purposes of this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

i. 1 Improvements needed for public outdoor recreation use or resource protection may be visible from the river but shall be primitive in character and designed to blend with the natural character of the landscape.

j. 1 Proposed utility facilities shall share existing utility corridors, minimize any ground or vegetation disturbance, and employ non-visible alternatives when reasonably possible.

k. 1 Whenever the standards of OAR 736-040-0035 and Section (2), Subsections (c) through (j) of this rule are more restrictive than the Grant County Land Use and Development Ordinance, the above Oregon Administrative Rule shall apply.

5/31/2000 Final Adopted Rules OPRD

National Park Service

Historic Routes and Significant Resources

OREGON NATIONAL HISTORIC TRAIL

The enabling legislation (Public Law 95-625 amendment to the National Trails System Act, PL 90-543) authorized a primary route between Independence, Missouri, and Oregon City, Oregon. Table 1 summarizes the approximate miles by state. The general route is shown on map 1. An official route map for the Oregon National Historic Trail, as required by the National Trails System Act, has been prepared, and the route has been digitized using ARC-INFO, a geographic information system (GIS). The description of the route will be published in the *Federal Register*. If new research identifies more accurate route locations, an official notice of correction will be published.

When the Oregon National Historic Trail legislation was passed, Congress decided to concentrate on the most important right-of-way for purposes of official designation and marking. Where an alternative right-of-way of equal importance existed, both were selected. The years 1841–48 were designated for determining the primary route to avoid confusion with the route of the forty-niners to California. This route also includes the Barlow Road between The Dalles and Oregon City, Oregon, which was developed in 1846. Congress authorized a single route, except for a 126-mile branch (South Alternate Route) between Three Island Crossing, Idaho, and eastern Oregon, and a 114-mile branch (Columbia River Route) used between 1841 and 1846 extending from The Dalles to Oregon City, Oregon (see maps 1 and 7-9).

The route of the Oregon National Historic Trail begins at Independence, Missouri. The emigrants followed the older Santa Fe Trail to the southwest for about 40 miles, then headed northwest for the Platte River. Emigrants crossed the rolling hills of the eastern Great Plains, bisected by numerous rivers and streams, such as the Wakarusa, Kansas, Red Vermillion, Black Vermillion, and Big Blue Rivers. They followed the Little Blue River valley (into Nebraska), and when the river turned south, they continued northwest to the broad Platte River valley.

The emigrants followed the Platte River to its confluence in western Nebraska, crossed the South Platte near California Hill, and descended in the North Platte valley through Ash Hollow. After Ft. Laramie, the first major stopping place on the trail, emigrants moved northwest over the dry ranges connecting the meanders of the North Platte River, crossed and left the North Platte at present-day Casper, and

Table 1: Oregon National Historic Trail — Route Miles by State

State	Miles
Missouri	16
Kansas	165
Nebraska	424
Wyoming	491
Idaho	510
Oregon	524
Total	**2,130**

headed southwest across the high range country of Wyoming toward Independence Rock.

After South Pass, which many emigrants considered to be the halfway point of their trip, they crossed the Dry Sandy and the Big Sandy and eventually reached the welcome water, grass, and shade of the Green River. They then proceeded to Fort Bridger, the second of the major resupply points along the trail, which was then a small and isolated fur trading post.

After Fort Bridger the emigrants went over the rugged Bear River Divide, followed the Bear River into Idaho, and then left it to head across the desert toward Fort Hall, on the banks of the Snake River. Fort Hall was a fur trading post operated by the Hudson's Bay Company. It was also a supply point and aid station for the weary emigrants.

After Fort Hall the emigrants followed the Snake River through southern Idaho. They forded the Snake River at Three Island Crossing whenever possible. Once across, they skirted the mountains north of the Snake toward Fort Boise, another Hudson's Bay Company trading post, and another spot where rest and resupply were possible before crossing the Snake. Approximately half of the emigrants were unable to cross the river at Three Island Crossing, and were forced to use the 126-mile South Alternate Route. Days of hot and dusty travel along the south bank of the Snake awaited emigrants before they could rejoin the main route just west of Fort Boise.

After Fort Boise the emigrants crossed the arid rangeland of eastern Oregon, broken by the Malheur River, and met the Snake for the last time at Farewell Bend. They then turned northwest toward the Columbia River at The Dalles and the Blue Mountains. After the taxing crossing of the Blue Mountains, emigrants turned west and crossed north-central Oregon. They forded the John Day and Deschutes Rivers, finally descending into the Columbia River valley just east of The Dalles.

The overland portion of the trail ended at The Dalles until 1846, when the Barlow Road was opened. Before that time, the emigrants built rafts to travel down the Columbia River to Fort Vancouver, and then up the Willamette River to Oregon City. After 1846 most emigrants preferred to head south from The Dalles to Tygh Valley and then west across the southern shoulder of Mount Hood on the Barlow Road. They then crossed the Cascade Range at Barlow Pass and descended into Oregon City.

CALIFORNIA NATIONAL HISTORIC TRAIL

According to an opinion of the U.S. Department of the Interior's Office of the Solicitor (see appendix C), only those routes and cutoffs identified in the 1987 NPS *Feasibility Study* constitute the authorized route of the California National Historic Trail (see maps 1-6). Table 2 summarizes the approximate number of trail miles by state.

An official route map for the California National Historic Trail, as required by the National Trails System Act, has been prepared, and the routes have been digitized in a GIS format using ARC-INFO. The description of the routes will be published in the *Federal Register*. If new research identifies more accurate trail locations, an official notice of correction will be published.

The NPS 1987 *Feasibility Study* identified the following routes and cutoffs as constituting the congressionally authorized California National Historic Trail. (To help locate the trails, geographic references to present-day towns and highways are used, even though these designations may not have existed during the period being described.)

Main Trail from Independence (Missouri) to the Humboldt Sink(Nevada)

The primary route of the Oregon-California Trail left from Upper Independence Landing at Wayne City and ascended the steep river bluffs to Independence, Missouri, where emigrants outfitted for the journey. Referred to as the Independence Road, the route followed the older Santa Fe Trail southwest out of Independence, crossed the Big Blue River at Red Bridge crossing, and intersected the Westport Road west of present-day Gardner, Kansas. Turning northwest from the Santa Fe Trail, the trail intersected the Westport-Lawrence Road on the Wakarusa River, crossed the Wakarusa River near Lawrence and the Kansas River near Topeka, intersected the Fort Leavenworth–Kansas River Route, and paralleled the north side of the Kansas River. After crossing Red Vermillion Creek, the trail turned north to intersect the St. Joe Road west of present-day Marysville, Kansas.

Table 2: California National Historic Trail — Route Miles by State

State	Miles
Missouri	18
Kansas	290
Nebraska	1,067
Colorado	16
Wyoming	1,088
Idaho	457
Oregon	424
Utah	349
Nevada	1,136
California	994
Total	***5,839***

In Nebraska the trail paralleled the north side of the Little Blue River, intersecting the Oxbow Trail on the south bank of the Platte River (15 miles west of Fort Kearny). Here the trail followed the south bank of the Platte River west to the fork of the Platte. Emigrants followed the south bank of the South Platte and crossed at one of three sites. The lower crossing was opposite O'Fallon's Bluff (2 miles east of Sutherland, Nebraska), the middle crossing was at Ogallala, and the upper crossing (the most popular) was 4 miles west of Brule. After crossing the Platte the routes came together at Ash Hollow on the south bank of the North Platte River.

The main trail headed northwest, following the south bank of the North Platte River, past the landmarks Courthouse, Jail, Chimney, and Castle Rocks to Fort Laramie. This was the most important military post and emigrant resupply point along the entire trail. From here the main trail stayed on the south side of the river but divided into numerous branches — some up on the plateau and others in the floodplain of the North Platte River. The route passed near Ayres Natural Bridge and rejoined the North Platte River 4 miles southeast of Glenrock. The main trail turned west and followed the south bank of the North Platte to the area of Fort Caspar.

West of Fort Caspar the trail route split on the way to Avenue of Rocks, with the main trail coming south through Emigrant Gap and continuing southwest to meet the Sweetwater River near Independence Rock. Here the trail turned west and followed the Sweetwater past Devil's Gate and Split Rock to Three Crossings, where the primary route crossed the Sweetwater four times within 9 miles. Some emigrants avoided these crossings by swinging south on the aptly named Deep Sand route.

After passing Ice Slough the trail crossed the Sweetwater River for the last time at Burnt Ranch and continued southwest to South Pass and the Continental Divide. After crossing Dry Sandy Creek, emigrants arrived at the Parting of the Ways. The primary trail followed a well-watered route southwest, crossing Little Sandy Creek and Big Sandy River, and then heading for the Green River at Lombard Ferry. There were many braids of the main trail and alternate routes between Big Timber Station (6 miles northeast of Lombard Ferry) and Granger, but the primary route crossed the Green River at Lombard Ferry, headed south along the river to the site of the Bridger-Fraeb trading post at Palmer Crossing, and then turned southwest to Granger. From Granger, the trail continued southwest, passed Church Butte, and intersected Blacks Fork, which it followed to Fort Bridger. At Fort Bridger the trail headed north over the Bear River divide to Bear River. The main trail followed the east side of the Bear northward toward Idaho.

Two miles east of the Idaho border the trail route varied, with emigrants trying to find better routes along the Bear River and over the Sheep Creek Hills to Montpelier. The trail then headed north along the east bank of the Bear River and passed through Soda Springs. At Sheep Rock the main trail headed northwest up the Portneuf Valley, crossed the Portneuf River north of the present Chesterfield Reservoir and turned west along Jeff Cabin Creek to the Narrows of Ross Fork Creek. The trail followed Ross Fork to Fort Hall on the Snake River

(the Hudson's Bay Company post). At Fort Hall the primary route followed the east bank of the Snake River south to American Falls and past Massacre Rocks and Register Rock. Three miles east of Tule Island the route split, with the primary route heading southwest to the Raft River crossing.

After crossing the Raft River, the Oregon Trail headed west and the California Trail turned south through the Raft River valley to City of Rocks. The trail climbed through Pinnacle Pass (near Twin Sisters) and Granite Pass, and then dropped to Goose Creek. Emigrants followed Goose Creek south, through the northwest corner of Utah and into Nevada.

Through the Great Basin the trail proceeded southwest, followed Goose Creek, Little Goose Creek, and Rock Spring Creek, through Thousand Springs Valley, and then along West Brush Creek to Willow Creek. At Humboldt Wells (the source of the Humboldt River) the trail followed the north bank of the Humboldt River southwest through Elko, Nevada. The main route stayed near the Humboldt River and passed through narrow Carlin Canyon (during periods of high water, this route was almost impassable). West of Carlin the trail climbed Emigrant Pass and descended through Emigrant Canyon to rejoin the Humboldt at Gravelly Ford. Here the route divided to follow the north and south sides of the river and rejoined at Humboldt Bar, where a series of branches followed various routes across the Sierra Nevada.

Eastern Feeder Routes

Both prior to and during the gold rush years various river towns competed for the lucrative outfitting trade. The following are the routes that developed from east to west along the Missouri River.

St. Joe Road— 1844

Starting in 1844 many emigrants traveled up the Missouri River to St. Joseph to start their journey west, saving two weeks of travel time. Between 1849 and 1851 more emigrants departed from St. Joseph than any other jumping-off point along the Missouri. After leaving the Missouri River bottoms, the trail extended through rolling country to the west, crossing the Wolf and Nemaha Rivers. After intersecting the Fort Leavenworth–Big Blue River route at Marysville, Kansas, the trail crossed the Big Blue River and joined the Independence Road in open prairie 3 miles east of Hanover.

Old Fort Kearny Road (Oxbow Trail)1850

The Old Fort Kearny Road started near the original site of Fort Kearny on Table Creek at Nebraska City. Opened by the U.S. Army in 1847 as a supply road to the new Fort Kearny, the trail was first used in 1850 by emigrants who were too impatient to wait for a ferry at Independence, St. Joseph, or Council Bluffs. After leaving the Missouri River about half way between St. Joseph and Council Bluffs, the road swung northwest toward the Platte. Near Skull Creek the route split. The primary route turned west and then northwest toward the Platte River. The Oxbow Trail alternate went north from Skull Creek to reach the Platte River west of Linwood, where it followed the south bank of the Platte to Deer Creek and met the main Oxbow Trail coming up from David City. The combined route continued along the south bank of the Platte and joined the primary Oregon-California Trail 15 miles west of Fort Kearny.

Council Bluffs Road— 1845

Another major starting point in the later 1840s and 1850s was at Council Bluffs (north of the mouth of the Platte River and across the Missouri River from Omaha). Emigrants could cross at the middle, upper, and lower Missouri River ferries, each following a slightly different route to the vicinity of Fremont, Nebraska, where they joined the main branch of the Council Bluffs Road.

From Fremont the Council Bluffs Road headed west along the north bank of the Platte River to Columbus, where the trail split briefly. The principal route stayed north of the Platte River to the fork. The trail then followed the north bank of the North Platte and entered Wyoming near the town of Henry. The Council Bluffs Road crossed the North Platte River and joined the primary Oregon-California Trail at Fort Laramie.

Central Cutoffs and Alternate Routes

The cutoffs and alternate routes along the central section of the Oregon-California Trail are described from east to west.

Julesburg Cutoff— 1859

After 1859 much of the emigrant and freight traffic on the California Trail continued southwest from the upper crossing of the South Platte River, along the south side of the river, to Julesburg, Colorado. The discovery of gold in 1858 made Julesburg a major stage station. This route added a few miles to the journey, but the stage station offered supplies, and travelers along Lodgepole Creek were able to avoid the difficult ascent of California Hill and the descent of Windlass Hill into Ash Hollow. The Julesburg Cutoff crossed the South Platte River near the present-day town of Ovid, Colorado, and headed north and then west along Lodgepole Creek. The trail turned north just east of Sidney, Nebraska, passed Courthouse and Jail Rocks, and rejoined the primary Oregon-California Trail on the North Platte River 4 miles west of Bridgeport.

Childs Cutoff— 1850

At Fort Laramie, where the Council Bluffs Road crossed the North Platte River to join the main trail on the south bank, Andrew Childs pioneered a new route in 1850 by staying on the north bank of the North Platte between Fort Laramie and Casper. It was tougher going than the main route, but it attracted some use in later years. The Childs Cutoff allowed emigrants to avoid the crush of wagon trains on the south bank, two crossings of the North Platte River, and contamination from diseases being spread along the main trail during peak travel years.

Seminoe Cutoff— 1853

The Seminoe Cutoff bypassed Rocky Ridge and several crossings of the Sweetwater River in Wyoming. Pioneered by a fur trapper named Seminoe, it extended between Warm Springs and Burnt Ranch. The route stayed south of the Sweetwater River. It was never very popular with emigrants, who liked to travel near water, but it was used by freighters and others wanting to pass the slower-moving emigrant wagons.

Lander Road— 1858

Frederick Lander laid out the Lander Road from Burnt Ranch, Wyoming, to Fort Hall, Idaho, and improved the trail from Fort Hall to City of Rocks. The Lander Road saved five days of travel. Emigrants used this route primarily during the 1860s, especially those heading to Oregon and to the Montana minefields.

The trail headed northwest out of Burnt Ranch, ascended Lander Creek, climbed over the Continental Divide at Jensen Meadows, and descended to the Big Sandy River. Continuing west, the trail crossed the New Fork and Green Rivers and passed north of Marbleton. After skirting the south flanks of Mount Thompson, the trail ascended La Barge Creek, climbed over Wagner Pass, and descended to Smiths Fork. It followed the Salt River north to Star Valley and the town of Auburn and then turned west to follow Stump Creek into Idaho.

The trail passed through Terrace Canyon, south of Grays Lake, and between the Limerock and Crater Mountains, crossing the Blackfoot

River, following the south bank of the river to the present Cutthroat Trout campground and heading west to the Portneuf River. After crossing the Portneuf, the trail headed west to meet the primary route of the Oregon-California Trail (coming up from the south) at the Narrows of Ross Fork Creek.

Sublette Cutoff— 1844

On the west side of South Pass numerous cutoffs and alternate routes were developed during the late 1840s. The Sublette Cutoff, first used in 1844 by the Elisha Stevens party, gradually gained favor over the older Fort Bridger Trail because emigrants avoided the long loop down to Fort Bridger and then back up toward Fort Hall, cutting 65 miles and three days off the trip. Its drawback was a lack of good water, including a 50-mile stretch of dry desert known as Sublette Flats. Emigrants continued to use both the Sublette and Fort Bridger routes, but the forty-niners showed a preference for the Sublette Cutoff.

The primary route of the Sublette Cutoff left the main Oregon-California Trail at Parting of the Ways and headed west across Sublette Flats. An alternate route traveled down the Oregon-California Trail to Little Sandy Crossing and swung northwest to intersect the principal cutoff route. After crossing the Little Colorado Desert, the trail crossed the Green River at one of three sites and headed south. At Willow Creek the cutoff split into numerous branches, with the main trail climbing west over Slate Creek Ridge, crossing Wheat Creek (where the Dempsey-Hockaday Cutoff went west), and turning south along the west foot of Commissary Ridge to cross Hams Fork south of Kemmerer Reservoir. The trail then turned northwest and ascended Quakenasp Canyon to Emigrant Springs at Pine Grove (with a connector trail going north to the Dempsey-Hockaday Cutoff). The main trail crossed Dempsey Ridge, descended the Rock Slide, and turned northwest to rejoin the primary Oregon-California Trail coming north from Fort Bridger.

Baker-Davis Road— 1852

In 1852 numerous alternate routes were pioneered from the Sublette Cutoff, as emigrants and gold-seekers sought to take advantage of this shortcut but wanted to avoid the 50-mile crossing of the waterless Sublette Flats. The Baker-Davis Road followed the Big Sandy River farther before turning northwest, thereby avoiding the long desert stretch that the principal cutoff crossed. The starting point for the Baker-Davis Road was 7 miles northeast of Lombard Ferry, just west of Big Timber station. The route crossed the Green River at Case Ferry and joined the Slate Creek Cutoff 2 miles west of Fontenelle, Wyoming.

Kinney Cutoff and Westside Kinney Cutoff 1852

The Kinney Cutoff had several routes and branches that crossed the Green River at four different ferry sites. The main cutoff left the primary Oregon-California Trail 3 miles northeast of Lombard Ferry and headed northwest along the west side of Green River. Four feeder routes came into the Kinney Cutoff from the more northerly Baker-Davis Road. The Westside Kinney Cutoff crossed the Green River at Lombard Ferry and traveled up the west side of the river to meet the other Kinney Cutoff routes at Fontenelle, Wyoming. Two miles west of Fontenelle, the Kinney Cutoff intersected the Baker-Davis Road at the start of the Slate Creek Cutoff.

Slate Creek Cutoff— 1852

The Slate Creek Cutoff was the western extension of the Kinney and Baker-Davis routes. The cutoff began near the Green River, 2 miles west of Fontenelle, Wyoming, and headed west to Emigrant Spring. The trail climbed over Slate Creek Ridge and met the main Sublette Cutoff near Rocky Gap.

Dempsey-Hockaday Cutoff– 1854

The Dempsey-Hockaday Cutoff was a more northerly variant of the Sublette Cutoff, leaving that cutoff at Wheat Creek and heading west. The cutoff crossed Hams Fork north of Lake Vina Naughton, climbed over Dempsey Ridge, and turned northwest to intersect the primary Oregon-California Trail at Big Hill, east of Cokeville, Wyoming.

Hastings Cutoff— 1846

Lansford Hastings believed the best route to California lay directly through the Great Salt Lake Desert. In 1846 Hastings convinced about 80 wagons of late-starting emigrants to try his new route; the last of them was the ill-fated Donner-Reed party. As news spread of the Donner-Reed disaster in the Sierra, the Hastings Cutoff was thoroughly discredited. A few foolhardy gold-rushers used the route in 1849 and 1850, but after 1850 the route was never used again. However, the section of trail from Fort Bridger to Salt Lake City was heavily used by Mormon emigrants and those using the Salt Lake Cutoff.

The Hastings Cutoff started from Fort Bridger and headed southwest, crossing Bear River, passing The Needles and Cache Cave, and traversing Echo Canyon to the Weber River, which it followed to Henefer. From Henefer the trail followed by the first wagon company (the Harlan-Young party) continued down the narrow, tortuous Weber River canyon and emerged from the Wasatch Mountains south of present-day Ogden. The cutoff headed south from Ogden, along the western foot of the Wasatch Mountains, to Magna.

Because Hastings found the Weber River canyon descent to be extremely difficult for wagons, he advised the Donner-Reed party to go south through Main Canyon, over Hogsback Summit, and down East Canyon Creek. The route then turned up East Canyon Creek, through Little Emigration Canyon, over Big Mountain Pass to Mountain Dell, over Little Mountain Summit to Emigration Canyon and into the Great Salt Lake valley. When the Mormon Pioneer Company arrived in 1847, they improved the Main Canyon route, which became the preferred route for subsequent emigrants.

From Salt Lake City the Hastings Cutoff headed west across Tooele Valley, skirting the Oquirrh and the Stansbury Mountains. The trail then turned south to Hope Wells (the last good water) and crossed 83 grueling miles to Donner Spring, on the far side of the Great Salt Lake Desert. Turning northwest, the route climbed through Hastings Pass, crossed the Grayback Hills, and headed out onto the salt flats. The trail entered Nevada near Bidwell Pass.

On the other side of Bidwell Pass and Silver Zone Pass, the cutoff arrived at Big Springs in Goshute Valley, where it turned south and then west to the Sulphur Hot Springs in Ruby Valley. The trail crossed the Ruby Mountains by way of Overland Pass, emerging into Huntington Valley. The cutoff then followed Huntington Creek due north and through the South Fork Humboldt River Canyon, emerging on the Humboldt River to rejoin the primary route of the California Trail north of Moleen.

Salt Lake Cutoff— 1848

Having gotten mired down in mud trying to follow the Hastings Cutoff across the Great Salt Lake Desert in 1848, frontiersman Samuel Hensley led his pack train back to Salt Lake City. He decided to stay near the base of the Wasatch Mountains as he headed north, swinging through Ogden, crossing the Ogden River, and heading north to Utah Hot Springs and Brigham City. The Salt Lake Cutoff then turned northwest over Rattlesnake Pass and headed west across Curlew Valley. Passing Pilot Springs, Emigrant Spring, and Cedar Spring, the trail proceeded northwest into Idaho and the Raft River. Emigrants traveled west through the Raft River Narrows, crossed the Upper Raft River Valley, ascended Emigrant Canyon, and intersected the main California Trail coming from the south at the western end of City of Rocks.

When Hensley originally pioneered the route, he met members of the returning Mormon Battalion, who had just opened the Carson route

of the California Trail, and told them about his new cutoff. At City of Rocks the Mormon group found Hensley's pack route and took their wagons over it to Salt Lake City, thereby adapting the cutoff to wagon use. During the gold rush period, Hensley's Salt Lake Cutoff received heavy emigrant traffic.

Hudspeth Cutoff— 1849

Intending to shave days off their travel time by bypassing Fort Hall, a large wagon train that was captained by Benoni Hudspeth and guided by John J. Myers, split off the California Trail and headed west from Sheep Rock. After crossing Gem Valley the cutoff ascended the Fish Creek and the Portneuf Mountains and dropped into Henderson Canyon. Passing south of Lava Hot Springs, the trail crossed Marsh Valley, climbed over Cedar Mountain, and turned south along Dairy Creek and Little Malad River. The route turned west up Sublett Canyon and crossed the Sublett Range, passed through Sublett Creek Canyon, and emerged from the mountains near Sublett Reservoir. After crossing the Raft River valley, the cutoff rejoined the main California Trail on the west edge of the valley at Cassia Creek. The route took six days, rejoining the California Trail where it left the Raft River. While this route did not save a great deal of time, the remaining year's migration followed this new cutoff.

Western Routes

The western routes are described from east to west.

Carson Route— 1848

During the summer of 1848 members of the disbanded Mormon Battalion pioneered a new wagon trail east across the Sierra Nevada to the Humboldt River. Beginning in Pleasant Valley, east of what would become Placerville, they followed ridges to the crest of the Sierra at West Pass. They then made their way over Carson Pass and along the Carson River to a point near Fallon, Nevada. From there, they struck northerly to the bend in the Truckee River, where they joined the Truckee Route and followed it across the Forty-Mile Desert to the Humboldt Sink and the main California Trail.

As they headed east along the Humboldt River, the Mormons met Joseph Chiles, whom they told of their new wagon trail. Chiles decided to turn southwest at the Humboldt Sink and blaze a wagon trail to the Carson River. The main trail ran through what is now Lahontan Reservoir to Willow Station, across Churchill Valley to Fort Churchill, and up the Carson River to Dayton and then Carson City. The route turned southwest to Mormon Station in the town of Genoa, then south to Daggett Creek, down the western edge of the Carson Valley, and into California to West Carson Canyon. The trail emerged from the canyon at Hope Valley, turned southwest to the top of Carson Pass, the first summit on the route. Continuing west, the trail climbed through Emigrant Valley to West Pass. At 9,600 feet, Covered Wagon Summit was the highest point on the Carson Route and the second highest Sierra Nevada crossing on any emigrant route into California.

The trail then skirted Squaw Ridge to the Plasse Trading Post, descended to Tragedy Springs, and headed west (the route is now followed by U.S. 50). At Leek Springs the Carson Route turned northwest and followed Iron Mountain Ridge to intersect the Johnson Cutoff and Georgetown trails (coming in from the east) at Union House. The trail then turned southwest and passed through Pleasant Valley. At Diamond Springs, a spur trail went north 2 miles to Placerville. Travelers bound for Sacramento continued west to Mormon Tavern and on to Ten Mile House. Sutter's Fort was about 8 miles farther west along the south bank of the American River.

Walker River–Sonora Trail- 1852

In July 1852 merchants and promoters of the community of Sonora subscribed funds for a relief expedition to benefit stranded and starving gold-rushers. Emigrants taking advantage of the relief were expected to head towards Sonora in gratitude. Unfortunately, the high, rough road of the Sonora Pass and the unbroken trail caused great hardships and suffering for those emigrants who tried it.

The Walker River–Sonora Road left the Carson Route at Fort Churchill, turned south through Adrian Valley, and met the Walker River near Yerington, Nevada. The trail followed the Walker River south to Mickey Canyon, then north to rejoin the Walker River only 4 miles southwest of where they left it.

The trail generally followed the West Walker River to its headwaters on a route that wound to the 9,780-foot summit at Sonora Pass, the highest emigrant wagon pass in the United States. Emigrants traveled northwest down Summit Creek and then turned southwest, following ridges to Pinecrest. The route followed the ridge between the South Fork Stanislaus River and the North Fork Tuolumne River before descending along Sullivan and Sonora Creeks to Sonora.

Truckee Route— 1844

After pioneering the Sublette Cutoff west of South Pass, the Elisha Stevens party, accompanied by mountain men Caleb Greenwood and Isaac Hitchcock, continued on the Oregon Trail to the Raft River. They then followed the route used the previous year by the Walker party. After reaching the Humboldt Sink, a Paiute Indian chief whom they named "Truckee" took them west across the Forty-Mile Desert to the Truckee River south of Pyramid Lake. They followed the river through two difficult canyons to an opening over the Sierra Nevada, later known as Donner Pass. Facing snow in late November, they abandoned some of their wagons near Donner Lake and packed on to Sutter's Fort. They retrieved their wagons early the next year, becoming the first emigrant group to take wagons across the Sierra.

Emigrants taking the Truckee Route in later years crossed Humboldt Bar at the west edge of the Humboldt Sink and cut southwest across the Forty-Mile Desert to meet the Truckee River (this route is basically followed by I-80). Emigrants then followed the Truckee River west to Truckee Meadows (near Reno) then to Verdi. The trail climbed to the northwest along the south branch of Dog Creek to Dog Valley, turned southwest through Hoke Valley, crossed the Little Truckee River, and jogged south to Prosser Creek Reservoir, meeting the Truckee River east of Truckee, California, and following the river to Donner Lake.

At Donner Lake the trail split: the 1844 route went over Donner Pass, and an 1846 route (pioneered by Caleb Greenwood) went over Roller Pass; the routes rejoined at Summit Valley, and the trail descended to the South Yuba River, which it followed to Cisco Butte. From here the trail climbed to Crystal Lake, crossed Sixmile Valley and Carpenter Flat, and made the hazardous descent through Emigrant Gap into Bear Valley. The trail then followed the Bear River southwest, up Lowell Hill Ridge, across Deadmans Flat, over the top of Camel's Hump, and made a precipitous descent to Steephollow Crossing. This was the steepest descent encountered in the entire mountain crossing. Continuing southwest (on the north side of the Bear River), the route followed ridges above the river all the way to Johnson's Ranch.

Beckwourth Trail— 1851

Jim Beckwourth, a mulatto trapper, found an easier pass through the Sierra Nevada in the spring of 1851. With the backing of the mining operators at Bidwell Bar and the merchants of Marysville, he intercepted trains headed down the Truckee Route and guided them into Marysville. His route left the Truckee River at Truckee Meadows (near Reno) and headed northwest (a route later followed by U.S. 395). The route ascended Upper Long Valley, climbed over Beckwourth Pass, then headed west across Sierra Valley. It paralleled the Big Grizzly Creek up to Grizzly Valley, climbed over Grizzly Ridge, and descended along Greenhorn Creek to American Valley and the town of Quincy, California. Heading southwest, the trail crossed Meadow Valley, climbed over Bucks Summit, descended to Bucks Lake, crossed Grizzly Summit, and followed ridges south to Mountain House. Emigrants then followed Galen and Canyon Creeks to Bidwell Bar on the Feather River (now flooded by Lake Oroville).

From Bidwell Bar, travelers followed the freight and stage road to Marysville. The Beckwourth Trail was shorter for gold-rushers headed to Bidwell Bar but somewhat longer for those going to Marysville.

Applegate Traibr Southern Road to Oregon 1846

By 1846 a number of attempts had been made to find an alternative to the treacherous Columbia River Gorge route. Jesse Applegate, Levi Scott, and David Goff successfully led a group from Polk County, Oregon, down the Old Trappers Trail to California as far south as Ashland, Oregon. Turning east, they dipped into the northeastern corner of California, swung south around Goose Lake, and headed southeast through High Rock Canyon and over the Black Rock Desert. They finally reached the Humboldt River and the main California Trail at Lassen Meadows (the northern tip of today's Rye Patch Reservoir). Soon a number of Oregon-bound emigrants were persuaded to leave the established Oregon Trail and try this new route. It was an arduous trip that stretched much longer than planned.

From Lassen Meadows, westbound emigrants headed northwest to Rabbithole Springs, across the 50-mile Black Rock Desert to Black Rock Springs — the long-awaited "oasis in the desert" and the first adequate water since leaving the Humboldt River. The trail continued north and west, passing over Fortynine Pass and into California, skirting Upper Alkali Lake to the south, and climbing northwest through Fandango Pass to Goose Lake. From here the trail headed west, reaching Bloody Point, the site of several fatal conflicts between emigrants and the Modoc Indians.

The Applegate Trail swung around the southern edge of Lower Klamath Lake to Willow Creek. then headed northwest to Lake Miller in Oregon, and continued west across the Cascade Mountains, and descended to Tyler Creek. The route turned northwest to Ashland and Medford, followed the south bank of the Rogue River to Grants Pass, and then headed north (this route is now followed by I-5).

The trail passed Canyonville, crossing the South and North Umpqua Rivers, Calapooya Creek, and following Cabin Creek north to Pleasant Valley, where the trail split (with the western branch heading north and the eastern branch heading northeast and following the west bank of the Willamette River through Eugene), and rejoined 2 miles south of Monroe. The trail then paralleled the west side of Muddy Creek to Corvallis, and north along the route now followed by Oregon 99W. After crossing Calloway Creek, the trail turned northwest and arrived at Rickreall Creek, east of Dallas, Oregon.

Nobles Trail— 1852

The Nobles Trail was opened by William H. Nobles, with the financial backing of merchants in Shasta City (west of Redding, California). Emigrants using the Nobles Trail left the main California Trail at Lassen Meadows and followed the Applegate Trail west. At Black Rock Springs the Nobles Trail turned southwest to Granite Creek. By 1856, however, the discovery of Trego Hot Springs made it possible to leave the Applegate Trail at Rabbithole Springs and head due west to Granite Creek, shortening the journey by about 23 miles. From Granite Creek the Nobles Trail headed west from spring to spring (Gerlach Hot Spring, Deephole Spring, Buffalo Springs) to Smoke Creek Canyon and into California.

The trail then turned south, west, then south again to Honey Lake Valley, and followed the Susan River west to Susanville. On the west side of Honey Lake Valley the trail began to ascend the Sierra Nevada, passing Big Spring and turning northwest to the junction with the Lassen Trail near Feather Lake. The Nobles Trail followed the Lassen Trail north for 3 miles, then it headed north and west to Black Butte Creek. Here the trail turned south and entered the area of Lassen Volcanic National Park, then it climbed over Nobles Pass and descended to Manzanite Creek, which it followed to Shingletown. The route followed the Shingle Creek drainage for a few miles and then turned southwest to Fort Redding, then northwest, crossing the Sacramento River and reaching Shasta City .

Lassen Trail— 1848

In 1848 Peter Lassen and a small wagon train left the Humboldt River on the Applegate Trail to reach his ranch in the northern Sacramento Valley. Lassen turned off the Applegate Trail at the southern end of Goose Lake and led his party down the Pit River and beyond, until the group became demoralized and in need of provisions. Fortunately, two Oregon groups headed for the goldfields (one a wagon party led by Peter Burnett and the other a packing party) caught up with Lassen's group about 50 miles from his ranch. The Oregonians provided aid and helped the stragglers reach their destination.

MORMON PIONEER NATIONAL HISTORIC TRAIL

The enabling legislature authorized a route commemorating the 1846–47 journey of the Mormon Pioneer party (see maps 1 and 10-11). Table 3 summarizes the approximate number of trail miles by state.

The official route map for the Mormon Pioneer National Historic Trail has been prepared, as required by the National Trails System Act, and the route has been digitized in a GIS format using ARC-INFO. The description of the route will be published in the *Federal Register.* If new research identifies more accurate trail locations, an official notice of correction will be published.

The route begins at Nauvoo, Illinois, a former Sauk and Fox Indian village on the east bank of the Mississippi River. Under the leadership of Brigham Young, the original pioneer party started February 4, 1846, crossing by ferry to the Iowa shore. The route in Iowa commenced at Sugar Creek Camp, where the main camp began to roll on March 1, 1846, traveling up the east side of the Des Moines River, fording the river near Bonaparte, then paralleling the southern border of Iowa to the Corydon vicinity. There they turned northward across the prairie to near Osceola, then traveled westward to the Council Bluff area and the Missouri River, arriving there on June 13, 1846.

Table 3: Mormon National Historic Trail — Route Miles by State

State	Miles
Illinois	2
Iowa	317
Nebraska	511
Wyoming	511
Utah	74
Total	***1,415***

The Mormon pioneers crossed the Missouri River and entered present-day Nebraska on June 29, 1846. They established the Mormon settlement of Winter Quarters on the west bank, which was then frontier lands of the Omaha Indian Nation. That summer, advance parties traveled as far as the Elkhorn, Loup, and Niobrara Valleys in quest of desirable wintering sites.

The trek across Nebraska began from Winter Quarters in April 1847. The pioneers assembled first at the Crossing of the Elkhorn, then later at Liberty Pole Camp on the bank of the Platte, near Fremont. They followed the broad floodplain of the Platte River to Columbus, turned up the Loup Fork to pass Pawnee Mission, then crossed the Loup River near the 98th meridian and returned to the Platte River near Grand Island.

Brigham Young and his followers paralleled the north side of the Platte, measuring and recording their travel for future trail guidance. Upon reaching the junction of the North and South Forks of the Platte, they chose to move along the northern branch of the river where, on May 18, they found themselves opposite the camping grounds of Ash Hollow. Leaving the Sand Hills, they passed Chimney Rock, Courthouse Rock, and Scotts Bluff, and they left Nebraska on May 31 near Henry, where they could see the snow of Laramie Peak far to the west.

Brigham Young and his pioneers entered present-day Wyoming on June 1, 1847, and camped in the vicinity of Fort Laramie (Ft. William), where they were joined by the Mississippi Branch of Latter-day Saints. After conferring with the fort's inhabitants about trail conditions, they forded the North Platte River and continued west following the Oregon Trail to the Casper area, where they established the Mormon Ferry to recross the river.

They departed the North Platte to continue overland to the Sweetwater River and Independence Rock. The pioneers then proceeded up that drainage to cross the Continental Divide at South Pass. In the Pacific drainage, they followed the Big Sandy and its tributary to the Green River.

Leaving the Green River Valley, the Mormon pioneer party continued along the Oregon Trail to Fort Bridger, then followed the Donner-Reed route, crossing the Bear River and departing the state of Wyoming in the vicinity of the Needles.

Entering present-day Utah, Brigham Young and his followers passed Cache Cave, then proceeded down the precipitous Echo Canyon, followed the Weber River north to Henefer, then turned away from the river and up the main canyon to Hogsback Summit. There they had their first real view of the Wasatch country. They continued along the Donner-Reed route descending to East Canyon, then south along the creek to Mormon Flats. Here they turned west following Little Emigration Canyon to the bald and rocky crest of Big Mountain Pass. They rough-locked their wagon wheels for a straight-down descent to Mountain Dell Canyon, where they took a southerly direction. The route then swung west over the dividing ridge of Little Mountain summit, the last summit on the long trail, and to a sharp descent to Emigration Canyon. The final lap was on the short but treacherous winding and narrow canyon floor of "This is the Place." The pioneer scouts first reached the Valley of the Great Salt Lake on July 21, 1847, and the main body on July 22; due to illness, Brigham Young followed the main body two days later.

PONY EXPRESS NATIONAL HISTORIC TRAIL

The enabling legislation authorized a route of approximately 2,000 miles, including the original route and subsequent route changes, extending from St. Joseph, Missouri to Sacramento, California, as described in the National Park Service's 1987 *Feasibility Study*. Separate legislation in 1992 and a subsequent *Feasibility Study* resulted in the secretary of the interior adding the route from Sacramento to San Francisco in 1997. Table 4 summarizes the approximate number of trail miles by state and includes the mileage from Sacramento to San Francisco.

The general route is shown on maps 1-6. It is difficult to identify a specific set of miles for the Pony Express route because it changed through time, particularly after its starting point moved to Atchison, Kansas.

An official route map for the trail, as required by the National Trails System Act, has been prepared, and the route has been digitized in a GIS format using ARC-INFO. The description of the route will be published in the *Federal Register*. If new research identifies more accurate trail locations, an official notice of correction will be published.

For the most part the eastern segment of the route follows the Oregon, California, and Mormon Pioneer trails through Missouri, Kansas, Nebraska, and Wyoming. In eastern Kansas the route initially avoided the St. Joe Road of the Oregon-California Trail, following a network of established roads and trails until meeting the St. Joe Road and the main Oregon-California Trail slightly farther west.

In Nebraska the Pony Express Trail followed the main trail to and along the south bank of the Platte to the junction of the South Platte, which the Pony Express followed into Colorado to Julesburg. Turning

Table 4: Pony Express National Historic Trail — Route Miles by State

State	Miles
Missouri	1
Kansas	139
Nebraska	441
Colorado	16
Wyoming	540
Utah	241
Nevada	404
California	223
Total	**2,005**

northwest, the trail reentered Nebraska and continued back to the North Platte River to rejoin the main Oregon-California Trail into Wyoming. In Wyoming the route followed the main trail route along the North Platte to present-day Casper, then followed the Sweetwater River until crossing the Continental Divide at South Pass. The Pony Express Trail left the Oregon-California Trail at Fort Bridger and followed the Mormon Pioneer Trail and the Hastings Cutoff of the California Trail southwest into Salt Lake City.

The Pony Express Trail left the Hastings Cutoff and headed south to avoid the Great Salt Lake. It then proceeded westerly through the barren, desolate land to Nevada. The next portion of the route covered high desert and crossed several mountain ranges to Carson City. Then the trail turned south to Genoa, where it reconnected with the Johnson Cutoff of the California Trail. It followed the Carson River and scaled the Sierra Nevada at Echo Summit, descended the South Fork of the American River to Placerville and then to Sacramento, following what is now old U.S. Highway 50. The later Kingsbury-McDonald route over Johnson Pass also descended along the South Fork to Placerville, cutting out about 12 miles.

Significant Resources

The National Trails System Act provides for the identification of high-potential sites and segments, based on criteria established in the act. These criteria include historic significance, the presence of visible historic remnants, scenic quality, and relative freedom from intrusion. 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 or affording an opportunity to vicariously share the experience of the original users of a historic route. Each site or segment must have the potential to interpret the trails' historical significance and to provide opportunities for high-quality recreation.

This plan acknowledges that the lists of high-potential sites and segments for each trail must be flexible and will require periodic updates. Under both alternatives a mechanism is provided to modify and revise high-potential sites and segments as new information becomes available, or if the integrity of trail resources becomes compromised.

All of the information on sites and segments gathered during the planning process and submissions received from resource managers and trail organizations through September 18, 1997, has been entered into the database. This database is available at the Long Distance Trails Office. In the future it will be linked to the GIS mapping effort completed as part of this planning process.

Revisions have been made to the lists of high-potential sites and segments for each trail to reflect comments received during the various review processes and to reflect research conducted by the Long Distance Trails Office since the release of the *Draft Comprehensive Management and Use Plan / Draft Environmental Impact Statement.*

OREGON NATIONAL HISTORIC TRAIL: HIGH-POTENTIAL SITES AND SEGMENTS UPDATE

Modifications to the original listing of sites and segments identified in the *Comprehensive Management and Use Plan* for the Oregon National Historic Trail have resulted in the addition of 5 segments and 20 sites, the modification of 1 segment, and the deletion of 7 sites. Since the publication of the draft plan the Long Distance Trails Office has refined the list of high-potential resources associated with this trail. Four sites have been added, 10 have been deleted, and 15 names of sites or segments have been modified (see maps 7-9, and appendixes G and H).

Table 5 indicates the number of high-potential sites and segments by state. Table 6 displays the mileage of segments by state.

This list can be modified in the future to add sites and segments that additional research might indicate to be worthy of inclusion. Sites and segments can also be deleted from this list.

Table 5: Oregon National Historic Trail — High-Potential Sites and Segments by State

State	Sites	Segments
Missouri	7	0
Kansas	14	1
Nebraska	17	0
Wyoming	32	5
Idaho	32	3
Oregon	27	6
Washington	2	0
Total	***131***	***15***

Table 6: Oregon National Historic Trail — Mileage of High-Potential Segments

State	Number of Segments	Number of Miles
Kansas	1	6
Wyoming	5	243
Idaho	3	114
Oregon	6	82
Total	***15***	***445***

CALIFORNIA AND PONY EXPRESS NATIONAL HISTORIC TRAILS: HIGH-POTENTIAL SITES AND SEGMENTS

From the extensive list of submissions, 244 sites and 52 segments listed in tables 7 and 8 have been identified as high-potential (for a more comprehensive description of these resources, see appendixes E and F and maps 2-6). The segments total 2,077 miles. Some of these sites and segments have already been classified as high-potential in the plans for the Oregon and Mormon Pioneer Trails.

Since the publication of the draft plan, the Long Distance Trails Office has refined the list of high-potential resources associated with this trail. These changes are the result of the opinion by the U.S. Department of the Interior's Office of the Solicitor, public comments, and additional research conducted by the Long Distance Trails Office. Seven segments were deleted, seven were added, and the names of seven segments were modified. A total of 37 sites have been deleted, 14 have been added, and the names of 26 sites have been modified (see maps 2-6 and appendixes E and F).

This list of high-potential resources can be modified in the future to add sites and segments that additional research might indicate to be worthy of inclusion. Sites and segments can also be deleted from this list.

A list of sites and segments that may merit inclusion as high-potential sites and segments in the future was developed during the planning process and is part of the resource database maintained at the Long Distance Trails Office.

Table 7: California and Pony Express National Historic Trails — High-Potential Sites and Segments by State

State	Sites	Segments
Missouri	11	0
Kansas	23	1
Nebraska	27	0
Wyoming	39	8
Utah	25	5
Idaho	16	3
Nevada	39	15
Oregon	15	3
California	49	17
Total	**244**	**52**

Table 8: California and Pony Express National Historic Trail — Mileage of High-Potential Segments

State	Number of Segments	Number of Miles
Kansas	1	16
Wyoming	8	356
Utah	5	588
Idaho	3	62
Nevada	15	584
Oregon	3	49
California	17	422
Total	**52**	**2,077**

MORMON PIONEER NATIONAL HISTORIC TRAIL: HIGH-POTENTIAL SITES AND SEGMENTS UPDATE

The original listing of sites and segments identified in the 1981 *Comprehensive Management and Use Plan* for the Mormon Pioneer National Historic Trail has been updated, resulting in the addition of 3 segments, the modification and extension of 3 segments, the addition of 7 sites, and the deletion of 33 sites. The plan did not specify mileages for some of the initial protection segments, but an examination of the document maps reveals about 40 miles of trail were identified as high-potential. This plan extends that mileage to 307 miles.

Sites were deleted from the list of high-potential sites because they failed to meet the criteria described in the legislation or were not associated with the pioneer trip of 1846–47. The original plan rated most of these sites C-2, indicating that they were of low priority and related to the period after the pioneer migration. However, many of these sites were part of the expanded high-potential segments and would continue to receive the protection such designation entails. Other sites have been deleted because there is disagreement as to their location.

Since the publication of the draft plan the Long Distance Trails Office has refined the list of high-potential resources associated with this trail. A total of 5 sites have been added, 1 has been deleted, and the names of 10 sites or segments have been modified (see maps 10-11, and appendixes I and J).

Table 9 indicates the number of high-potential sites and segments by state. Table 10 displays the mileage of segments by state.

This list can be modified in the future to add sites and segments that additional research might indicate to be worthy of inclusion. Sites and segments can also be deleted from this list.

Table 9: Mormon Pioneer National Historic Trails — High-Potential Sites and Segments by State

State	Sites	Segments
Illinois	2	0
Iowa	10	0
Nebraska	12	0
Wyoming	30	4
Utah	5	2
Total	**59**	**6**

Table 10: Mormon Pioneer National Historic Trail — Mileage of High-Potential Segments

State	Number of Segments	Number of Miles
Wyoming	4	212
Utah	2	95
Total	**6**	**307**

Exhibit S

Historic, Cultural, and Archaeological Resources

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Acronyms and Abbreviations

AC	alternating current
AINW	Archeological Investigations Northwest Inc.
ASC	Application for Site Certificate
BCP	Boardman Coal Plant
BESS	battery energy storage system
Certificate Holder / PGE	Portland General Electric Company
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
HPRCSIT	Historic Property of Religious or Cultural Significance to Indian Tribes
LCIS	Legislative Commission on Indian Services
MW	megawatt
NRHP	National Register of Historic Places
OAR	Oregon Administrative Rules
OARRA	Oregon Archaeological Records Remote Access
ODOE	Oregon Department of Energy
ORS	Oregon Revised Statutes
RFA	Request for Amendment
SHPO	Oregon State Historic Preservation Office
WillametteCRA	Willamette Cultural Resources Associates Ltd.

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1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

The Oregon Energy Facility Siting Council (Council) previously found the Certificate Holder has demonstrated an ability to construct, operate, and retire the Facility in compliance with Council standards and conditions of the Site Certificate. Exhibit S provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(s) in support of RFA 4. Exhibit S provides an analysis of potential significant adverse impacts of the Facility to historic, cultural, and archaeological resources. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate (ASC), previous RFAs, and Oregon Department of Energy (ODOE) Final Orders to demonstrate that the Carty Generating Station (Facility), as modified by RFA 4, continues to comply with applicable Site Certificate Conditions and the approval standards in OAR 345-022-0090, providing evidence to support findings by the Council as required by OAR 345-022-0090. Specifically, OAR 345-022-0090 states that:

> ***345-022-0090 Historic, Cultural and Archaeological Resources***
>
> *(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 ORS 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.

2.0 Information About Historic, Cultural, and Archaeological Resources – OAR 345-021-0010(1)(s)

OAR 345-021-0010(1)(s) Information about historic, cultural and archaeological resources. Information concerning the location of archaeological sites or objects may be exempt from public disclosure under ORS 192.345(11). The applicant must submit such information separately, clearly marked as "confidential," and shall request that the Department and the Council keep the information confidential to the extent permitted by law. The applicant must include information in Exhibit S or in confidential submissions providing evidence to support a finding by the Council as required by OAR 345-022-0090, including:

Pursuant to OAR 345-021-0010(1)(s), this exhibit provides information about historic, cultural, and archaeological surveys conducted for the Amended Carty Solar Farm and general findings of those surveys. More detailed information is provided in the 2023 Cultural Resources Survey Report, Carty Generating Station (Attachment S-1). In addition, the historic, cultural, and archaeological information provided comes from the Archaeological Inventory for the PGE Carty Expansion Project (WillametteCRA 2016), previously provided as part of RFA 1.

The cultural resources survey reports are confidential documents, which are exempt from public disclosure under Oregon Revised Statutes (ORS) 192.345(11); Attachment S-1 is provided to ODOE under separate cover. The Certificate Holder has provided a copy of the confidential 2023 cultural resources survey report to the Oregon State Historic Preservation Office (SHPO) and area Tribes identified by the Legislative Commission on Indian Services (LCIS) as the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO). The 2016 report has been reviewed by SHPO and is available to the Tribes on SHPO's Oregon Archaeological Records Remote Access (OARRA) database.

3.0 Analysis Area

Pursuant to OAR 345-021-0010(1)(s)(A) and (B), the analysis area for historic, cultural, and archaeological resources in support of RFA 4 consists of both direct and indirect analysis areas.

Direct Analysis Area

The direct analysis area is composed of approximately 1,061 acres within the Amended Site Boundary. The Amended Site Boundary is defined in detail in Section 4.1.1.2 of RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station). The direct analysis area is referred to in this exhibit as the Cultural Resources Study Area (see Figure S-1). The Cultural Resources Study Area is where the Certificate Holder is proposing permanent and temporary disturbance for RFA 4.[1] All permanent and temporary disturbance associated with RFA 4 are proposed within the Cultural Resources Study Area; however, not all of the study area will be disturbed. For example, Figure S-1 shows that the study area includes portions of the northern shoreline along Carty Reservoir; however, the actual disturbance associated with RFA 4 will be setback from the northern shoreline (see Figure 2 in RFA 4's Division 27 document [Request for Amendment 4 for the Carty Generating Station]). Figure S-1 also shows that separate surveys in 2016 by Willamette Cultural Resources Associates (WillametteCRA 2016) and by Tetra Tech in 2023 (Attachment S-1) were conducted to investigate cultural and historic resources within the Cultural Resources Study Area/direct analysis area.

Indirect Analysis Area

A records review (i.e., literature and SHPO database reviews) was conducted prior to both the 2016 (WillametteCRA 2016) and 2023 cultural resources surveys (Attachment S-1) to identify previously recorded built environment and Historic Properties of Religious and Cultural Significance to Indian Tribes (HPRCSITs). Prior to the 2023 survey, a records review was conducted within and extending out to 1-mile (i.e., 1-mile buffer)—and a further expansion south beyond this 1-mile buffer—from the Cultural Resources Study Area. Figure S-1 shows the 1-mile records review boundary as the 2023 Records Review Area. This boundary forms the indirect analysis area.

Historic Built Environment

In support of RFA 3, the Certificate Holder conducted a desktop review of aerial photographs and assessors' records to identify historic built environment resources within the RFA 3 site boundary and within one mile of the RFA 3 site boundary. The boundary studied within this records review (1-mile buffer from the RFA 3 site boundary) is shown on Figure S-1 and encompasses all areas

[1] The Cultural Resources Study Area used for Exhibit S is not exactly the same as the study area boundary used to direct biological surveys for Exhibits J, P, and Q. The study area for cultural resources was defined significantly later than the boundary for biological studies. Thus, the site layout and associated disturbances had been refined and were subtly different when the Cultural Resources Study Area was defined. However, the differences are minor and both the cultural and biological study areas encompass all permanent and temporary disturbance associated with RFA 4.

within 1 mile of the Amended Site Boundary. This boundary is referred to on Figure S-1 as the Analysis Area for 2022 Review for Historic Resources of the Built Environment. No historic buildings are documented within the 1-mile buffer.

4.0 Historic and Cultural Resources within the Analysis Area

Pursuant to OAR 345-022-0090(1)(a), this exhibit addresses potential impacts to significant historic, cultural, and archaeological resources. Significant resources, in this context, refers to structures, objects, or sites that:

1. Are currently listed on the National Register of Historic Places (NRHP) as individual sites or contributing resources to a recognized historic district;
2. Have been deemed eligible for listing by SHPO; or
3. Would become a contributing resource to a historic district or site as a result of a proposed preservation plan.

Pursuant to OAR 345-022-0090(1)(b) this exhibit also addresses potential impacts to archaeological objects and sites. Archaeological objects and sites are defined in Oregon Revised Statutes (ORS) 358.905(1) as follows:

- Archaeological object – means an object that is at least 75 years old, part of the physical record of an indigenous or other culture found in the state or waters of the state, and 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.
- Archaeological site – 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 association of the archaeological objects with each other or biotic or geological remains or deposits.

4.1 Historic and Cultural Resources Listed, or Likely Eligible for Listing, on the National Register of Historic Places – OAR 345-021-0010(1)(s)(A)

OAR 345-021-0010(1)(s)(A) Historic and cultural resources within the analysis area that have been listed, or would likely be eligible for listing, on the National Register of Historic Places.

No historic or cultural resources were identified within the direct analysis area. Thus, no historic or cultural resources within the direct analysis area have been listed, or would likely be eligible for listing, on the NRHP.

One HPRCSIT (Šišúpa) within the indirect analysis area has been listed, or would likely be eligible for listing, on the NRHP. Four precontact archaeological sites in the indirect analysis area

(35MW15, 35MW16, 35MW17, 35MW18) are currently listed as "Unevaluated/Important" in the SHPO database.

4.2 Archaeological Objects and Sites on Private Lands within the Analysis Area – OAR 345-021-0010(1)(s)(B)

OAR 345-021-0010(1)(s)(B) For private lands, archaeological objects, as defined in ORS 358.905(1)(a), and archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area.

Background research identified no previously recorded archaeological sites on private lands within the direct analysis area. The 2023 Cultural Resources Survey Report (Attachment S-1) identified no new archaeological sites on private lands within the direct analysis area.

One HPRCSIT (Šišúpa), five precontact archaeological sites (35MW15, 35MW16, 35MW17, 35MW18, 35MW19), and two archaeological isolates occur on private lands within the indirect analysis area.

No new archaeological sites were identified during the 2023 survey.

4.3 Archaeological Sites on Public Lands within the Analysis Area – OAR 345-021-0010(1)(s)(C)

OAR 345-021-0010(1)(s)(C) For public lands, archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area.

The direct and indirect analysis areas are located entirely on private property. No archaeological or historic resources were identified on public lands.

5.0 Significant Potential Impacts of Construction and Operation, and Retirement of the Facility on Historic, Cultural, and Archaeological Resources - OAR 345-021-0010(1)(s)(D)

OAR 345-021-0010(1)(s)(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:

5.1 Methods – OAR 345-021-0010(1)(s)(D)(i)

(i) A description of any discovery measures, such as surveys, inventories, and limited subsurface testing work, recommended by the State Historic Preservation Officer or the National Park Service of the U.S. Department of Interior for the purpose of locating,

identifying and assessing the significance of resources listed in paragraphs (A), (B) and (C);

A cultural resources survey was completed by Tetra Tech in 2023 for previously unsurveyed areas within the direct analysis area (see Attachment S-1). The 2016 survey conducted by WillametteCRA also covered areas within the direct analysis area. The cultural resources surveys included desktop studies and field studies described separately below. These surveys meet the requirements of Site Certificate Condition 11.3 in the Third Amended Site Certificate, which requires that field investigation be conducted in all areas to be disturbed during construction that lie outside the previously surveyed areas (Council 2022).

5.1.1 Desktop Study

Tetra Tech reviewed the Oregon SHPO's Online Archaeological Records Remote Access and Historic Sites databases to identify previously conducted surveys and recorded cultural resources within the analysis area. Additionally, historic aerial photographs and maps of the analysis area were reviewed to inform the surveys. Efforts focused on collecting information regarding previously recorded cultural resources, areas where potential unrecorded resources may exist, and potential locations of unrecorded historic sites within the analysis area. This research provided a summary of the type and frequency of cultural resources that may be encountered during the course of the subsequent survey.

The most recent records review by Tetra Tech was completed on September 16, 2023. The results indicate that 18 previous cultural resource studies have been performed within the analysis area. Five of the previous cultural resource studies have been performed within the direct analysis area (Table S-1). One was carried out prior to construction of Carty Reservoir, two were related to the PGE Cascade Crossing transmission line project, one was carried out for the PGE Carty Lateral gas pipeline, and one was carried out for RFA 1 for expansion of the CGS.

One place name was identified in the vicinity of the Facility and is recorded as an HPRCSIT by the CTUIR. Šišúpa means "rotten odor place" in reference to a spring (Hunn et al. 2015) that was likely odiferous due to high alkalinity. Šišúpa was used as a "stop over" between the Columbia River and Ione, Oregon (Hunn 2015). According to the OARRA database, the HPRCSIT has been determined to be NRHP-eligible and occurs approximately 0.25 miles outside the Amended Site Boundary but within the indirect analysis area.

Table S-1. Previous Surveys Completed within the Direct Analysis Area

SHPO Report #	Authors	Year	Title
106	David L. Cole	1977	Archaeological research in the Carty and Pebble Springs Reservoir Areas in the Columbia Plateau of Oregon
26783	Michael S. Kelly et al.	2013	Archaeological Survey for Portland General Electric's Cascade Crossing Transmission Project, Morrow, Gilliam, Sherman, and Wasco Counties, Oregon
26786	Donald Shannon et al.	2011	Ethnographic Report for Portland General Electric's Cascade Crossing Transmission Project, Morrow, Gilliam, Sherman, Wasco, Clackamas, and Marion Counties, Oregon
27594	Brennan P. Bajdek, Terry L. Ozbun	2015	Cultural Resource Survey for the Proposed Carty Lateral Project, Morrow County, Oregon. Addendum Eight Hydrostatic Test Fill Pipeline and Water Withdrawal Temporary Extra Work Area
28567	Paul S. Solimano, Breanne Taylor	2016	Archaeological Inventory for the PGE Carty Expansion Project, Morrow County, Oregon

No cultural resources have been previously identified in the direct analysis area.

On February 1, 2022, a letter documenting a desktop review of the RFA 3 site boundary and 1-mile buffer was submitted to SHPO (SHPO Case NO. 10-0046). In support of RFA 3, the Certificate Holder conducted a desktop review of aerial photographs and assessors' records to identify historic built environment resources within the RFA 3 site boundary and within one mile of the RFA 3 site boundary. The letter documents that there are no historic buildings within the 1-mile buffer. While the letter had indicated that the BCP facility was present in the area, it was ineligible for listing on the NRHP. This letter is included as Appendix A to the 2023 Cultural Resources Survey Report (Attachment S-1).

On August 21, 2023, the Certificate Holder consulted with LCIS, requesting assistance in identifying appropriate tribes to consult with regarding Tribal historic, and cultural resources in the vicinity of the Facility. LCIS identified CTUIR and CTWSRO. On August 24, 2023, the Certificate Holder sent outreach letters via email to representatives of CTUIR and CTWSRO. These letters introduced proposed changes to the Facility through RFA 4 and requested input regarding the potential impacts of the amended Facility on resources of concern to the tribes.

On October 6, 2023, the Certificate Holder followed up to notify the CTUIR and CTWSRO of plans for a cultural resources survey. On October 6, 2023, CTUIR responded, indicating the Facility is within the areas of concern for the Tribe and included previous comments to ODOE regarding RFA 2[2]: Comments specific to cultural resources centered on previous archaeological surveys and oral histories highlighting the importance of past use of the CGS area by the CTUIR, and the CTUIR recommended that ground disturbance occurring under RFA 2 be monitored for archaeological resources.

[2] Final Order on Request for Amendment 2 to the Site Certificate for the Carty Generating Station, pp. 63-64 (November 2020).

Demolition of the BCP was completed at the end of 2023. Therefore, historic built environment resources will not be impacted by the changes proposed with RFA 4 and no further analysis of built environment resources is provided in this exhibit.

Follow-up conversations with CTUIR are ongoing. At the time of this exhibit, no response from the CTWSRO had been received to the initial letter or subsequent emails.

5.1.2 Field Surveys

Tetra Tech conducted a "non-collection" cultural resources survey of the entire direct analysis area between October 11 and 13, 2023 (Attachment S-1).

The survey of the direct analysis area consisted of a pedestrian survey that included both intensive survey and reconnaissance survey. Areas covered by intensive survey included personnel walking transects spaced no more than 20 meters apart. Portions of the direct analysis area characterized by substantial disturbance and ongoing demolition of the BCP comprising approximately 188.5 acres of the direct analysis were surveyed at a reconnaissance level that included observations and photographs.

Due the acceptable ground visibility encountered during the survey and level of disturbance, no subsurface shovel probes were excavated in the direct analysis area.

5.2 Survey and Inventory Results– OAR 345-021-0010(1)(s)(D)(ii)

> *(ii) The results of the discovery measures described in subparagraph (i), together with an explanation by the applicant of any variations from the survey, inventory, or testing recommended;*

As a result of the records review and cultural resource fieldwork, no cultural resources were identified within the direct analysis area during the 2023 survey (Attachment S-1). Likewise, WillametteCRA did not identify any cultural resources in the portions of the 2016 survey that overlap with the direct analysis area.

Construction of the Amended Carty Solar Farm will proceed within the current direct analysis area within the framework of PGE's Inadvertent Discovery Procedure included as Appendix D to the 2023 Cultural Resources Survey Report (Attachment S-1). Should the design plans change or the Amended Carty Solar Farm expand into any new areas, additional archaeological surveys may be necessary to determine whether archaeological resources are present.

The Certificate Holder understands that the HPRCSIT extends into the indirect analysis area and is a significant resource to the CTUIR. The Certificate Holder is open to continued dialogue with the CTUIR about these resources.

5.3 Measures Designed to Prevent the Destruction of Historic, Cultural, and Archaeological Resources – OAR 345-021-0010(1)(s)(D)(iii)

(iii) A list of measures to prevent destruction of the resources identified during surveys, inventories and subsurface testing referred to in subparagraph (i) or discovered during construction.

Construction of the Amended Carty Solar Farm will proceed within the framework of PGE's Inadvertent Discovery Procedure in the event that archaeological resources or human remains are discovered (Appendix D of Attachment S-1).

The Certificate Holder can comply with the existing Site Certificate conditions (11.2 through 11.5) in the Third Amended Site Certificate regarding measures for Protection of Historic, Cultural, and Archaeological Resources (Council 2022). Specifically, the Certificate Holder will ensure that a qualified archaeologist, as defined in OAR 736-051-0070, develops a training program for cultural resources (Site Certificate Condition 11.4). The training program will instruct construction personnel in the identification of cultural materials and avoidance of accidental damage to identified resource sites. Records of such training shall be maintained at the administration/control building and made available upon request. In addition, the Certificate Holder will ensure construction personnel cease all ground-disturbing activities in the immediate area if any archaeological or cultural resources are found during construction until a qualified archeologist can evaluate the significance of the find (Site Certificate Condition 11.5). The Certificate Holder will notify ODOE and SHPO of the find. If SHPO determines that the resource is significant, the Certificate Holder will make recommendations to the Council for mitigation, including avoidance, field documentation and data recovery, in consultation with ODOE, SHPO, and interested tribes. The Certificate Holder shall not restart work in the affected area until the Certificate Holder has demonstrated to the ODOE and the SHPO that it has complied with archaeological resource protection regulations.

6.0 Proposed Monitoring Plan – OAR 345-021-0010(1)(s)(E)

OAR 345-021-0010(1)(s)(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.

Intensive-level surveys have not indicated the presence of cultural material or features in the direct analysis area. For this reason, no formal monitoring is planned at this time. However, the Certificate Holder understands that there will remain a possibility of subsurface deposits, and PGE's Inadvertent Discovery Procedure will be adhered to during the course of this project. Additionally, PGE staff working on this Facility have had intensive cultural resources awareness training and will be equipped to contact a professional archaeologist should evidence for cultural material emerge. However, if the Tribe would like to have a Tribal monitor on site during specific ground disturbing activities, PGE could certainly coordinate that.

The Certificate Holder can comply with the existing Site Certificate Condition 11.6 in the Third Amended Site Certificate regarding monitoring for Protection of Historic, Cultural, and Archaeological Resources (Council 2022).

7.0 Conclusion

The conclusion derived from the cultural and archaeological surveys is that construction, operation, and retirement of the Amended Carty Solar Farm proposed in RFA 4 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 NRHP.

8.0 References

Buchanan, B. G., J. Held, S. Davis, and T. Ozbun. 2009. Cultural Resources Survey of the PGE Carty Generating Station Project, Gilliam and Morrow Counties, Oregon. Archaeological Investigations Northwest, Inc. (AINW). Submitted to Ecology and Environment, Inc., Portland, Oregon. Oregon State Historic Preservation Office Case No. 23086.

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Cole, D. L. 1977. Archeological Research in The Carty and Pebble Springs Reservoir Area in the Columbia Plateau of Oregon. University of Oregon Museum of Natural History. Prepared for Portland General Electric Company. Oregon State Historic Preservation Office Case #106.

Council (Oregon Energy Facility Siting Council). 2022. Third Amended Site Certificate for the Carty Generating Station. Oregon Energy Facility Siting Council, Salem, Oregon. July 2022. 2022-08-07-CGS-AMD3-Site-Certificate.pdf (oregon.gov).

Hunn, E. S., E. Thomas Morning Owl, P. E. Cash, and J. Karson Engum. 2015. Čáw Pawá Láakni, They Are Not Forgotten – Sahaptin Place Names Atlas of the Cayuse, Umatilla, and Walla Walla. Tamastslikt Cultural Institute, Pendleton, Oregon.

Kelly, M. S., E. Nilsson, S. Butler, M. Button, and R. Bevill. 2013. Archaeological Survey for Portland General Electric's Cascade Crossing Transmission Project, Morrow, Gilliam, Sherman. and Wasco Counties, Oregon. URS Corporation. Submitted to Portland General Electric, Portland, Oregon. Oregon State Historic Preservation Office Case No. 26783.

Shannon, D., D. Ellis, S. McDaniel, M. Stegner, R. Bevill, S. Butler, M. S. Kelly, and E. Nilsson. 2011. Ethnographic Report for Portland General Electric's Cascade Crossing Transmission Project, Morrow, Gilliam, Sherman, Wasco, Clackamas, and Marion Counties, Oregon. Submitted to Portland General Electric, Portland, Oregon. Oregon State Historic Preservation Office Case No. 26786.

WillametteCRA (Willamette Cultural Resources Associates Ltd.). 2016. Archaeological Inventory for the PGE Carty Expansion Project, Morrow County, Oregon. P. S. Solimano and B. Taylor. Submitted to Portland General Electric, Portland, Oregon. Portland, Oregon. Oregon State Historic Preservation Office Case No. 28567.

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Figures

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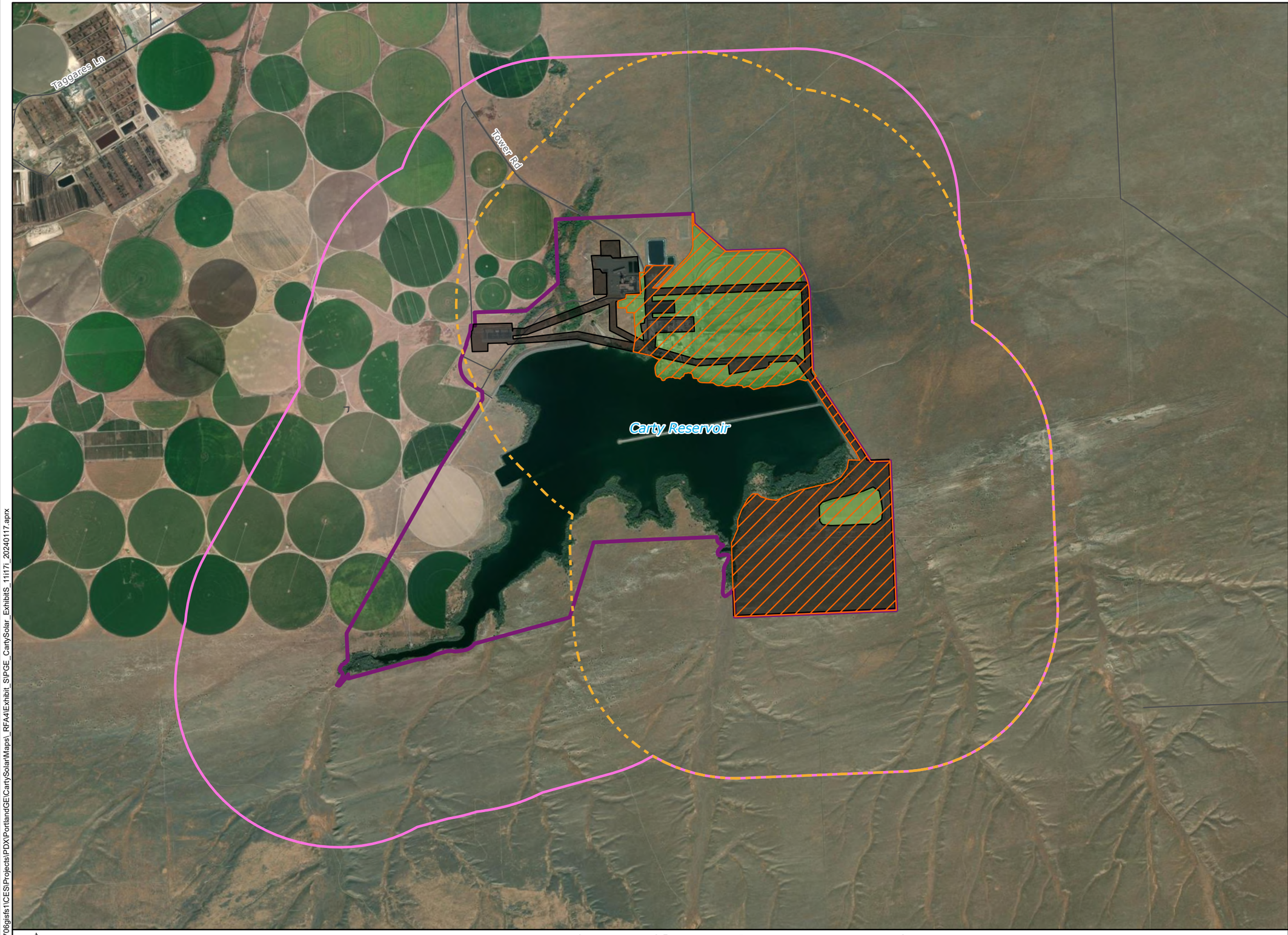
Carty Generating Station Request for Amendment 4

Figure S-1
Analysis Areas

MORROW COUNTY, OR

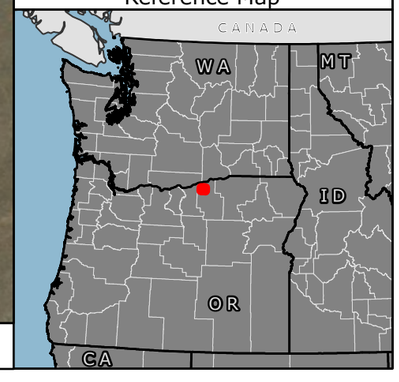


- Amended Site Boundary
- Cultural Resources Study Area (Direct Analysis Area)
- 2023 Archaeological Survey Area
- 2016 Archaeological Survey Area
- 2023 Records Review Area (Indirect Analysis Area)
- Analysis Area for 2022 Review for Historic Resources of the Built Environment
- Local Roads

TETRA TECH

PGE

Reference Map



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Attachment S-1: Cultural Resources Survey Report, Carty Generating Station. Morrow County, Oregon

(Confidential and provided under separate cover)

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Exhibit T

Recreational Opportunities

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Table of Contents

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Acronyms and Abbreviations

AC	alternating current
ASC	Application for Site Certificate
BCP	Boardman Coal Plant
BESS	battery energy storage system
BLM	Bureau of Land Management
Certificate Holder / PGE	Portland General Electric Company
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
kV	kilovolt
MW	megawatts
NPS	National Park Service
OAR	Oregon Administrative Rules
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
RFA	Request for Amendment
TNC	The Nature Conservancy
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
ZVI	zone of visual influence

1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

Exhibit T provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(t) in support of RFA 4. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate (ASC), previous RFAs, and Oregon Department of Energy Final Orders to demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate Conditions and the approval standard in OAR 345-022-0100.

The Oregon Energy Facility Siting Council (Council) previously found in the Final Order on RFA 1 that the Carty Solar Farm would comply with the Council's Recreation standard.[1] The Council reaffirmed that the Carty Solar Farm would comply with the Council's Recreation standard in the Final Order on RFA 3.[2]

2.0 Analysis Area

In accordance with OAR 345-001-0010(35)(d), the analysis area for recreation areas is the area within and extending 5 miles from the site boundary (Figure T-1). The Amended Site Boundary is

[1] Final Order on Request for Amendment 1 to the Site Certificate for the Carty Generating Station, p. 114 (December 2018).
[2] Final Order on Request for Amendment 3, p. 68 (July 2022).

defined in detail in Section 4.1.1.2 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station). The Amended Site Boundary used for analysis in RFA 4 is almost identical to the Approved Site Boundary. The proposed modifications to the Approved Site Boundary as described in Section 4.1 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station) do not result in an expansion of the Approved Site Boundary's outer limits, and in fact retract the site boundary in the northeast corner.

3.0 Recreational Opportunities in the Analysis Area – OAR 345-021-0010(1)(t)(A)(E)

OAR 345-021-0010(1)(t) Information about the impacts the proposed facility would have on important recreational opportunities in the analysis area, providing evidence to support a finding by the Council as required by OAR 345-022-0100, including:

OAR 345-021-0010(1)(t)(A) A description of the recreational opportunities in the analysis area that includes information on the factors listed in OAR 345-022-0100(1) as a basis for identifying important recreational opportunities;

OAR 345-021-0010(1)(t)(E) A map of the analysis area showing the locations of important recreational opportunities identified in paragraph (A).

Based on the proposed amendments to the Facility in RFA 4, there are no new recreation areas located within the analysis area since the Final Order on RFA 3 was issued (see Table T-1),[3] and no recreation areas are located within the Amended Site Boundary. Table T-1 provides an inventory of the recreation areas within the analysis area: the Oregon National Historic Trail (ONHT), which is inclusive of the Oregon Trail Wells Spring Interpretive Site.[4] As described in Section 2.0, RFA 4 does not result in an expansion of the Approved Site Boundary's outer limits, and in fact retracts the northeast corner of the currently Approved Site Boundary. RFA 4 does not propose to alter the southern portion of the Approved Site Boundary, nearest the ONHT and Well Springs Interpretive Site; the proposed changes to the Amended Site Boundary occur in the northeast corner of the Facility, on the opposite side of the Facility from the ONHT. Thus, the distances from the Amended Carty Solar Farm to the previously analyzed recreation area have remained unchanged. Therefore, the impact to this recreation area is anticipated to be similar to what was previously described for the Carty Solar Farm in RFA 1 and approved in the Final Order on Amendment 1 (see Table T-1).[5]

[3] Final Order on Request for Amendment 3, p. 63-68 (July 2022).
[4] Note that the Oregon Trail Wells Spring Interpretive Site is part of the ONHT, and thus they are analyzed together. The interpretive site was not considered in previous amendments of the Facility but is included for the purposes of this updated analysis.
[5] Final Order on Request for Amendment 1, p. 114 (December 2018).

3.1 Inventory Methods

Recreational opportunities within the analysis area were identified through collection and review of existing published and unpublished information available from desktop research sources commonly used for recreation inventory efforts. Key types of information resources investigated for the inventory included:

- Geographic information system files documenting recreational resources obtained from key recreation provider agencies, e.g., the Bureau of Land Management (BLM; BLM 2023a, BLM 2023b), Oregon Department of Fish and Wildlife (ODFW; ODFW 2021), U.S. Forest Service (USFS 2023a, USFS 2023b), U.S. Geological Survey (USGS 2023), 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, the Oregon Department of Transportation (ODOT), and county and city park departments (Morrow County 2023, ODFW 2023a, ODOT 2019, OPRD 2023a, OPRD 2023b); 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).

3.2 Resource Descriptions

In general, recreation activities in the analysis area consist of hiking, dispersed camping, bicycling, photography, game and bird hunting, and sightseeing. These activities also occur in numerous locations outside the analysis area, and therefore some of the recreational opportunities identified within the analysis area do not rise to the level of uniqueness or irreplaceability contemplated in OAR 345-022-0100(2)'s factors. The changes proposed in RFA 4 do not alter the recreational activities or recreational opportunity sites identified within the Facility's analysis area.

There is one identified recreational opportunity site within the analysis area: the ONHT. This site was previously reviewed by the Council as described in the Final Order on RFA 1.[6] The recreational site is not within the Amended Site Boundary as proposed by RFA 4.

Recreational opportunities within the analysis area are described below in order of federal, state, local and private ownership/management. Table T-1 provides a summary of the one identified recreational opportunity, and an assessment of the importance of the opportunity. Figure T-1 shows the location of the recreation opportunity identified in the analysis area.

[6] Final Order on Request for Amendment 1, p. 111-114 (December 2018).

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Table T-1. Inventory of Recreational Opportunities in the Analysis Area

Recreational Opportunity	Responsible Entity	Distance to the Facility (miles)			Description	Size or Distance	Importance Factors					Important Recreation Resource
		Amended Site Boundary	Solar Areas (North and South)	Collector Line			Special Designation	Demand	Outstanding or Unusual Qualities	Rareness	Replaceability	
Oregon National Historic Trail (ONHT) Segments/Sites	National Park Service (NPS) and Oregon Historic Trails Advisory Committee	2.1	2.1	3.1	The Oregon Trail was one of the main overland migration routes on the North American continent, leading from locations on the Missouri River to the Oregon Country. A high-potential[1] trail segment has been identified, extending from the eastern boundary of the Boardman Bombing Range westward to Immigrant Road (NPS 1999).	Approx. 2,000 miles total; approx. 12.0 miles of high-potential trail segment in analysis area	National Historic Trail	Low	Most trail segments destroyed by agricultural use; interpretive information at the Oregon Trail Wells Spring Interpretive Site; public access to this high-potential trail segment restricted by federal and private ownership.	Intact evidence of trail route - rare	Irreplaceable (intact segments only)	Yes
		4.3	4.3	5.1	The Oregon Trail Wells Spring Interpretive Site offers views of intact wagon ruts, a graveyard, and remains of a stage station along with informational signage (NPS 1999).	Approx. 0.5 acre; Approx. 0.5 acre in the analysis area	National Historic Trail interpretive site	Low	Interpretive signage with historical information but no other facilities; views of intact wagon ruts; appears to be located on private land.	Intact evidence of trail route - rare	Irreplaceable	Yes

1. High-potential 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 sites are specific locations with similar attributes. See Section 4.4.2.1 for additional background on this management designation.

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3.2.1 Federal

The National Park Service (NPS), in conjunction with the Oregon Historic Trails Advisory Committee, manages the remaining segments and important sites of the ONHT. The trail route passes approximately 2.1 miles south of the Amended Site Boundary and southern end of the Southern Solar Area, and 3.1 miles south of the aboveground segment of the 34.5-kilovolt (kV) collector line (see Table T-1 for specific distances to amended Facility infrastructure). The Oregon Trail Wells Spring Interpretive Site is a high-potential site located along the ONHT and within the analysis area. Due to the rareness and historic importance of the ONHT, the resource is considered an important recreational resource.

3.2.2 State

There are no lands owned or managed by the State of Oregon within the analysis area.

3.2.3 Local Governments and Special Districts

Morrow County, cities, and special districts do not provide any recreation opportunities within the analysis area.

3.2.4 Private

No privately owned recreational opportunities were identified within the analysis area.

3.3 Importance Criteria

Recreational opportunities identified within the analysis area were evaluated for "importance" based on the criteria outlined in OAR 345-022-0100. A recreational opportunity may be determined to be important based on assessment of available information specific to each criterion, and a qualitative balancing of the attributes for all five criteria for a given resource. Specific considerations used to characterize the importance of a recreational opportunity relative to the five criteria outlined in OAR 345-022-0100 are summarized as follows:

1. *Any special designation or management of the location;*

There are distinct, identifiable differences among the types of special management designations that apply to lands within the analysis area, and their associated implications for resource protection. Wilderness designation, for example, results in management direction to preserve the resource values of the designated area and represents a high level of protection. Other types of designations allow much more latitude in undertaking management activities and involve a lower degree of resource protection. The source of the special designation is also a relevant consideration; a designation established through an Act of Congress clearly carries more weight than an administrative designation applied by a resource management agency.

2. *The degree of demand;*

Qualitative ratings of High, Moderate, and Low were used as proxy measures for the level of demand for a specific recreational opportunity.

3. Outstanding or unusual qualities;

Identification of characteristics that might be considered outstanding or unusual for a given opportunity is a highly subjective task, as there is a wide variation in the values, tastes, and perceptions among the recreational public. The standard does not specify what qualities would define an opportunity as "outstanding" or "unusual," or indicate how those characteristics could be measured. Some sites or areas have attributes that qualify them as "unique" (i.e., one of a kind), while others have qualities that are not unique, but intuitively set them apart from other opportunities and could be considered outstanding or unusual.

4. Availability or rareness; and

Qualitative ratings of Rare, Uncommon, and Common were used to address the criterion based on the apparent rareness of an opportunity. Consideration of this rareness attribute was based on the approximate set of comparable opportunities (and the geographic scale appropriate to each type of opportunity) available within the region surrounding the Facility.

5. Irreplaceability or irretrievability of the opportunity.

Ratings of Irreplaceable, Somewhat Irreplaceable, and Replaceable were used to address the criterion based on the ability to replace an opportunity. In general, opportunities based on inherent natural resource characteristics that could not feasibly be re-created in the same place or at another reasonably nearby location were considered Irreplaceable. By contrast, most opportunities that are based on constructed recreational facilities or infrastructure (such as typical campgrounds) could feasibly be replaced and were considered Replaceable.

The assessment of the overall importance for each identified recreational opportunity occurred on a case-by-case basis. Table T-1 provides a summary of each identified recreational opportunity in the analysis area, describes the characteristics of the opportunity relative to the importance criteria, and indicates which opportunities are considered important for the purposes of this exhibit. A description of each recreational opportunity appears in the following section.

3.4 Importance Assessment Summary

Based on the importance criteria described above, the ONHT has been determined to be important for the purposes of this analysis. This resource is summarized in Table T-1 of this exhibit. The potential for impacts to the important recreation resource as a result of the amended Facility is discussed in Section 4.

4.0 Impact Assessment – OAR 345-021-0010(1)(t)(B)(C)

OAR 345-021-0010(1)(t)(B) A description of any potential adverse impacts to the important opportunities identified in paragraph (A) including, but not limited to:

OAR 345-021-0010(1)(t)(C) An evaluation of the significance of the potential adverse impacts identified under paragraph (B);

The Council previously found that the design, construction and operation of the Carty Solar Farm are not likely to result in a significant adverse impact to any important recreational opportunities in the analysis area.[7] The potential effects to the single important recreational opportunity in the analysis area were studied to determine whether the design, construction, and operation of the Amended Carty Solar Farm, when taking into account mitigation, would be likely to result in any significant adverse impacts. The following sections summarize the types of potential adverse impacts evaluated and provide summaries of the analysis.

4.1 Direct or Indirect Loss of Recreational Opportunities – OAR 345-021-0010(1)(t)(B)(i)

(i) Direct or indirect loss of a recreational opportunity as a result of facility construction or operation;

A direct loss of opportunity occurs only where the Facility would physically disturb the ground located within the affected recreational resource area. The Facility as modified by RFA 4 would not directly impact any identified recreation resource, as the single identified recreational opportunity is not within the Amended Site Boundary.

An indirect loss of opportunity could occur if 1) a recreational opportunity nearby the Facility would not be physically disturbed by construction activity but might need to be temporarily closed to public use in response to safety concerns; or 2) if development of the Facility were to alter the environment of a recreational opportunity through indirect effects that it substantially adversely impacted the quality of the recreation experience at that site. For example, if the Facility were to destroy intact evidence of the Oregon Trail in view of an interpretive site (which it does not), it could render the site meaningless in terms of its historic importance and value as a tourism resource.

With respect to the first type of potential indirect loss, because the single identified important recreation resource in the analysis area is located farther than 1 mile from the Amended Site Boundary, indirect opportunity loss due to temporary closure for safety concerns is unlikely to occur. Note that construction of the Facility in general will last for up to 24 months to accommodate construction or weather delays. Potential sources of the second type of indirect loss—environmental disturbance impacts to important recreational opportunities—include noise, traffic, and changes in visual quality associated with the Facility; the following sections analyze these three factors.

4.2 Facility Noise – OAR 345-021-0010(1)(t)(B)(ii)

(ii) Noise resulting from facility construction or operation;

[7] Final Order on Request for Amendment 1, p. 114 (December 2018).

The Council previously found that noise generated by the construction and operation phases of the Carty Solar Farm is unlikely to cause significant adverse noise impacts to important recreation areas[8]; the Amended Carty Solar Farm proposes no significant additional noise impacts from the approved Facility. Exhibit Y provides an assessment of the existing acoustical environment and anticipated sound levels from the Amended Carty Solar Farm; the methodology for noise modeling is detailed in that exhibit. Activities associated with construction of the proposed solar areas and related or supporting facilities would be similar to the construction noise already reviewed by Council for the Facility.

Exhibit Y describes sound level thresholds derived from the Oregon Department of Environmental Quality (ODEQ) noise regulations (OAR 340-035-0035), which are used to assess the significance of impacts to noise sensitive properties. As defined in OAR 340-035-0035, "noise sensitive properties" are "real property normally used for sleeping, or normally used as schools, churches, hospitals or public libraries. Property used in industrial or agricultural activities is not Noise Sensitive Property unless it meets the above criteria in more than an incidental manner." The single important recreation area within the analysis area is not considered to be a noise sensitive property.

Based on the results of operations noise modeling, described in detail in Exhibit Y, operation of the Amended Carty Solar Farm will not create new noise impacts to important recreation areas beyond those that were previously identified for the Facility. As detailed in Exhibit Y, the solar modules will create no significant operational noise, and operational noise from primarily cooling equipment associated with the BESS and electrical equipment will be similar to operational noise already reviewed by the Council for the Facility. Comprehensive Facility noise would attenuate to below 26 A-weighted decibels (dBA)[9], or less than the background/ambient (nighttime) noise level, within approximately 3.3 miles from the Amended Site Boundary. The Oregon Trail Wells Spring Interpretive Site is greater than 3.3 miles from the Amended Site Boundary and thus would not be affected by Facility operation noise, but the closest ONHT segment is within 2.1 miles of the Amended Site Boundary and nearest solar area.

Modeled worst-case amended Facility operational noise levels at the ONHT would be a maximum of 23 dBA, respectively, which is below rural nighttime ambient background noise levels. This level of noise is unlikely to substantively diminish the experience at the ONHT, for a majority of the ONHT segment is inaccessible to the public (restricted by federal and private ownership) and is managed as natural areas (Kelly Wallis, The Nature Conservancy, pers. comm., July 18, 2022; see Exhibit L and Attachment L-1). The small portion of this ONHT segment that is accessible to the public, i.e., the Oregon Trails Wells Spring Interpretive Site, is not anticipated to be affected by Facility operation noise. The ONHT is not considered a noise sensitive property.

Noise from construction would similarly be less than 26 dBA within 12.2 miles from the Amended Site Boundary (daytime ambient sound level) and would thus be audible at the ONHT. Pursuant to

[8] Final Order on Request for Amendment 1, p. 112-113 (December 2018).

[9] Note that the 26 dBA value was selected as representative because OAR 340-035-0035(1)(b)(B)(iii)(I) allows for an assumed ambient sound level of 26 dBA for wind energy facilities. Site-specific ambient sound data was not collected for the Facility, but 26 dBA is assumed to be a conservative estimate.

OAR 340-035-0035(5), noise from construction activities is exempt from the state noise standards. Construction activities associated with the Facility have the potential for localized noise on a temporary basis as construction activities progress through certain locations within the Amended Site Boundary. Noise-generating activities during construction could result from the use of heavy machinery, such as heavy trucks, bulldozers, graders, and cranes. Based on the estimated noise levels of construction equipment provided in Exhibit Y, construction noise levels at the ONHT would peak at approximately 36 dBA; this noise level is comparable to a quiet library. This elevated noise level will occur sporadically while Amended Carty Solar Farm infrastructure such as the solar area closest to the ONHT is built. As construction progresses elsewhere in the Facility, noise levels will drop to background levels. Continued implementation of Site Certificate Condition 13.1 will help reduce construction noise impacts through the requirement of exhaust mufflers on combustion engine-powered equipment and establishment of a noise complaint response system. At this time, pending geotechnical investigation of the final layout, blasting is not anticipated to be required for Facility construction.

The Council previously found that the Facility noise will not result in a significant adverse impact to important recreation areas[10] and the amendments in RFA 4 do not alter that conclusion.

4.3 Traffic – OAR 345-021-0010(1)(t)(B)(iii)

(iii) Increased traffic resulting from facility construction or operation;

Traffic impacts in general are addressed in greater detail in Exhibit U, including information on anticipated traffic levels and typical travel routes for the Amended Carty Solar Farm.

As previously found by the Council for the Carty Solar Farm, traffic generated by construction and operation of the Amended Carty Solar Farm is unlikely to result in significant adverse impacts to the single important recreation area.[11] Based on the analysis provided in Exhibit U, the primary traffic route used for construction of the Amended Carty Solar Farm will be the same as what was already evaluated for the approved Facility. Construction-related traffic will utilize Interstate 84 (I-84) and Tower Road to access the Facility. The ONHT is located south of I-84 but is not accessed by Tower Road or roads anticipated to carry Facility-related truck traffic. Construction worker traffic may occur on roads providing access to this resource; however, construction worker traffic will be dispersed on multiple roads throughout the area, and the nominal level of worker traffic anticipated on roads other than I-84 and Tower Road will not adversely affect level of service on those roads (see Exhibit U). Timing patterns for construction-related traffic and recreational traffic to important recreation areas will likely differ substantially. Construction traffic will primarily be dispersed throughout the business work week and primarily during commuter hours, whereas peak recreational traffic related to visitation to the ONHT will be greatest during the weekend. Additionally, no roads providing access to the ONHT are expected to be closed during construction or operation of the Amended Carty Solar Farm.

[10] Final Order on Request for Amendment 1, p. 112-113 (December 2018).
[11] Final Order on Request for Amendment 1, p. 113 (December 2018).

The nearest segments of the ONHT are accessed from State Route 74, located 9 miles west of Tower Road, or from Bombing Range Road, 8 miles to the east of Tower Road on I-84. A majority of the ONHT segment (except the Oregon Trails Wells Spring Interpretive Site) is inaccessible to the public (restricted by federal and private ownership) and is managed as a natural area (Kelly Wallis, The Nature Conservancy, pers. comm., July 18, 2022; see Exhibit L and Attachment L-1). For these reasons and based on the distance from ONHT access roads to Tower Road, the Council previously found that construction-related traffic will not result in significant adverse impacts to the ONHT,[12] and RFA 4, in turn, will not alter this conclusion.

Temporary, short-term delays are most likely to occur only during deliveries of oversized loads, which will occur sporadically and will be accompanied by traffic control teams. Construction of the Amended Carty Solar Farm in general will be short in duration (lasting approximately 24 months) and thus any construction traffic impacts will be temporary.

Although there will be no significant traffic impacts to the ONHT, the Certificate Holder will continue to implement Site Certificate Condition 6.17 which requires adhering to various traffic control measures and a Construction Traffic Management Plan. Site Certificate Condition 6.27 in turn requires that the plan be reviewed and approved by the Council and in consultation with Morrow County and requires that construction-related traffic will be evaluated to confirm whether a Traffic Impact Assessment will be required. Any damage or wear to county roads from Facility construction will be repaired and restored per Site Certificate Condition 6.19. Therefore, no significant adverse traffic impacts to important recreation areas are anticipated from construction of the Facility.

During operations, traffic would be minimal, as the Amended Carty Solar Farm will permanently employ up to 12 permanent personnel. Solar and BESS-related equipment will require periodic maintenance, but traffic associated with repair or maintenance visits will be low, and daily traffic generated by operation of the Amended Carty Solar Farm is not expected to affect operations of any of the state or local county roads used to access the important recreation area within the analysis area.

The Council previously found that the construction and operational traffic will not be likely to result in significant adverse impacts to important recreation areas within the analysis area,[13] and the amendments in RFA 4 do not alter that conclusion.

4.4 Visual – OAR 345-021-0010(1)(t)(B)(iv)

> *(iv) Visual impacts of facility structures or plumes, including, but not limited to, changes in landscape character or quality;*

The Council previously found that while the Facility components will result in a change to the existing viewshed and will be visible from several small areas along the ONHT within the analysis area, the visual impacts of construction and operation of the Facility will not likely result in a

[12] Final Order on Request for Amendment 1, p. 113 (December 2018).
[13] Final Order on Request for Amendment 1, p. 113 (December 2018).

significant adverse visual impact to any important recreation area due the distance of over 2 miles from the Amended Site Boundary to the nearest point of the ONHT, and the overall height of solar components.[14] The inclusion of the additional solar modules and associated infrastructure at the Facility, as proposed in RFA 4, will result in a change to the existing viewshed, but this change will not result in a significant visual impact to the single important recreation area.

The Amended Carty Solar Farm will not generate any emissions plumes, so will not cause any visual impacts from air emissions. Potential visual impacts due to dust created during construction of the Amended Carty Solar Farm will be largely prevented by following best management practices for dust control as detailed in Exhibit I.

Existing Visual Character

Since the Final Order on RFA 1 was issued, there has been one change in conditions within the Facility: the demolition of the BCP. Commercial operation of the coal plant ceased in October 2020 and demolition was completed at the end of 2023. The Northern Solar Area, BESS, and collector substation are all proposed in former BCP areas. Other Facility conditions have not changed. The Facility includes numerous existing aboveground transmission lines including the existing 500-kV transmission line and dead-end structure where the proposed collector substation will connect. Other existing transmission lines that support the Facility include the 500-kV Grassland to Slatt transmission line (approximately 17 miles long) and 230-kV BCP to Dalreed transmission line (approximately 16 miles long). In addition, the CGS Unit 1 was constructed and placed into service in 2016. Unit 1 is located directly adjacent to the Northern Solar Area, BESS, and proposed collector substation. Adjacent lands outside the Facility continue under habitat conservation to the north, east, and south, and farm use to the west. The Boardman Bombing Range is also adjacent to the north and east.

4.4.1 Visual Impact Assessment Methodology

The potential for visual impacts from the Facility as amended by RFA 4 are primarily related to the components that will be the most prominent in terms of size and scale. The two most prominent components in terms of height off the ground and overall surface area include the Northern and Southern solar areas, and the 1-mile segment of aboveground 34.5-kV collector line proposed along the eastern shore of the Carty Reservoir. Thus, these two components were the main focus of the visual impact assessment.

A zone of visual influence (ZVI) analysis, also known as a viewshed analysis, was performed using Esri geographic information system software and a bare-earth 30-meter digital elevation model to identify those areas from which the Northern and Southern solar areas and the 1-mile segment of aboveground 34.5-kV collector line might be visible (Figures T-2 and T-3). The ZVI analysis assumed a maximum height of 12 feet for the solar modules and a maximum height of 70 feet for the aboveground collector line. All other components proposed with RFA 4 were deemed less

[14] Final Order on Request for Amendment 1, p. 114 (December 2018).

visually impactful (due to height, being dispersed throughout the Amended Site Boundary, or adjacent to taller infrastructure, etc.) and addressed by the assessment of the solar areas and aboveground collector line. A typical viewing height of 1.8 meters (6 feet) was assumed. Visibility of the two components was defined by visible or not visible, indicated by color coding (see Figures T-2 and T-3), and by proximity, i.e., foreground (less than 0.5 mile), middleground (0.5 to 5 miles), or background distances (more than 5 miles).

It should be noted that this bare-earth modeling approach (based only on the effects of terrain on visibility) results in a highly conservative assessment of potential visibility for several reasons. First, a bare-earth analysis does not take into account the effects of vegetation or buildings, which will in practice block or screen views in some places. Finally, the model does not account for distance, lighting, weather, and atmospheric attenuation factors that diminish visibility under actual field conditions.

The solar modules will be the most visible components within the solar areas and will consist of solar module strings, the vast majority of which will be mounted on single-axis tracker systems. The visibility of the solar modules within the solar areas will depend primarily on topographic or other view obstructions and the distance from the viewer to the solar areas. With a maximum height of 12 feet to the top edge of the solar module when fully tilted, the modules will not be visible from sites lower in elevation than the area on which the solar modules are constructed. From sites that are similar in elevation to the solar modules, viewers will see only a line on the horizon and not individual solar panels. Depending on the viewing distance, viewers at sites higher in elevation may have views of the modules, especially if the view direction is toward the angle at which the module is tilted toward the sun. To the extent practicable, reflectivity of solar modules will be minimized. Antireflective coating will be used to reduce glare, and the surface of the modules will have high transmittance to increase the amount of light reaching the photovoltaic cells. With these methods, the modules will be less reflective than a natural water body or a coated glass surface that is not antireflective.

4.4.2 Visual Impact Assessment Results

Based on the results of the ZVI analysis, there is the potential for visibility of some portions of the Amended Carty Solar Farm from the single important recreation area, i.e., the ONHT, in the analysis area (see Figures T-2 and T-3). The visibility of the solar areas and aboveground collector line are characterized as visible or not visible. The discussion below provides additional detail on the updated visual impact analysis that was conducted for RFA 4.

Potential visibility is one of several factors that comprise an assessment of visual impact to an important recreation area. Other factors to consider include the existing visual context, particularly other sources of visual contrast present within the view; the likely number and nature of visitors to a recreation area; and whether there is any management direction related to preservation of scenic quality (see Exhibit R), either within the recreation area or outside of it.

The solar areas and aboveground collector line will be potentially visible from the single identified important recreation area in the analysis area: the ONHT. Views of the Amended Carty Solar Farm from the ONHT would be from a middleground viewing distance, where both the low-profile solar modules and aboveground collector line would occupy a limited portion of the total viewshed. Existing views already include wind farms, transmission lines, and industrial development so the Amended Carty Solar Farm will not introduce a new or unusual feature to the view. In addition, potential Facility views from the ONHT would be partially to fully screened in some areas by terrain.

The associated visual impacts at the ONHT were found to be similar to or less than the previously approved Facility.[15] The following paragraphs provide a more in-depth visual impact assessment for this important recreation area.

4.4.2.1 Oregon National Historic Trail

Congress designated the route of the Oregon Trail as a National Historic Trail in 1978, and the Oregon Historic Trails Advisory Committee was created to provide public input and advice to the NPS on management of historic trails in Oregon. The National Historic Trail designation applies to a general, primary route (and two specified branches) extending approximately 2,000 miles from Independence, Missouri, to Oregon City, Oregon. The Oregon Trail designation was intended to preserve the legacy of the westward immigration of settlers to the Oregon Territory, based on routes used from 1841 to 1848 (NPS 1999). In recognition of the intermittent evidence of many of the historic trail routes, the National Trails System Act provided for the identification of "high-potential sites and segments" along these routes, using specified criteria for historic significance, the presence of visible historic remnants, scenic quality, and relative freedom from intrusion. High-potential 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 sites are specific locations with similar attributes. Each site or segment must have the potential to interpret the trail's historical significance and to provide opportunities for high-quality recreation.

The NPS (1999) management plan identifies a 12-mile Boardman segment of the ONHT in Morrow County as a high-potential trail segment. This trail segment extends from the eastern edge of the Boardman Bombing Range in a southwest direction to Immigrant Road and then parallels the 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 Wells 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 [TNC] as part of the Boardman Conservation Area and Boardman Research Natural Area) and is also not open to the public (Kelly Wallis, TNC, pers. comm., July 18, 2022; see Exhibit L and Attachment L-1). Due to the restricted access to this high-potential trail

[15] Final Order on Request for Amendment 1, p. 113 (December 2018).

segment, it is questionable whether this should be considered an important resource for recreation; however, its federal protection status, irreplaceability, and historical importance qualify it as important for the purposes of this analysis.

The overall visual impact from the solar areas and aboveground collector line on the ONHT would be negligible. The ZVI analysis demonstrates only intermittent visibility along the high-potential ONHT segment and from the Well Springs Interpretive Site. In addition, access to the trail where it is south of the Facility is extremely limited and the existing viewshed contains wind turbines, numerous aboveground transmission lines, and other industrial infrastructure. The high-potential ONHT segment within the Boardman Bombing Range is not accessible to the public. Potential visibility occurs intermittently along ONHT segments west of the Bombing Range, located on private lands, which are also not accessible to the general public.

RFA 4 does not propose to alter the southern portion of the Approved Site Boundary, nearest the ONHT and Well Springs Interpretive Site. The proposed changes to the Amended Site Boundary occur in the northeast corner of the Facility. The ONHT lies at a middleground distance of approximately 2.1 miles from the nearest segment of the Amended Site Boundary. The nearest solar modules in the Southern Solar Area and the nearest point of the aboveground collector line are at middleground distances of at least 2.1 and 3.1 miles, respectively. Given that the distance from the closest point to the Amended Site Boundary and Amended Carty Solar Farm result in a middleground distance of approximately 2.1 miles, it is questionable whether any of the solar modules or the aboveground collector line will be noticeable to a viewer from the ONHT. Furthermore, most of the high-potential trail segment is within the Boardman Bombing Range and is off-limits to the public, except for a small area surrounding the Oregon Trail Well Springs Interpretive Site. The ZVI analysis in Figures T-2 and T-3 show that the most prominent features proposed with the Amended Carty Solar Farm will not be visible from the Well Springs Interpretive Site.

The ONHT is managed to maintain historic value (i.e., view of visible trail remnants and ruts, along with the immediate surroundings), rather than scenic qualities; there is no management direction for preservation of views or scenic quality related to the lands on which this segment of the ONHT is located (NPS 1999). Although the relatively undeveloped viewshed is said to provide an experience that enables visitors to relate to the emigrants, the viewshed is no longer in the nearly pristine condition that it was during the emigrants' time. Existing roads are visible, much of the landscape is farmed and fenced, little of the tallgrass native prairie remains, and existing wind turbines and transmission lines from other projects are visible to the northwest, west, southwest, and southeast.

4.5 Summary of Impacts

The analysis area contains part of one important recreation area, the ONHT, found within the analysis area. The Certificate Holder analyzed potential impacts to these areas and concluded as follows:

- Direct or Indirect Loss. The Amended Carty Solar Farm has been designed to avoid direct loss to all important and identified recreational opportunities, and any indirect disturbance effects would not lead to an indirect loss of any important or identified recreational opportunities.
- Noise. Based on the results of the noise modeling presented in Exhibit Y, operational noise was determined to likely be less than 26 dBA, which is consistent with a rural nighttime background ambient according to OAR 340-035-0035. The single important recreation area, the ONHT, is not considered to be noise-sensitive receptor under the ODEQ noise regulations and is anticipated to receive sounds levels that are less than rural nighttime ambient background levels, less than the noise levels previously modeled for the approved Facility. Construction noise may be audible at the ONHT nearest the Facility; however, construction noise would be short-term and intermittent, and would not be considered a significant impact to any important recreation area. Therefore, the Amended Carty Solar Farm will result in no significant difference in operational or construction noise at the ONHT where it is within the analysis area.
- Traffic. The Amended Carty Solar Farm will not alter the previous analysis demonstrating that Facility-related traffic would not be sufficiently high, nor located to significantly impact any important recreation area within the analysis area. Some short-term, intermittent, and temporary delays may be experienced during Facility construction by visitors; however, these would be temporary and traffic conditions would return to typical low levels following construction. Therefore, consistent with previous conclusions for the approved Facility, there would be no significant impact to traffic resulting from the construction or operation of the Amended Carty Solar Farm.
- Visual. The Amended Carty Solar Farm will potentially be visible intermittently from the single identified important recreation area within the analysis area, the ONHT, which will have middleground views of the proposed Facility. However, due to distance from the Facility, topographic obstructions, other features within view (i.e., wind turbines and other utility infrastructure), low impact to users, and an overall lack of management direction applicable to scenic quality beyond the boundaries of the ONHT, the Amended Carty Solar Farm will not alter the Council's previous finding that the Facility would not have a significant visual impact on important recreation areas. The ZVI analysis shows that there will be no views of the Amended Carty Solar Farm from the ONHT Well Springs Interpretive Site.

5.0 Minimization and Mitigation Measures – OAR 345-021-0010(1)(t)(D)

OAR 345-021-0010(1)(t)(D) A description of any measures the applicant proposes to avoid, reduce or otherwise mitigate the significant adverse impacts identified in paragraph (B).

As described in Section 4, the Amended Carty Solar Farm will have no significant, direct adverse impact on any important recreational opportunity in the analysis area. Nor will any indirect disturbance effects associated with traffic, noise, or visual aspects of the Amended Carty Solar Farm lead to an indirect loss of any important or identified recreational opportunity. Consequently, no mitigation measures for recreation are proposed.

6.0 Monitoring Program – OAR 345-021-0010(1)(t)(F)

> *OAR 345-021-0010(1)(t)(F) The applicant's proposed monitoring program, if any, for impacts to important recreational opportunities.*

Because construction and operation of the Amended Carty Solar Farm will have no significant adverse impacts on recreational opportunities in the analysis area, and no mitigation specific to recreation is warranted or proposed, no monitoring program for recreation is proposed.

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Figures

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Carty Generating Station Request for Amendment 4

Figure T-1
Recreation Areas within the Analysis Area

MORROW COUNTY, OR

- Amended Site Boundary
- Analysis Area (5-mile Buffer)
- City/Town
- County Boundary
- Interstate Highway
- US Highway
- State Highway
- Local Roads
- National Register Historic Place
- Blue Mountain Scenic Byway
- Oregon Trail (Historic Route)
- Boardman Naval Bombing Range

TETRA TECH

PGE

Reference Map

Tower Rd

Well Springs Interpretive Site

Cecil

Gilliam County

Morrow County

74

30

84

1:100,000

WGS 1984 UTM Zone 11N

0 1 2 4 6 8 Miles

NOT FOR CONSTRUCTION

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Carty Generating Station Request for Amendment 4

Figure T-2
Zone of Visual Influence for Solar Areas

MORROW COUNTY, OR

- Amended Site Boundary
- Analysis Area (5-mile Buffer)
- Proposed Solar Areas Fence Line
- City/Town
- County Boundary
- Interstate Highway
- US Highway
- State Highway
- Local Roads
- National Register Historic Place
- Oregon Trail (Historic Route)
- Blue Mountain Scenic Byway
- Boardman Naval Bombing Range

Viewshed Results*

- Solar Areas Not Visible
- Solar Areas Potentially Visible

TETRA TECH PGE

Reference Map

*Solar Areas visibility calculated using a 30 meter bare-earth digital elevation model with array heights of 12 feet (3.66 meters) and a viewing height of 6 feet (1.8 meters).

1:100,000 WGS 1984 UTM Zone 11N 0 1 2 4 6 8 Miles

NOT FOR CONSTRUCTION

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Carty Generating Station Request for Amendment 4

Figure T-3
Zone of Visual Influence for Aboveground 34.5-kV Collector Line

MORROW COUNTY, OR

Tower Rd

Well Springs Interpretive Site

Cecil

Gilliam County

Morrow County

30

84

74

- Amended Site Boundary
- Analysis Area (5-mile Buffer)
- Proposed Aboveground 34.5-kV Collector Line
- City/Town
- County Boundary
- Interstate Highway
- US Highway
- State Highway
- Local Roads
- Blue Mountain Scenic Byway
- National Register Historic Place
- Oregon Trail (Historic Route)
- Boardman Naval Bombing Range

Viewshed Results*

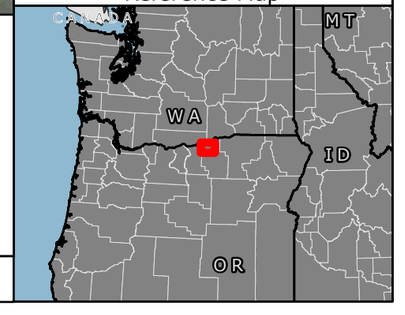
- Aboveground 34.5-kV Collector Line Not Visible
- Aboveground 34.5-kV Collector Line Potentially Visible

TETRA TECH

PGE

*Potential Aboveground 34.5-kV Collector Line visibility calculated using a 30 meter bare-earth digital elevation model with collector line heights of 70 feet (21.34 meters) and a viewing height of 6 feet (1.8 meters).

Reference Map



1:100,000

WGS 1984 UTM Zone 11N

0 1 2 4 6 8 Miles

NOT FOR CONSTRUCTION

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Exhibit U

Availability of Public and Private Providers to Provide Services

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Acronyms and Abbreviations

AADT	average annual daily traffic
AC	alternating current
ASC	Application for Site Certificate
BESS	battery energy storage system
Certificate Holder / PGE	Portland General Electric Company
CFR	Code of Federal Regulations
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
ESCP	Erosion and Sediment Control Plan
FAA	Federal Aviation Administration
kV	kilovolt
MW	megawatt
NPDES	National Pollution Discharge Elimination System
NWSTF	Naval Weapons Systems Training Facility
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODA	Oregon Department of Aviation
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
RFA	Request for Amendment
RV	recreational vehicle
TIA	traffic impact analysis

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1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

Exhibit U provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(u) in support of RFA 4. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate (ASC), previous RFAs, and Oregon Department of Energy (ODOE) Final Orders to demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate Conditions and the approval standard in OAR 345-022-0110.

2.0 Applicable Rules and Standards

Under OAR 345-022-0110, the Energy Facility Siting Council (Council) must find through appropriate study that:

> *(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.*

To demonstrate compliance with this standard, and in accordance with OAR 345-021-0010(1)(u), Exhibit U must include information about significant potential adverse impacts resulting from the construction and operation of the Amended Carty Solar Farm on the ability of public and private providers in the analysis area to provide the services listed in the standard. Exhibit U demonstrates that the Council may rely on its earlier findings along with the supplemental information provided here to conclude that the construction and operation of the Facility, as modified by RFA 4, taking into account mitigation, is not likely to result in significant adverse impacts to the provision of the public services listed in OAR 345-022-0110.

3.0 Analysis Area

In accordance with OAR 345-001-0010(35)(b), the analysis area for public services is the area within and extending 10 miles from the Amended Site Boundary (Figure U-1). The Amended Site Boundary is defined in detail in Section 4.1.1.2 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station).

4.0 Analysis

4.1 Methods

The following analysis incorporates information, analysis, and findings from the Facility ASC, previous RFAs, and data from federal, state, and local government agencies. Local public service providers were also contacted directly for data on potentially affected public services. The potential effects of the Amended Carty Solar Farm were evaluated with respect to the ability of public and private providers within the analysis area to provide sewers and sewage treatment, water, stormwater drainage, solid waste management, housing, traffic safety, police and fire protection, health care, and schools.

4.2 Assumptions Used to Evaluate Potential Impacts – OAR 345-001-0010(1)(u)(A)

OAR 345-021-0010(1)(u) Information about significant potential adverse impacts of construction and operation of the proposed facility on the ability of public and private providers in the analysis area to provide the services listed in OAR 345-022-0110, providing evidence to support a finding by the Council as required by OAR 345-022-0110. The applicant must include:

OAR 345-021-0010(1)(u)(A) The important assumptions the applicant used to evaluate potential impacts;

Exhibit U provides key assumptions and information used to evaluate potential impacts of the Amended Carty Solar Farm on public and private providers. It is expected that the types of impacts to public services anticipated will be similar to the impacts described in RFA 1.

Potential impacts were evaluated based on assumptions for the number of employees needed to construct and operate the Facility, population shifts, and use of transportation routes, as described in the following sections.

The analysis area includes Morrow County and a very small portion of Gilliam County in Oregon, and Klickitat and Benton counties in Washington. Due to the location of the Facility, the Certificate Holder expects that within the analysis area, most personnel will use public and private service providers in northern Morrow County (i.e., in Boardman or Irrigon); usage of service providers in Benton and Franklin counties is also anticipated (e.g., housing in the Tri-Cities area). PGE expects some personnel to also use providers beyond the analysis area, including in Umatilla County, Oregon (e.g., hospital and housing in Hermiston). This assumption is incorporated into the applicable public service provider analyses, i.e., housing, traffic, and health care.

4.2.1 Construction

PGE expects an average of 31 workers on-site during the 24-month construction period for the Amended Carty Solar Farm, with a peak number of 188 workers while multiple disciplines of contractors complete their work simultaneously during periods of the highest activity (approximately 6 to 12 months during construction). Most construction workers will be employees of construction and equipment manufacturing companies under contract to the Certificate Holder.

PGE anticipates that approximately 30 percent of the construction workforce will be local residents within 70 miles (1-hour duration) commuting distance to the Facility. Very few, if any, of the non-local workers employed during the construction phase of the Facility will be expected to permanently relocate to the area. The percentage of the construction workforce hired locally will depend on the availability of workers with appropriate skills. The size of the skilled local workforce is continually growing as more solar farms are built in eastern Oregon, so the percentage of local construction workers may be higher than estimated.

Workers in some positions, such as construction foremen and inspectors, will be employed for the entire duration of construction, but many workers will be employed for 6 to 12 months and therefore will not be expected to bring families with them. The Certificate Holder assumes very few workers will relocate their families.

As the Certificate Holder assumes that because most construction workers will not be in the area for more than 6 to 12 months, housing for most construction workers will primarily be provided by hotels, motels, temporary housing, and recreational vehicle (RV) parks within a commutable distance to the Facility (70 miles, or 1-hour commute duration).

4.2.2 Operations

The Certificate Holder expects that the Amended Carty Solar Farm will require up to 12 personnel for daily maintenance activities during operations over the 25-year lifespan of the Amended Carty Solar Farm. The operations and maintenance (O&M) staff will be hired locally, to the extent that skilled workers are available. Some outside contractors may be required from time to time for

specialized maintenance tasks, such as solar array inspections or the repair of associated equipment. A household size of 3.0 is conservatively assumed per employee, thus a total of 36 new permanent residents could be added to the local population. It is assumed that these workers will live locally. The Certificate Holder may also rely on O&M staff from its existing operating portion of the Facility to provide operational support for the Amended Carty Solar Farm.

4.2.3 Decommissioning

Decommissioning employment will be temporary and similar to the construction of the Amended Carty Solar Farm. Decommissioning is estimated to require a similar duration as construction, i.e., up to 24 months.

4.3 Affected Public and Private Service Providers – OAR 345-001-0010(1)(u)(B)

OAR 345-021-0010(1)(u)(B) Identification of the public and private providers in the analysis area that would likely be affected;

4.3.1 Affected Counties, Cities, and Communities

Table U-1 presents historical population estimates for communities in Morrow, Gilliam, Benton, and Klickitat counties within the analysis area. Communities within 10 miles of the Facility were analyzed; Boardman is the only Census Designated Place found within the analysis area. Boardman had a 2022 population of approximately 3,830 people, 32 percent of Morrow County's total population.

Table U-1. Historical Population of Counties and Communities within the Analysis Area

Location	Population		2010 -2022	
	Census 2010	Census 2022	Absolute Change	Percent Change
OREGON	3,831,074	4,229,374	398,300	10.4
Morrow County	**11,173**	**12,140**	**967**	**8.7**
Boardman	3,220	3,830	610	18.9
Gilliam County	**1,871**	**1,983**	**112**	**6.0**
WASHINGTON	6,724,540	7,688,549	964,009	14.3
Benton County	**175,177**	**207,560**	**32,383**	**18.5**
Klickitat County	**20,318**	**22,798**	**2,480**	**12.2**
Source: U.S. Census Bureau 2010, U.S. Census Bureau 2022.				

All communities within a commutable distance (70 miles) are considered in the housing analysis (see Sections 4.3.7 and 4.4.5). According to the most recent available U.S. Census Bureau (2020)

residence to workplace data for 2016 to 2020, nearly 74 percent of Morrow County residents work within Morrow County (3,486 commuters per day). Morrow County receives 2,407 Umatilla County, Oregon, commuters per day, 307 Benton County, Washington, commuters per day, 185 Franklin County, Washington, commuters per day, 59 Gilliam County, Oregon, commuters per day, and 45 Clackamas County, Oregon, commuters per day. The remaining 187 Morrow County commuters travel from multiple other, more distant counties.

4.3.2 Public and Private Service Providers

Table U-2 identifies the public and private service providers in and near the analysis area that may be affected by construction of the Amended Carty Solar Farm. The analysis area includes Morrow County in Oregon, as well as a small portion of eastern Gilliam County in Oregon and southern Klickitat and Benton counties in Washington. PGE does not expect any providers in the Gilliam County portion of the analysis area to be affected. PGE does expect that some providers in Umatilla County in Oregon (outside of the analysis area) may be affected. An analysis of different services and providers necessary for construction and operation of the Amended Carty Solar Farm are identified in the following sections.

Table U-2. Public and Private Service Providers

Service	Service Provider Detail	Location
Sewers and Sewage Treatment	Various providers: portable toilets and sewage disposal	Hermiston or Boardman, Oregon
Water	No service provider is required	N/A
Stormwater Drainage	No service provider is required	N/A
Solid Waste Management	Finley Buttes Landfill: non-hazardous and some hazardous waste	Boardman, Oregon
	Columbia Ridge Landfill: non-hazardous and some hazardous waste	Arlington, Oregon
Housing	Approximately 3,100 vacant units	Boardman, Oregon Tri-Cities, Washington
	Approximately 75 hotels, motels, and recreation vehicle parks	Boardman, Oregon Hermiston, Oregon Pendleton, Oregon Tri-Cities, Washington
Traffic	Oregon Department of Transportation	Salem, Oregon
	Morrow County Public Works Department	Lexington, Oregon

Service	Service Provider Detail	Location
Police and Fire Protection	Morrow County Sheriff's Office (primary law enforcement provider for the Facility location)	Heppner, Oregon
	Oregon State Police (secondary law enforcement provider for the Facility location)	Arlington, Heppner, Hermiston, and Pendleton, Oregon
	Boardman Police Department (Backup law enforcement provider)	Boardman, Oregon
	Boardman Fire Rescue District	Boardman, Oregon
Health Care	Irrigon Medical Clinic (not Trauma rated)	Irrigon, Oregon
	Good Shepherd Medical Center (Level III Trauma Center)	Hermiston, Oregon
	Trios Southridge Hospital (Level III Trauma Center)	Kennewick, Washington
	Kadlec Regional Medical Center (Level III Trauma Center)	Richland, Washington
	Legacy Emanuel Medical Center (Level I Trauma Center)	Portland, Oregon
	Oregon Health and Science University Hospital (Level I Trauma Center)	Portland, Oregon
	Morrow County Health District's Emergency Medical Services (Emergency medical transport)	Boardman and Irrigon, Oregon
Schools	Sam Boardman Elementary School	Boardman, Oregon
	Windy River Elementary School	Boardman, Oregon
	Riverside Junior/Senior High School	Boardman, Oregon

4.3.3 Sewers and Sewage Treatment

In the rural area surrounding the Facility, there are no developed sewer systems that will be impacted by construction or operation of the Amended Carty Solar Farm. The nearest developed sewer systems are located approximately 9 miles away from the Amended Site Boundary in the town of Boardman, Oregon; other cities' sewer systems are farther away. As explained in Exhibit O, portable toilets will be used during construction; these will be provided and serviced (including off-site disposal of waste) by a private sanitation service provider. During operation of the Amended Carty Solar Farm, PGE's staff will make use of sanitary facilities at the proposed (O&M) building, which will send sewage to the existing septic system. During operations, if there are numerous workers at the Facility for multiple days in a row, a portable toilet may be temporarily installed.

4.3.4 Water

In the rural area surrounding the Facility, there are no developed water systems that will be impacted by construction or operation of the Amended Carty Solar Farm. The nearest developed water systems are located in the city of Boardman, approximately 9 miles from the Amended Site Boundary; other cities' water systems are farther away.

PGE expects that approximately 84 million gallons of water will be required for construction of the Amended Carty Solar Farm. As discussed in Exhibit O, all non-potable water used for construction and operations will be withdrawn from the Carty Reservoir, which is owned and operated by PGE. Potable water will be sourced from the Facility's existing potable water system, which in turn is sourced from an existing Boeing well located 170 feet south of the Carty Generating Station Unit 1 building. During construction, potable water will be obtained from a temporary tie in with the existing Boeing well located 170 feet south of the Carty Generating Station Unit 1 building or from a bottled water vendor (per Site Certificate Condition 10.23). During operation, potable water will be obtained within the proposed O&M building with a connection to the Carty potable water system via the existing Boeing well. For water rights information and other details, see Exhibit O of this RFA.

4.3.5 Stormwater Drainage

In the rural area surrounding the proposed Facility, stormwater infrastructure is limited to minimal facilities associated with public roads maintained by Morrow County. The nearest developed stormwater drainage facilities in the vicinity of the Facility are located within the Boardman city limits; however, the Amended Site Boundary is approximately 9 miles from Boardman and the Amended Carty Solar Farm will not connect to or otherwise impact the city's stormwater system.

4.3.6 Solid Waste Management

Morrow County provides solid waste disposal services through agreements with private providers. It is assumed that solid waste developed during construction, operation, and decommissioning of the Amended Carty Solar Farm will be transported to landfills through agreements with local private disposal services. The closest landfill to the Facility is the Finley Buttes Landfill (9.8 miles east of the Amended Site Boundary) and the Columbia Ridge Landfill (18.5 miles northwest of the Amended Site Boundary; PGE will provide a record of correspondence in Attachment U-1 prior to the final RFA 4 being deemed complete).

Morrow County has adopted a Solid Waste Management Ordinance that addresses solid waste disposal and recycling in the county. One of the purposes of this ordinance is to "[provide] the opportunity to recycle as part of the overall solid waste plan," and refers in turn to Oregon's reuse and recycling requirements. The majority of the ordinance relates to licensing of waste disposal sites and waste collection franchises and recycling franchises. The ordinance obligates the waste and recycling franchisees to maintain records of amounts of waste collected or received, and

amounts and types of waste recycled, consistent with reporting requirements of the Oregon Department of Environmental Quality. PGE will continue to coordinate with waste and recycling franchisees servicing the Facility and maintain adherence to the ordinance (Site Certificate Condition 6.24).

4.3.7 Housing

Construction is anticipated to last approximately 24 months. Based on PGE's experience during construction of the Carty Generating Station Unit 1 building from 2014 to 2016, PGE anticipates that much of the construction personnel will be permanent residents or temporary residents who commute from the Tri-Cities area in Benton and Franklin counties, Washington. For this analysis, it is assumed that temporary housing could be required for up to 132 new households during the peak construction period and about 22 new households on average during the 24-month construction period. This is assuming 70 percent of construction staff will not be existing residents and will migrate to the area during construction. Additionally, permanent housing for roughly 12 new households, including workers and their families (based on a household size of 3.0), may be required during operations.

Varying degrees of housing options are provided in incorporated and unincorporated communities within the analysis area, and within a commutable distance from the Facility (70 miles) outside of the analysis area. Typical housing options for temporary workers include hotels or motels, apartments, short-term rental homes, RV parks, and public or private campgrounds. Note that no RV usage is proposed at the Facility itself but rather at existing RV parks and campgrounds. There are over 50 hotels/motels within commutable distance (70 miles, or 1 hour of travel) to the Facility (Hotels.com 2023). These include five hotels/motels in Boardman, Oregon, around 10 hotels/motels near Hermiston, Oregon, and approximately 10 hotels/motels in Pendleton, Oregon. There are approximately 30 hotels/motels within the Tri-Cities area, Washington. In addition, approximately 25 recreational vehicle parks are available within commutable distance of the Facility in northern Morrow and Umatilla counties, Oregon, and the Tri-Cities, Washington (RV Life Campgrounds 2023).

The Certificate Holder assumes that most construction workers will be in the area for approximately 6 to 12 months, and that the housing for those workers will primarily be provided by hotels and RV parks.

Some construction workers, particularly those employed for the entire duration of construction, may rent a house or apartment during construction of the Amended Carty Solar Farm. Table U-3 presents housing supply and availability data for counties and communities within a commutable distance. The estimated number of vacant rental units is calculated as a percentage of total vacant housing units; that percentage is based on the ratio of renter-occupied dwellings to owner-occupied dwellings. Using this method, an estimated 4,976 housing units were available for rent in communities within a commutable distance. Housing vacancy rates for 2022 ranged from zero percent in several communities to 20 percent in Weston. The 2022 seven-Oregon county average rental vacancy rate of approximately 4.3 percent is higher than the state of Oregon's rental vacancy

rate of 3.7 percent; the 2022 six-Washington county average rental vacancy rate of approximately 4.2 percent is higher than the state of Washington's rental vacancy rate of 4 percent. Twelve of the 55 communities experience vacancy rates greater than 5 percent. If workers migrate from the larger Tri-Cities area of Washington (i.e., Kennewick, Pasco, and Richland), it is expected that approximately 1,600 rental units may be vacant in that area.

Table U-3. Available Housing Estimates

Geographic Area	Total Housing Units (2022)	Vacant Housing Units (2022)	Of Occupied Housing, Percentage Occupied by Renter (2022)	Estimated Number of Vacant Rental Units (2022)	Rental Vacancy Percentage (2022)
OREGON	***1,818,599***	***137,799***	***36.8***	***50,710***	***3.7***
Morrow County	**4,724**	**523**	**30.2**	**158**	**3.7**
Boardman	1,182	63	46.7	29	4.4
Heppner	633	100	49.5	50	8.3
Ione	***176***	10	27.7	3	0.0
Irrigon	727	61	22.4	14	0.0
Lexington	***71***	2	13.0	0	0.0
Umatilla County	**31,264**	**3,842**	**33.5**	**1,287**	**5.3**
Echo	238	31	52.7	16	0.0
Hermiston	6,971	420	38.8	163	5.9
Meacham	73	47	42.3	20	0.0
Milton-Freewater	2,774	479	52.4	251	8.3
Pendleton	6,950	1,000	45.5	455	6.2
Pilot Rock	579	58	16.9	10	0.0
Stanfield	911	48	27.3	13	3.3
Ukiah	156	49	21.5	11	0.0
Umapine	200	0	18.0	0	0.0
Umatilla	2,168	123	31.1	38	0.0
Weston	230	52	15.7	8	20.0
Gilliam County	**1,081**	**219**	**25.4**	**56**	**5.2**
Arlington	252	22	33.9	7	0
Condon	461	83	19.6	16	14.0

Geographic Area	Total Housing Units (2022)	Vacant Housing Units (2022)	Of Occupied Housing, Percentage Occupied by Renter (2022)	Estimated Number of Vacant Rental Units (2022)	Rental Vacancy Percentage (2022)
Lonerock	23	11	0	0	0.0
Grant County	**4,128**	**760**	**22.1**	**168**	**2.6**
Monument	147	18	20.9	4	0.0
Wheeler County	**930**	**306**	**30.9**	**95**	**10.6**
Fossil	268	26	20.7	5	0.0
Spray	97	16	37.0	6	0.0
Sherman County	**953**	**183**	**30.0**	**55**	**1.3**
Biggs Junction	0	0	0.0	0	0.0
Grass Valley	116	24	46.7	11	0.0
Moro	171	34	42.3	14	0.0
Wasco	226	25	21.9	5	0.0
Wasco County	**12,038**	**1,550**	**34.9**	**541**	**1.6**
Antelope	40	18	40.9	7	0.0
Dufur	398	47	33.0	16	0
Maupin	310	147	23.9	35	0.0
Shaniko	19	10	22.2	2	0.0
The Dalles	6,695	354	40.0	142	1.4
Tygh Valley	65	32	60.6	19	0.0
WASHINGTON	***3,216,243***	***236,971***	***36.2***	***85,784***	***4.0***
Benton County	**80,421**	**4,912**	**31.9**	**1,567**	**5.0**
Benton City	1,353	43	21.2	9	2.1
Finley	2,045	225	23.1	52	0.0
Kennewick	32,496	1,845	37.1	684	5.5
Prosser	2,403	148	44.7	66	6.7
Richland	25,542	1,454	35.4	515	5.8
West Richland	5,548	298	14.8	44	0.0
Klickitat County	**10,602**	**984**	**25.0**	**246**	**1.5**

Geographic Area	Total Housing Units (2022)	Vacant Housing Units (2022)	Of Occupied Housing, Percentage Occupied by Renter (2022)	Estimated Number of Vacant Rental Units (2022)	Rental Vacancy Percentage (2022)
Bickleton	49	6	11.6	1	0.0
Goldendale	1,733	137	49.1	67	0.0
Yakima County	**90,660**	**5,102**	**37.7**	**1,923**	**2.9**
Grandview	3,312	196	44.5	87	1.9
Granger	853	11	45.8	5	2.8
Mabton	599	31	42.4	13	6.2
Sunnyside	4,661	232	39.0	90	2.3
Toppenish	2,436	21	39.8	8	1.4
Union Gap	2,183	125	32.3	40	11.8
Wapato	1,299	76	47.5	36	6.0
White Swan	142	26	58.6	15	6.8
Yakima	36,623	1,793	46.9	841	3.0
Walla Walla County	**25,032**	**2,054**	**33.8**	**694**	**7.6**
Touchet	177	6	9.9	1	0.0
Walla Walla	14,014	1,149	39.6	455	7.4
Franklin County	**29,806**	**1,456**	**30.1**	**438**	**3.3**
Basin City	337	0	21.7	0	0.0
Pasco	24,252	1,118	31.1	348	3.3
West Pasco	626	92	10.3	9	0.0
Grant County	**38,851**	**5,185**	**35.2**	**1,825**	**4.8**
Desert Aire	1,306	342	16.9	58	0.0
Source: U.S. Census Bureau 2022					

4.3.8 Traffic

Roads within the primary transportation route are serviced by the Oregon Department of Transportation (ODOT; Interstate 84 [I-84] and a portion of Interstate 82 [I-82]) and the Morrow County Public Works Department (Tower Road and other local roads). It is anticipated based on the assessment completed in this section and Section 4.4.6 that roads within the primary transportation route are of sufficient quality to accommodate the temporary increase in

construction traffic, and that no road upgrades will be required outside of the Amended Site Boundary. The primary transportation routes utilize a commutable distance assumption of 70 miles, or 1 hour of travel.

4.3.8.1 Primary Transportation Routes

Privately owned vehicles will transport workers to and from the Amended Carty Solar Farm. Most construction personnel are expected to originate from the Tri-Cities, Washington, and will access the Facility by traveling south on I-82 and then west on I-84 until reaching Tower Road (located approximately 5 miles west of the city of Boardman, Oregon; Figure U-1). Workers will travel south on Tower Road for approximately 10 miles until reaching the Facility entrance near the Carty Generating Station Unit 1 building.

Heavy-duty trucks will be used to carry gravel, concrete, and materials for solar modules. Light-duty trucks will mostly be used to deliver electrical equipment and water. Primary transportation for construction trucks will likely begin near Portland, Oregon. Trucks will access the Facility by traveling east on I-84 until reaching Tower Road. From Tower Road, trucks will travel south for approximately 10 miles until entering the Facility on Tower Road. From there, construction areas will be accessed via existing access roads within the Amended Site Boundary. New access roads are only needed within the perimeter fence for each of the two solar areas.

4.3.8.2 Traffic Volumes

Table U-4 provides traffic volumes for the expected transportation routes to the Facility. State highway volumes were published in the 2018 through 2022 Traffic Volume Tables (ODOT 2018, ODOT 2019, ODOT 2020, ODOT 2021, ODOT 2022a). Table U-4 shows the average annual daily traffic (AADT) volumes for the most recent 5 years of data available at various milepost locations along the transportation routes. For Tower Road, there was only one year of AADT data available (2022) via ODOT's TransGIS Data Viewer (ODOT 2024), provided at the end of Table U-4.

Table U-4. Transportation Route Average Annual Daily Traffic Volumes

Highway[1]	Location	Milepost	2018	2019	2020	2021	2022	Average Percent Change 2018-2022
I-82								
I-82 (No. 70)	South of Oregon Washington State Line [0.58 miles]	0.58	21,500	21,600	20,908	24,536	24,824	4%
I-82 (No. 70)	South of Columbia River Highway (US-730) [0.30 miles]	1.3	15,900	15,900	15,333	18,227	17,928	3%
I-82 (No. 70)	South of Powerline Road [0.30 miles]	5.13	15,500	15,500	14,967	17,666	17,317	3%

Highway[1]	Location	Milepost	2018	2019	2020	2021	2022	Average Percent Change 2018-2022
I-82 (No. 70)	North of Old Oregon Trail Highway (I-84) [0.30 miles]	10.4	17,100	17,100	16,566	19,584	18,934	3%
I-84								
I-84 (Columbia River Highway No. 002)	East of Heppner Highway No. 52 (OR-74) [0.43 mile] {Heppner JCT AVC, Sta. 11-009}	147.78	13,100	13,300	11,515	14,286	14,152	3%
I-84 (Columbia River Highway No. 002)	West of Tower Road Interchange [0.30 miles]	159.00	13,600	13,800	11,992	14,460	14,324	2%
I-84 (Columbia River Highway No. 002)	West of Boardman Interchange [0.30 miles]	163.86	16,600	16,700	14,850	16,147	15,997	-1%
I-84 (Columbia River Highway No. 002)	West of Port Morrow Interchange [0.30 miles]	165.46	19,200	19,400	17,677	18,137	17,966	-2%
I-84 (Columbia River Highway No. 002)	West of Old Oregon Trail Interchange (I-84) [0.40 miles]	167.18	22,200	22,400	20,701	21,116	20,915	-1%
I-84 (Old Oregon Trail No. 006)	SE of Columbia River Highway No. 2 (US-730) Interchange (US-730) [0.60 miles]	168.55	17,700	17,900	16,781	19,389	19,286	2%
I-84 (Old Oregon Trail No. 006)	East of Paterson Ferry Interchange [0.40 miles]	171.53	18,200	18,400	17,237	19,796	19,686	2%

Highway[1]	Location	Milepost	2018	2019	2020	2021	2022	Average Percent Change 2018-2022
I-84 (Old Oregon Trail No. 006)	East of Ordnance Interchange [0.30 miles]	178.28	19,100	19,100	17,982	20,451	20,336	2%
I-84 (Old Oregon Trail No. 006)	East of McNary Interchange (I-82) [0.60 miles]	180.05	16,100	16,200	15,168	16,459	16,336	1%
I-84 (Old Oregon Trail No. 006)	East of Westland Interchange [0.30 miles]	180.71	16,100	16,100	15,143	16,432	16,309	0%
	Location	**Milepost**	**2022**					**% Trucks**
Tower Road								
Tower Road	On Tower Rd, 0.07 mile south of EB I-84 ramps	N/A	7,401					26.9%

Source: ODOT 2018, 2019, 2020, 2021, 2022a, 2024
1. The name/number in parenthesis is the ODOT name/number designation for each state highway.

Table U-4 shows that from 2018 to 2022, AADT volumes increased by approximately 1 percent on average for I-84, while volumes for I-82 roadway segments increased by approximately 3 percent, on average over the same period.

I-82, which carried a volume of 19,751 vehicles per day in 2022 (compared to 17,531 vehicles per day on I-84, as of 2022), saw an increase of 2,251 vehicles per day, between 2018 and 2022. I-84 saw an increase of 341 vehicles per day between 2018 and 2022.

Due to the rural nature of the analysis area, recent traffic counts for county roads that are proposed as transportation routes are not available. The counties do not monitor traffic volumes on a yearly basis. The most recent version of the Morrow County Transportation System Plan (Morrow County 2022) indicates that the County only has one year of traffic-count data (2005) for a select group of roadway segments in the county. Traffic data in the Transportation System Plan indicate that Tower Road had an AADT of 2,600 in 2005, one of the highest counts of the roads included in the analysis (Morrow County 2022). However, in general, traffic volumes on Morrow County roadways are low. Existing volume-to-capacity ratios are low for county roads, and thus it is assumed that existing capacity deficiencies on any county roadways are unlikely (Morrow County 2022). County roadway volumes are minimal, with some increase during the summer and early fall for harvest of various crops in the area.

4.3.8.3 Pavement Conditions

Pavement conditions can influence traffic safety issues. Poor pavement with potholes might cause vehicles to swerve, resulting in unsafe vehicle operation. ODOT's 2022 Pavement Condition data were reviewed for state highway transportation routes. Table U-5 shows the conditions for state highways anticipated to be used as part of the transportation routes to the Facility.

Table U-5. Pavement Condition for State Highway Transportation Routes

Roadway	Description	Starting Milepost	Ending Milepost	Pavement Condition
I-82	COLUMBIA RVR - END OF JCP	0.4	0.5	PR
I-82	BEGIN CRCP - HWY 002 O-XING	0.5	1.02	FR
I-82	HWY 002 O-XING - JCT HWY 006	1.02	11.21	GD
I-84	GILLIAM CO. LINE - TOWER RD	149.5	159.3	GD
I-84	TOWER RD-BOARDMAN	159.3	163.5	FR
I-84	BOARDMAN - IRRIGON JCT	163.5	167.58	FR
I-84	IRRIGON JCT - JCT I-82	167.58	179.45	FR
I-84	JCT I-82 - MP 184.6	179.45	184.6	PR
I-84	184.6 - STANFIELD INTCH	184.6	188.04	GD
I-84	STANFIELD INTCH - PENDLETON	188.04	203.65	FR
Source: ODOT 2022b; GD = Good, FR = Fair, PR = Poor				

The majority of the sections of I-82 and I-84 being considered for the haul routes are in fair condition. There are some segments on I-82 and I-84 with a good rating as well. A fair rating indicates minor or low severity pavement deficiencies that typically lead to treatment such as chip seal or light resurfacing (ODOT 2022b); however, fair conditions do not indicate a safety hazard.

Tower Road's surface quality is not assessed by ODOT because it is a local roadway. It is a two-lane asphalt roadway with striping. In street level imagery dated 2021, the road surface appears to have intermittent cracking that has been recently sealed, suggesting a fair condition (Google Earth 2021).

4.3.8.4 Air Transportation

There is one aviation facility within the analysis area, considering both public and private airports: Boardman Airport (public; 7.3 miles north of the Amended Site Boundary). Otherwise, the next closest aviation facility is outside of the analysis area: Lexington Airport (16 miles south-southeast of the Amended Site Boundary). There is also one military facility within the analysis area, the

Naval Weapons Systems Training Facility (NWSTF) Boardman, which is a U.S. Navy aviation training and testing site located more than 1 mile east of the Amended Carty Solar Farm.

4.3.9 Police and Fire Protection

Police service in the analysis area is primarily provided by county police departments; some of the cities in the analysis area have a city police department that operates within their respective cities but do not cover the Facility. As necessary, PGE relies on assistance from the nearest Morrow County Sheriff's Office, located in Heppner, Oregon. PGE will provide a record of correspondence in Attachment U-1 prior to the final RFA 4 being deemed complete (see Attachment U-1). Additional law enforcement service is available through the Oregon State Police, with offices in Arlington, Heppner, Hermiston, and Pendleton, and through the Boardman Police Department. The small number of temporary construction workers and additional permanent-resident employees is not anticipated to place significant new demands on law enforcement agencies in the area.

Fire protection service in the analysis area is provided by the Boardman Fire Rescue District. The Certificate Holder will provide the fire department with construction plans, and locational information for Amended Carty Solar Farm infrastructure, including access. PGE will provide a record of correspondence in Attachment U-1 prior to the final RFA 4 being deemed complete (see Attachment U-1).

4.3.10 Health Care

Because population density in the analysis area is relatively low, hospitals and health care services tend to be regional. The Irrigon Medical Clinic provides family medicine, urgent care, and minor surgery services, and is located approximately 20 miles from the Amended Carty Solar Farm. There are three Level III Trauma centers within the vicinity of the Amended Carty Solar Farm: Good Shepherd Medical Center (in Hermiston, Oregon), Trios Southridge Hospital (in Kennewick, Washington), and Kadlec Regional Medical Center (in Richland, Washington; Oregon Health Authority 2023). The closest Level I Trauma centers are the Legacy Emanuel Medical Center and Oregon Health and Science University Hospital, both located in Portland, Oregon. The Morrow County Health District's Emergency Medical Services (EMS) operates two ambulances in Boardman, Oregon, and two ambulances in Irrigon, Oregon (Morrow County Health District 2023).

4.3.11 Schools

The analysis area is within the Morrow County School District No 1. The nearest schools within the district are located in the town of Boardman, Oregon and include Sam Boardman Elementary School (9.3 miles northeast of the Facility), Windy River Elementary School (9.4 miles northeast of the Facility), and Riverside Junior/Senior High School (10.3 miles northeast of the Facility).

4.4 Potential Impacts on Public and Private Providers – OAR 345-001-0010(1)(u)(C)(D)

OAR 345-021-0010(1)(u)(C) A description of any likely adverse impact to the ability of the providers identified in (B) to provide the services listed in OAR 345-022-0110;

OAR 345-021-0010(1)(u)(D) Evidence that adverse impacts described in (C) are not likely to be significant, taking into account any measures the applicant proposes to avoid, reduce or otherwise mitigate the impacts; and

The Amended Carty Solar Farm is not expected to have any significant adverse impact on any public or private service providers in the analysis area during construction or operation. The Council previously found that the Carty Solar Farm was not likely to result in significant adverse impacts to public services within the analysis area,[1] and the amendments in RFA 4 do not alter that conclusion. No amendments to relevant conditions listed in the Third Amended Site Certificate to the Carty Generating Station are proposed.

4.4.1 Sewer and Sewage Treatment

No adverse impacts to sewer services are expected as a result of construction, as the only sewage services required for construction will be related to portable toilet sewage disposal via private contractor. During operations, PGE's staff will use the sanitary facilities at the proposed O&M building, which will not connect to public sewage infrastructure. PGE will follow Site Certificate Conditions 6.2, 6.22, and 10.24 in the Third Amended Site Certificate related to portable toilets and sewage management (Council 2022).

4.4.2 Water

PGE does not expect adverse impacts to water services, as non-potable water for construction will be sourced from the existing Carty Reservoir and potable water will mostly be sourced from the existing on-site Boeing well. No public sources of water will be used, and no new water rights will be required (see Exhibit O). PGE will follow Site Certificate Condition 10.23 regarding water sourcing, and Conditions 10.24, 10.28, 10.29, and 10.32 regarding wastewater discharges (Council 2022).

4.4.3 Stormwater Drainage

The Amended Carty Solar Farm will not adversely impact public stormwater drainage facilities. Any construction-related stormwater will evaporate or infiltrate on site and no public stormwater facilities will be used. During construction, stormwater best management practices and monitoring will be implemented in accordance with the 1200-C National Pollution Discharge Elimination System (NPDES) Storm Water Discharge General Permit and draft Erosion and Sediment Control

[1] Final Order on Request for Amendment 1, p. 120 (December 2018).

Plan (ESCP) (see Exhibit I, Attachment I-1) (Site Certificate Conditions 9.1, 9.2, and 9.4). The Amended Carty Solar Farm will be graded in a manner to encourage stormwater to infiltrate the ground without the need for collection in stormwater swales or retention basins. During operation, PGE will monitor the area until soils are stabilized and evaluate whether construction-related impacts to soils are being adequately addressed by the mitigation procedures described in the draft Erosion and Sediment Control Plan and the Amended Revegetation and Noxious Weed Control Plan (Site Certificate Condition 9.6). Stormwater management infrastructure installed during construction will, as needed, be left in place to continue functioning during operation. Such features may include roadside ditches, infiltration swales, or retention basins. These facilities will be located on private land and will not affect the provision of stormwater management services by any public agency. PGE will also follow wastewater discharge practices listed in Site Certificate Conditions 10.24, 10.28, 10.29, and 10.32 (Council 2022).

4.4.4 Solid Waste Management

Construction and operation activities will not adversely impact solid waste management services. Solid waste will be disposed through contracts with local waste disposal providers (Site Certificate Condition 6.24). The Amended Carty Solar Farm will implement a waste management plan during construction and operation, in accordance with Site Certificate Conditions 6.3. and 10.22. PGE will comply with Section 5, Public Responsibilities of the Morrow County's Solid Waste Management Ordinance (Condition 6.24; Council 2022). Exhibit W includes detailed information about types and quantities of solid waste and disposal.

PGE will contract with a private disposal service to transport any solid waste that is not recycled to an approved landfill. The Finley Buttes Landfill, located 9.8 miles east of the Facility, or Waste Management, Inc.'s Columbia Ridge Landfill, located 18.5 miles northwest of the Facility site, will be the most likely recipients for solid waste for the Amended Carty Solar Farm. PGE expects construction waste to be within the handling capacities of the aforementioned landfills (PGE will provide a record of correspondence in Attachment U-1 prior to the final RFA 4 being deemed complete, see Attachment U-1; Snider 2018; Anderson 2018; see Exhibit W).

4.4.5 Housing

PGE does not expect adverse impacts to housing as a result of constructing or operating the Amended Carty Solar Farm. Potential impacts on housing could result if there were an inadequate supply of housing in relation to the demand from the new temporary and permanent residents associated with the Amended Carty Solar Farm; it is not yet known where the new temporary and permanent residents will settle and what type of housing they will select. However, based on the availability of housing options outlined in Section 4.3.7, adequate supply is available to accommodate the construction and operations employees.

The number of skilled local workforce is continuously growing as more solar energy projects are built in eastern Oregon. As discussed below, additional workers are likely to commute daily from

communities outside the analysis area (within a 70-mile commutable distance), which will lessen impacts to housing associated with the in-migration of outside workers.

Based on the projected employment and population amounts for the Amended Carty Solar Farm, temporary housing could be required for up to 132 new households during the peak construction period and about 22 new households on average during the 24-month construction period. However, this is based on the conservative assumption that 30 percent of construction workers will be hired locally—and thus not require temporary housing—while the remainder will be from outside the 70-mile commuting distance. Additionally, it is assumed that most construction workers will be in the area for approximately 6 to 12 months as opposed to the full construction period. The actual number of temporary residents may be fewer if more locals are hired.

Hotels, motels, and trailer or RV parks will likely be the most viable available housing option for temporary residents. Publicly available hotel and motel occupancy data show an estimated statewide year-to-date occupancy rate of 60.8 percent in October from 2023 (Travel Oregon 2023). Hotel and motel occupancy rates also vary by region, with occupancy rates in Oregon generally higher in the Portland Metro area. For new workers that migrate to the area, approximately 75 hotels, motels, and recreation vehicle parks are within commuting distance to the Facility. Ample housing units will be available for longer-term workers (see Section 4.3.7; Hotels.com 2023, RV Life Campgrounds 2023). Additional rooms may be available in establishments that do not have information available online. Additional temporary housing will be available in overnight facilities located at private RV campgrounds or private, long-term rentals offered through companies like Airbnb. Consultation with cities will occur as necessary regarding temporary housing options prior to construction. Note that no RV usage is proposed at the Facility itself but rather at existing RV parks and campgrounds within a 70-mile commute distance.

Even if all migrant (non-local) construction workers sought temporary housing within the 70-mile analysis area, there will be enough supply to meet that demand. Industry experience indicates that construction workers are unlikely to relocate if commuting to work is an option, and that commuting an hour or more is common. Therefore, a 70-mile commute distance is certainly a conservative estimate based on keeping commute times to an hour or less. Additionally, based on PGE's experience during construction of the Carty Generating Station Unit 1 building from 2014 to 2016, much of the construction personnel are likely to be permanent residents within the area or temporary residents who commute from the Tri-Cities area in Washington within 70 miles (1 hour duration) commuting distance. That distance includes several communities that have greater housing availability (see Section 4.3.7), as well as other amenities when compared to options within 10 miles, which will attract workers in need of temporary housing. Although it cannot be assumed that housing facilities will have vacancies at any given time, adequate supplies are available within a commutable distance in relation to the number of temporary workers. Additionally, experience with energy facility construction, for example during the peak of wind power construction in 2009 and 2010 near the community of Arlington, Oregon, demonstrates that multiple facilities can be built in an area comparable to the analysis area without creating local housing issues. Therefore, no

significant adverse housing impacts from construction of the Amended Carty Solar Farm are anticipated.

Permanent housing for about 12 new households (with up to 3.0 people per household) may be required starting at the beginning of operations. For the maximum 36 new permanent residents expected because of Amended Carty Solar Farm operations, it is anticipated that adequate opportunities will be available to purchase housing or to construct new housing in the analysis area, or within a commutable distance from the Facility outside of the analysis area. Given the reasoning described in this section as well as the general availability of housing opportunities, no significant adverse impacts on the ability of communities to provide housing are anticipated from construction or operations of the Amended Carty Solar Farm.

4.4.6 Traffic

PGE expects an average of 198 worker vehicle trips generated per day during construction of the Amended Carty Solar Farm, with a peak of 301 worker vehicle trips (assuming a carpooling factor of 1.25). PGE expects a peak of 30 trucks per day or 60 truck trips per day by small and large trucks to deliver modules, trackers, and cabling. Thus, during peak construction, it is possible the Amended Carty Solar Farm could generate approximately 361 trips per day. It is anticipated that 12 two-way vehicle trips per day will be required for maintenance personnel during operations. Transportation routes will be used to bring construction workers, equipment, and materials from outside of the analysis area to the Facility, and will include state and county roads. The primary transportation route is depicted in Figure U-1.

Construction and operation of the Amended Carty Solar Farm will temporarily increase the traffic volume within the primary transportation route. However, construction-related traffic typically occurs during off-peak hours. Construction workers generally start their days earlier than the surrounding residents and construction trucks typically use roads in the middle of the day during off-peak hours. The private vehicle traffic will generally occur out of phase with the truck traffic, as the workers report earlier and leave later than most of the truck traffic. PGE will encourage carpooling for construction workers and include traffic safety as part of its safety training program.

As described in Section 4.3.8.2, in 2022 I-82 carried an AADT volume of approximately 19,751 vehicles between the Washington/Oregon border and the Old Oregon Trail No. 006 (I-84) Interchange. Based on the above AADT estimates, for the construction period, construction vehicles could cause an average increase to 19,979 if 100 percent of the average construction traffic uses this route, which is a total increase of about 1.2 percent. This increase is expected to be inconsequential.

Between the interchange with I-84 and Tower Road, I-84 carried an AADT volume of approximately 17,531 vehicles in 2022. Based on the above AADT estimates, for the construction period, construction vehicles could cause an average increase to 17,759 if 100 percent of the average construction traffic uses this route, which is a total increase of about 1.3 percent. This increase is expected to be inconsequential.

At Tower Road just south of I-84, the 2022 AADT was found to be 7,401. With the addition of 100 percent of the average construction traffic, this will increase the anticipated vehicles per day to 7,629. This equates to a total increase in traffic of 3.1 percent. This increase is expected to be inconsequential.

PGE will coordinate with ODOT and Morrow County on any potential road closures, impacts, and permits needed for construction or movement of equipment and materials. PGE will implement all traffic-related Site Certificate Conditions (6.17–6.21, 6.23, 6.27, 7.3, 9.2, and 10.8), including those related to oversize/overweight delivery timing, parking, road wear and repair, and signage (Council 2022). A Construction Traffic Management Plan will be developed prior to construction, in accordance with Site Certificate Conditions 6.17 and 6.27, that will include traffic minimization measures at Tower Road that would be implemented as needed, staggering shift start times to reduce vehicle trips through the westbound I-84/Tower Road ramp terminal, installation of temporary traffic controls during peak construction, and other mitigation measures, as applicable (Council 2022). In accordance with Site Certificate Condition 6.19, PGE will ensure that any wear or damage to county roads as a result of the project is repaired, and that roads are restored to pre-construction condition or better (Council 2022).

Morrow County Zoning Ordinance 3.070.E requires a traffic impact analysis (TIA) be completed if the Amended Carty Solar Farm will generate more than 400 passenger car equivalent (PCE) trips per day. While the project generates a peak of 361 trips per day, when considering PCEs, Morrow County requires a PCE rate of 2.2 passenger cars per truck for this calculation. With 30 trucks per day making 2 trips a day, this results in a peak PCE trip count of 433 PCE trips per day. Based on the assumptions described in Section 4.2, it is anticipated that the Facility will require a TIA. Prior to the start of construction, when staging and workforce assumptions are better known, the Certificate Holder will confirm expected passenger car equivalents and prepare a TIA (per Site Certificate Condition 6.27; Council 2022). The prepared TIA will also be used to inform consultation with the Morrow County Sheriff's Office. The Construction Traffic Management Plan will be submitted concurrently with the TIA (Condition 6.17 and 6.27).

4.4.6.1 Traffic and Design Standards

Traffic Standards

State highways are designed and constructed to handle legal loads of 80,000 pounds without a permit. During construction, it may be necessary for trucks exceeding the legal load limit to access the site via state highways. These trucks will potentially be used to deliver the substation transformers or heavy construction equipment. Note that per Site Certificate Condition 6.21, oversize and overweight deliveries shall be made by rail or barge as feasible to avoid impacts to the I-84 and Tower Road interchange (Council 2022). Before construction, the transportation contractor will consult with the Morrow County Road Department and ODOT to determine whether any segments of roadway or bridges are restricted for travel, and to obtain any oversize/overweight permits required to allow transport of these loads. There are no permanent restrictions on state highways proposed for transportation routes. Because the state highways are

built to accommodate overweight vehicles with permits, impacts to safety or roadway pavement conditions are not expected. Vehicles up to 75 feet in length are allowed without special permitting on the construction transportation routes. There are requirements imposed by Morrow County and ODOT, such as the previously referenced Construction Traffic Management Plan (Site Certificate Conditions 6.17 and 6.27; Council 2022), to promote traffic safety and prevent cumulative damage to the pavement along the primary transportation routes identified in this exhibit.

Design Standards

County and local roadways are expected to safely accommodate Amended Carty Solar Farm construction traffic. Note that no county or local roadways are anticipated to require improvement prior to construction. Note that road conditions could change, thus the Construction Traffic Management Plan will reflect what is actually needed at the time of preconstruction compliance for the Amended Carty Solar Farm (Site Certificate Conditions 6.17 and 6.27; Council 2022). To ensure the integrity of local roads, the Certificate Holder will coordinate with local transportation officials to make improvements where necessary to accommodate Facility construction traffic, and improvements will be restricted to areas within the respective rights-of-way. Per Site Certificate Condition 9.2, construction truck traffic must be limited to improved road surfaces to avoid soil compaction (Council 2022).

The Certificate Holder will work with ODOT and the Morrow County Road Department to ensure that any unusual damage or wear to state or county roads that is caused by Facility construction is repaired by the Certificate Holder consistent with Condition 6.19. All county roads on the primary transportation route will be evaluated prior to and after construction of the Amended Carty Solar Farm to determine what, if any, degradation has occurred. Inspections will include monitoring of roadway conditions after the completion of construction activities. Monitoring may include the use of video footage, photographs, and engineer field notes to document road conditions. During construction of the Amended Carty Solar Farm, the contractor will obtain authorization from ODOT and Morrow County before proceeding with overweight loads on state- or county-maintained roadways. The Certificate Holder will strictly abide to travel conditions and transportation equipment requirements enforced by either ODOT or Morrow County. Upon completion of construction, the Certificate Holder will restore county roads to their pre-construction condition or better, to the satisfaction of the County Road Department. Regardless of existing pavement conditions, roadway segments will be reviewed prior to any added construction traffic, and a system for monitoring safety or degradation to pavement will be developed for the necessary roadways prior to construction (Site Certificate Condition 6.19; Council 2022). The Certificate Holder will ensure that the construction and operation of the Amended Carty Solar Farm will maintain ODOT's and Morrow County's road systems in as good or better quality than prior to the Facility's construction.

4.4.6.2 Air Transportation

There is one aviation facility within the analysis area, Boardman Airport, located over seven miles from the Amended Site Boundary; this airport does not meet the notice criteria based on Federal

Aviation Administration (FAA)-identified impact areas (i.e., over 3.8 miles from the Amended Site Boundary), and therefore formal submission of a Form 7460-1 to the FAA under Code of Federal Regulations (CFR) Title 14 Part 77.9 (Safe, Efficient Use, and Preservation of the Navigable Airspace) is not anticipated. Additionally, the one military facility within the analysis area, the NWSTF Boardman, is a U.S. Navy aviation training and testing site located more than one mile east of the Amended Carty Solar Farm and will therefore not create any physical obstruction to use of the training facility. As part of RFA 1, the U.S. Navy and PGE discussed the potential for glare from the Carty Solar Farm to impact flight paths to the NWSTF Boardman. Following that discussion, PGE filed a Notice of Proposed Construction (Form 7460-1) with the FAA on July 13, 2016, and the FAA subsequently issued a determination of no hazard. In support of the Amended Carty Solar Farm, the U.S. Navy and PGE discussed the potential for increased glare from the additional solar modules. The U.S. Navy concluded that no additional glare and glint analysis is required for the Amended Carty Solar Farm (Kimberly Peacher, U.S. Navy NW Training Range Complex, pers. comm., e-mail message, October 23, 2023). To confirm that a formal FAA notification was not required for the Amended Carty Solar Farm, PGE utilized the FAA Notice Criteria Tool. PGE initiated the Department of Defense's Military Aviation and Installation Assurance Siting Clearinghouse Informal Review Process to confirm there is no impact to the nearby Boardman Bombing Range; the response will be provided to ODOE when received.

4.4.7 Police and Fire Protection

The relatively small number of new temporary and permanent residents is not expected to create significant new demands on the police or fire protection services for the area. Any impacts to police and fire services will be intermittent and temporary during construction, as construction workers will remain on-site for 24 months.

During construction and operation of the Amended Carty Solar Farm, the Certificate Holder will provide for on-site security and maintain good communications between on-site security personnel and the Morrow County Sheriff's Office, consistent with Condition 8.1. During operation, the Certificate Holder will ensure that appropriate law enforcement agency personnel have an up-to-date list of the names and telephone numbers of Amended Carty Solar Farm personnel available to respond on a 24-hour basis in case of an emergency on the site (Condition 8.1).

PGE has previously consulted with the Morrow County Sheriff's Office and the Boardman Rural Fire Protection District (previous name; now the Boardman Fire Rescue District) to address potential impacts and committed to coordinating with them regarding appropriate traffic safety measures. PGE will provide a record of correspondence specific to the Amended Carty Solar Farm in Attachment U-1 prior to the final RFA 4 being deemed complete. PGE will provide the Boardman Fire Rescue District with construction plans, schedules, and locations prior to the start of construction.

Solar panels contain a number of safety features designed to provide increased fire protection. The BESS also introduces an element that could pose a fire hazard. Lithium-ion batteries must be kept in a temperature-controlled facility with individual battery modules isolated to prevent the spread of

fire if it were to occur. The lithium-ion BESS will incorporate a fire response system as designed by the battery manufacturer. During the operational phase of the Amended Carty Solar Farm, fire danger will be minimal.

The following measures could be implemented to minimize fire and safety risks:

- Conditions in Section 8.0 of the Site Certificate (On-Site Safety and Security) will be followed during construction and operation of the Facility, including conditions related to implementing fire safety plans and health and safety plans, mitigating fire risk, and coordinating with the Boardman Fire Rescue District (Condition 8.7) (Council 2022).
- All electrical equipment will meet National Electrical Code and Institute of Electrical and Electronics Engineers standards.
- Adequate firefighting equipment and water supplies will be maintained and made available during operations that carry a high fire risk (e.g., metal cutting, welding, parking in high, dry grass).
- The solar array will have shielded electrical cabling to prevent electrical fires.
- The collector system and substation will have redundant surge arrestors to deactivate the Facility during unusual operational events that could start fires.
- Facility infrastructure will be spaced sufficiently (fire breaks) to prevent the spread of fire.
- A non-flammable gravel base will be installed around the solar inverters, substation, and BESS.
- 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.
- Vehicles and equipment will drive and park on maintained graveled areas and roads to the extent practicable; roads will be established before accessing the site to keep vehicles away from grass (Condition 8.4 and 8.5).
- Vehicles will avoid idling in grassy areas, and cutting torches and similar equipment will be kept away from grass (Condition 8.4 and 8.5).
- Diesel vehicles will be used whenever practicable to prevent potential ignition by catalytic converters.
- Roads will be sufficiently sized for emergency vehicle access.
- Fire prevention and response training will be administered annually to all on-site employees (Condition 8.5). Operations staff will be trained in the use of fire extinguishers for responding to incipient stage fires on site (Condition 8.6).
- An Amended Carty Solar Farm site plan will be submitted to fire protection officials including current contact information for personnel (Condition 8.8).

- Off-site, 24-hour monitoring of the BESS will be implemented and will include shutdown capabilities.
- The BESS will be stored in completely contained, leak-proof modules, and will be inspected regularly according to the manufacturer's recommendations.
- Transportation of lithium-ion batteries is subject to 49 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 BESS will be in accordance with applicable Underwriters Laboratories (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.
- The site will be mowed as needed for fire safety requirements and to keep vegetation from interfering with operation and maintenance activities.
- A physical vegetation survey assessment of the fenced area will be completed at least twice a year (and seasonally as needed during heightened fire risk) to monitor for vegetation clearances, maintain fire breaks, as applicable, and monitor for wildfire hazards.
- The programs outlined in Exhibit V will be implemented to minimize fire risk during operations.

The Certificate Holder proposes revisions to Site Certificate Condition 8.8 to incorporate the amendments proposed in RFA 4 as follows:

8.8 Upon the beginning of operation of Unit 1, ~~facility components approved in Final Order on RFA1, or~~ facility components approved in Final Order on RFA2, or facility components approved in Final Order on RFA4, the certificate holder shall provide a site plan to the Boardman ~~Rural~~ Fire ~~Protection~~ Rescue District. The certificate holder shall indicate the actual location of all facility structures on the site plan. The certificate holder shall provide an updated site plan if additional structures are later added to the facility. During operation, the certificate holder shall ensure that appropriate fire protection agency personnel have an up-to-date list of the names and telephone numbers of facility personnel available to respond on a 24-hour basis in case of an emergency on the facility site.
[Final Order IV.M.2.8] [AMD4]

Both Condition 8.8 and Condition 8.7 also update the Boardman Rural Fire Protection District to the Boardman Fire Rescue District to reflect a name change; this is intended as clarification and is not

intended to materially change the original intent of the condition (refer to Section 6.0 of the RFA 4's Division 27 document [Request for Amendment 4 for the Carty Generating Station]).

4.4.8 Health Care

PGE does not expect construction or operation of the Amended Carty Solar Farm to have adverse impacts on local and regional emergency health service providers, hospitals, or health clinics, considering the relatively small number of personnel that will be added for construction and operation of the Amended Carty Solar Farm. Healthcare providers appear to have adequate capacity for potential patients associated with the Amended Carty Solar Farm, and the need for healthcare services will be minimized through implementation of robust health and safety programs (Site Certificate Conditions 8.2 and 8.3; Council 2022). The Amended Carty Solar Farm will also comply with all emergency planning and notification requirements of Emergency Planning and Community Right-to-Know Act (Site Certificate Condition 7.4) and will notify the Oregon Department of Energy and Morrow County within 72 hours of any event that threatens public health and safety or the environment (Site Certificate Condition 7.8; Council 2022).

In an emergency, Morrow County EMS will likely provide emergency medical transportation to the Good Shepherd Medical Center in Hermiston, Oregon (Morrow County Health District 2023). If more advanced treatment is needed, patients may be flown via helicopter or fixed-wing aircraft to Level I Trauma centers in Portland, Oregon. Construction workers are expected to adhere to contractor safety programs, which will prevent serious injuries and the need for ambulance or hospital services.

4.4.9 Schools

PGE does not expect construction or operation of the Amended Carty Solar Farm to have adverse impacts on schools, considering the relatively small number of new students that will be enrolled. No schools are located within the Amended Site Boundary or will be directly affected by Facility construction or operations. During operations, up to 12 new permanent households (assuming a household size of 3.0) may require school services, which should not adversely impact school operations. Impacts on school services will depend on the housing choices of new residents with children, which cannot be predicted; however, given the number of schools in the locations in which new residents are likely to settle, and the small number of new school children expected, it is unlikely that any one school will receive more new students than it can accommodate. To the extent possible, PGE will coordinate the timing of oversized/overweight vehicles and equipment deliveries to avoid peak school traffic times and bus routes. Note that truck traffic (inclusive of large component or equipment deliveries) will generally not coincide with morning and evening peak hours; rather, truck traffic will be dispersed throughout the working day. School buses are anticipated to be operational in the mornings and evenings, before and after schools are in session, and thus are not anticipated to coincide with the timing of construction truck traffic.

5.0 Proposed Monitoring Programs

OAR 345-021-0010(1)(u)(E) *The applicant's proposed monitoring program, if any, for impacts to the ability of the providers identified in (B) to provide the services listed in OAR 345-022-0110.*

Because PGE does not anticipate the construction and operation of the Amended Carty Solar Farm to have long-term significant adverse impacts on the ability of service providers in the analysis area to provide services, PGE does not plan any monitoring programs other than the monitoring efforts required under NPDES and the Traffic Management Plan. PGE will continue to communicate with the Morrow County Planning Department and local service providers to keep them informed of major developments at the Amended Carty Solar Farm that could potentially affect public services.

6.0 Conclusion

The evidence provided in this exhibit demonstrate that the Amended Carty Solar Farm will not result in a significant adverse impact on the ability of public and private entities in the analysis area to provide the following services: sewers and sewage treatment, water, stormwater drainage, solid waste management, housing, transportation and traffic safety, police protection, fire protection and emergency response, health care, and schools.

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Figures

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Carty Generating Station Request for Amendment 4

Figure U-1 Analysis Area and Primary Construction Transportation Route

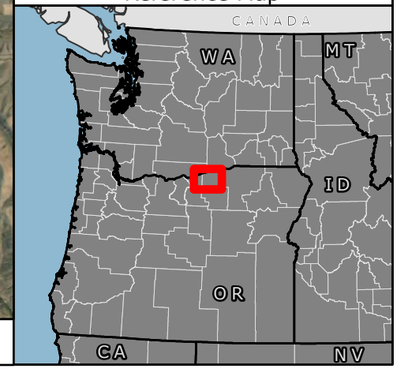
MORROW COUNTY, OR

- Amended Site Boundary
- Analysis Area (10-mile Buffer)
- City/Town
- County Boundary
- State Boundary
- Interstate Highway
- US Highway
- State Highway
- County Highway
- Primary Construction Traffic Route

TETRA TECH

PGE

Reference Map



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Gilliam County
Morrow County
Umatilla County
Alderdale
Columbia River
WASHINGTON
OREGON
Boardman
Irrigon
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Tower Rd
Roosevelt
Arlington
Olex
Mikkalo
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Attachment U-1. Service Provider Letters

(To be provided prior to fRFA submission)

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Exhibit V

Wildfire Prevention and Risk Mitigation

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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List of Attachments

Acronyms and Abbreviations

BESS	battery energy storage system
Certificate Holder / PGE	Portland General Electric
CGS / Facility	Carty Generating Station
MW	megawatt
OAR	Oregon Administrative Rules
PUC	Oregon Public Utility Commission
RFA	Request for Amendment
WMP	Wildfire Mitigation Plan

1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

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. OAR 345-022-0115 is a new standard introduced in 2022 and therefore was not previously addressed in the original Application for Site Certificate or subsequent amendments for the approved Facility. Portland General Electric Company is an investor-owned utility that provides electric service in Oregon and is subject to the requirements of Oregon Administrative Rules (OAR) 860, Division 300 which requires PGE to have a risk-based Wildfire Mitigation Plan (WMP) filed and approved by the Oregon Public Utility Commission (PUC).

2.0 Wildfire Risk – OAR 345-022-0115(2)

(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, 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.

(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.

The applicable section of OAR 345-022-0115 is Section 2 because PGE is an investor-owned utility and the Facility is subject to a Wildfire Mitigation Plan (or WMP) that has been approved in

compliance with OAR 860, Division 300; therefore, the requirements of Section 1(a) and 1(b) are not required for the Oregon Energy Facility Siting Council to issue a site certificate.

The WMP that has been approved in compliance with OAR 860, Division 300 is PGE's 2023 WMP (Attachment V-1). This 2023 WMP was approved by the Oregon PUC on June 13, 2023, under PUC Order 23-221 (Attachment V-2). Pursuant to OAR 860-300-0020(2), the WMP is required to be updated annually; PGE submitted the 2024 WMP to the Oregon PUC on December 29, 2023. The risk analysis required by OAR 860-300-0030 must describe the wildfire risk within PGE's service territory and outside the service territory within PGE's right of way for generation and transmission assets. Therefore, the wildfire risk for the Facility was modeled and evaluated when PGE prepared the WMP; see Attachment V-2 for the PUC Order 23-221 and PUC staff's analysis of PGE's compliance with the WMP requirements as stated in OAR 860-300-0030. Oregon PUC Order 23-221 (Attachment V-2) contains PUC staff's review, review of an Independent Evaluator's Report, review of stakeholder comments, and ongoing participation in WMP public workshops and stakeholder engagement. If construction of the Amended Carty Solar Farm proceeds, the following annual update for the WMP will include a re-evaluation of risks considering the new solar and BESS components.

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Attachment V-1.
PGE 2023 Wildfire Mitigation Plan

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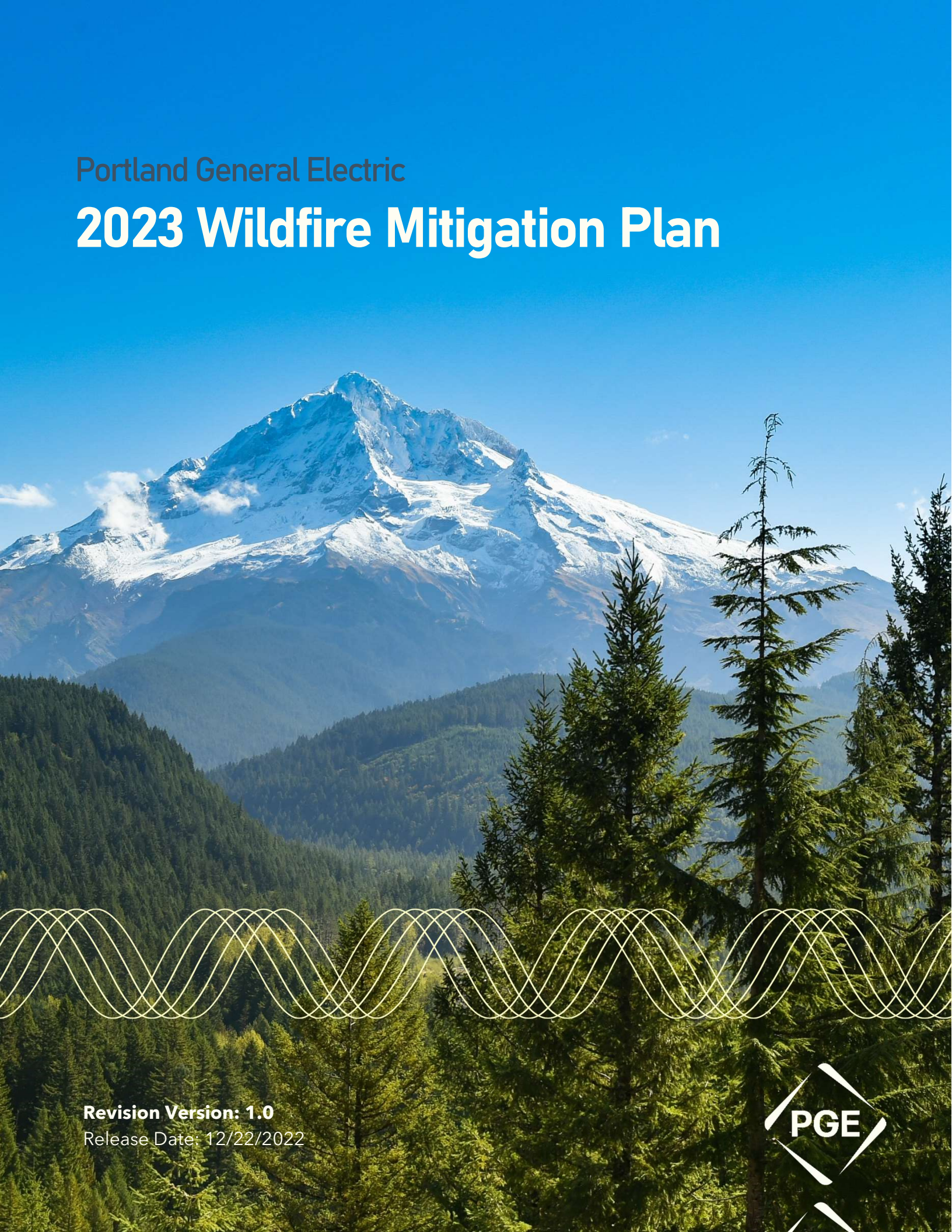
Portland General Electric

2023 Wildfire Mitigation Plan



Revision Version: 1.0
Release Date: 12/22/2022

This Wildfire Mitigation Plan (WMP) contains statements that relate to future plans, objectives, expectations, performance, and events. These forward-looking statements represent PGE's estimates and assumptions as of December 1, 2022; because PGE is continually updating its wildfire data, information included in the WMP reflects the data available at the time of publication. Furthermore, the estimated costs and schedules contained herein are subject to certain uncertainties including delays in supply chain and increased supply costs, nonperformance of counterparties and employee work factors. PGE assumes no obligation to update or revise any forward-looking statement as a result of new information, future events, or other factors.

These forward-looking statements are not a guarantee of future performance, and any such forward-looking statements are subject to risks and uncertainties which may be difficult to predict or are beyond PGE's control. As a result, actual results may differ materially from those projected in the forward-looking statements.

1. Executive Summary

PGE's Wildfire Mitigation & Resiliency (WM&R) organization plans and implements the Wildfire Mitigation Program (Program), developing and coordinating wildfire mitigation activities across the company. The company's approach to wildfire mitigation continues to evolve in response to both global climate change, which is fueling landscape-altering wildfire events worldwide, and to the wildfire rules recently issued by the Oregon Public Utility Commission (OPUC). PGE's goal is to improve regional safety by reducing the risk that PGE's electric utility infrastructure could cause a wildfire, while limiting the impacts of Public Safety Power Shutoff (PSPS) events and other mitigation activities on customers and increasing the resiliency of PGE assets to wildfire damage.

In compliance with OPUC rules governing wildfire protection plans, the Wildfire Mitigation Plan (WMP) describes PGE's approach to wildfire risk mitigation and guides the company's Program.

The WMP presents PGE's approach to risk modeling, which is the foundation of the Program. The risk model, referred to as the "Wildfire Risk Mitigation Assessment," provides guidance for the major Program focus areas: operating protocols, PSPS events, asset management and inspections, vegetation management, Public Safety Partner and community engagement, public awareness and outreach, and research and development.

For 2023, the updated Wildfire Risk Mitigation Assessment resulted in PGE maintaining its 10 existing High Fire Risk Zones (HFRZs) with some minor refinements. HFRZs are areas within PGE's service territory where vegetation, terrain, meteorological patterns, and wildland-urban interface considerations increase the risks associated with wildfire. PGE implements specific inspection and maintenance, vegetation management, and operational actions within these HFRZs during and in preparation for PGE's declared Fire Season for improved ignition prevention and safety.

In addition, PGE continues to expand its situational awareness capabilities, including measures such as installing new remote automated weather stations and artificial intelligence (AI)-enhanced ultra-high-definition cameras (Pano AI cameras) to automatically notify PGE and its Public Safety Partners when they detect a fire, in real time. PGE will continue to invest in mitigations to reduce wildfire risk throughout our system.

However, factors beyond PGE's control, including rising costs and other supply chain issues, changing weather patterns driven by climate change, and competition for limited contract resources for vegetation management and inspections, will continue to impact delivery of PGE's Program in 2023. Investor-owned utilities, the OPUC, and other stakeholders must strive to achieve a reasonable balance between affordable electricity rates and meaningful wildfire risk reduction.

At PGE, wildfire-related planning, mitigation, and research are year-round endeavors. PGE may update this WMP and the Program throughout the year to address new findings, data, and analysis. PGE will continue to work collaboratively with Public Safety Partners, Tribes, local communities, and other key stakeholders to prioritize the safety of people, property, and public spaces.

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Glossary and Acronyms

***AAR**:* After-Action Review

AGOL: ArcGIS Online

***ANSI**:* American National Standards Institute

APPA: American Public Power Association

***AWRR**:* Advanced Wildfire Risk Reduction

***Blue-Sky/Grey-Sky Events**:* During Blue-Sky events, a utility executes normal daily operations with no natural disasters or other disruptive events. A Grey-Sky event refers to an operating day or days in which a utility faces severe weather or other incident which causes reliability concerns, and all hands are on deck to respond to the incident.

BPA: Bonneville Power Administration

CBO: Community-Based Organization

CEOP: Corporate Emergency Operations Plan

CIMT: Corporate Emergency Management Team

CPC: Climate Prediction Center

CRC: Community Resource Center

DEI: Diversity, Equity & Inclusion

EAC: Equivalent Annual Cost

ECC: Emergency Coordination Center

EEI: Edison Energy Institute

EEMT: Energy Emergency Management Team

EFD: Early Fault Detection

EOC: Emergency Operations Center

EPRI: Electric Power Research Institute

ESCC: Electricity Subsector Coordinating Council

***ESF-12**:* Refers to Emergency Support Function-12 and indicates the Public Utility Commission of Oregon's role in supporting the State Office of Emergency Management for energy utilities' issues during an emergency, per OAR 860-300-0002(1).

FAQ: Frequently Asked Question

***FDRA**:* Fire Danger Rating Area

***Fire Season**:* Period(s) of the year during which wildland fires are most likely to occur, spread, and affect resources sufficiently to warrant organized fire management activities

***Fire Weather**:* Weather conditions that influence fire ignition, behavior, and suppression

FITNES: Facilities Inspection & Treatment to National Electrical Safety Code

GIS: Geographic Information System

High Fire Risk Zone (HFRZ)*:* Geographic areas at elevated risk of wildfire ignition identified by PGE in its risk-based WMP

HSEEP: Homeland Security Exercise & Evaluation Program

IAM: Institute of Asset Management

IAP: Incident Action Plan

ICP: Incident Command Post

IMT: Incident management Team

IRWIN: Integrated Reporting of Wildland Fire Information

IWRMC: International Wildfire Risk Mitigation Consortium

ISO: International Organization for Standardization

LCES: Lookouts, Communications, Escape Routes, and Safety Zones

LiDAR: Light Detection & Ranging

Local Community*:* Any community of people living, or having rights or interests, in a distinct geographical area, per OAR 860-300-0002(2)

Local Emergency Management*:* Refers to city, county, and Tribal emergency management entities, per OAR 860-300-0002(3)

NICC: National Interagency Coordination Center

NIFC: National Interagency Fire Center

NIMS: National Incident Management System

No-Test Policy*:* PGE will disable auto-reclosing and not manually close-in a faulted circuit

NRECA: National Rural Electric Cooperative Association

NWCC: Northwest Coordination Center

NWS: National Weather Service

OAR: Oregon Administrative Rule

ODF: Oregon Department of Forestry

ODHS: Oregon Department of Human Services

ODOT: Oregon Department of Transportation

OH: Overhead (transmission or distribution circuit)

OJUA: Oregon Joint Use Association

O&M*:* Operations and Maintenance

OPUC: Public Utility Commission of Oregon

P1: Hazard/danger tree

P2: A tree that poses a grow-in or fall-in threat and displays arboricultural defect that poses risk to PGE facilities

PGE: Portland General Electric

PMO: PGE's Project Management Office

PSA: Predictive Service Area

PSPS: Public Safety Power Shutoff

Public Safety Partners*:* Includes the ESF-12, Local Emergency Management, and Oregon Department of Human Services (ODHS), per OAR 860-300-0002(6)

QA/QC*:* Quality Assurance/Quality Control

RAWS: Remote Automated Weather Station

Red Flag Warning*:* A term used by the National Weather Service to alert forecast users of an ongoing or imminent critical fire weather pattern. Red Flag Warnings will be issued whenever a geographical area has been in a dry spell for a week or two, or for a shorter period, if before spring green-up or after fall color, the National Fire Danger Rating System (NFDRS) is high to extreme, and all of the following weather parameters are forecasted to be met:

- Ten-hour fuels (moisture content of small vegetation that take only about 10 hours to respond to changes in moisture conditions) of 8 percent or less
- A sustained wind average 15 mph or greater.
- Relative humidity less than or equal to 25%.
- A temperature of greater than 75 degrees Fahrenheit.

In some states, dry lightning and unstable air are criteria. A Fire Weather Watch may be issued prior to the Red Flag Warning.

ROW: Right-of-way

RSE*:* Risk-Spend Efficiency

RVM: Routine Vegetation Management

SB: Senate Bill

SCADA: Supervisory Data Control & Acquisition

SEL: Schweitzer Engineering Laboratories

SME: Subject Matter Expert

Supervisory Control and Data Acquisition (SCADA)*:* The control system architecture comprising computers, networked data communications and graphical user interfaces (GUI) for high-level process supervisory management, while also comprising other peripheral devices like programmable logic controllers (PLC) and discrete proportional-integral-derivative (PID) controllers to interface with process plant or machinery.

Striking Distance*:* A term used to describe a tree that has the potential to impact PGE powerlines and other equipment.

T&D*:* Transmission and Distribution

Tier 1 Risk*:* Describes an area where there is not an elevated or extreme risk of wildfires.

Tier 2 (Elevated) Risk*:* Describes an area where there is an elevated risk (including likelihood and potential impacts on people and property) of utility-associated wildfires.

***Tier 3 (Extreme) Risk**:* Describes an area where there is an extreme risk (including likelihood and potential impacts on people and property) of utility-associated wildfires.

Tribes: this term is used collectively to describe PGE's Tribal partners, including the Confederated Tribes of the Grande Ronde, Confederated Tribes of Warm Springs, *Confederated* Tribes of the Umatilla Indian Reservation, and Confederated Tribes of Siletz Indians.

UAM: PGE's Utility Asset Management program

USDOE: United States Department of Energy

USFS: United States Forest Service

Utility-Identified Critical Facilities: the facilities identified by PGE within its service territory that have the potential to threaten life safety or disrupt essential socioeconomic activities if their services are interrupted. Communications facilities and infrastructure are considered Critical Facilities.

Wildfire Risk Mitigation Assessment: a PGE program that models and assesses a wide range of potential wildfire-related risk factors to inform PGE's operational and financial decision-making.

WMP: Wildfire Mitigation Plan

WM&R: PGE's Wildfire Mitigation & Resiliency organization

2. Introduction

This WMP describes PGE's wildfire prevention and mitigation efforts and PGE's planned activities to prevent utility-caused wildfire ignition events. The WMP incorporates internal and external lessons learned from the 2022 Fire Season and describes PGE's wildfire preparedness and response activities for 2023.

The success of the Program relies on the active participation of a broad spectrum of internal and external stakeholders under the direction of PGE's WM&R organization. The foundation of the Program is PGE's Wildfire Risk Mitigation Assessment and Risk Spend Efficiency calculations, used to develop and guide Program activities and wildfire mitigation investments. Based on industry benchmarking and findings from its Wildfire Risk Mitigation Assessment, PGE believes that the frequency of utility-caused ignition events can be reduced through:

- Inspection and maintenance of poles and equipment
- Engineering of reliable systems that experience fewer events that result in spark failure modes (potential ignitions)
- System hardening
- Effective vegetation management
- Situational awareness and operational readiness
- Operational changes during Fire Season, including the use of system protection devices such as electronic reclosers
- Effective use of PSPS to prevent utility-caused ignitions during Red Flag Warning meteorological events.

PGE will review its Fire Season operations and wildfire mitigation preparedness and response actions on an annual basis and update the WMP as needed. PGE will also update the WMP as required to comply with applicable regulatory requirements or changes in laws or regulations. If PGE substantively updates the plan outside of the annual submission cycle, PGE will refile the WMP with the OPUC and post the most current version of the WMP on PGE's website.

Some of the most important changes made for the 2023 WMP include the ongoing evolution of PGE's Wildfire Risk Mitigation Assessment in partnership with PGE's Public Safety Partners (please refer to Section 6.2, Updates to 2023 Wildfire Risk Mitigation Assessment, for additional details). PGE also expanded its situational awareness capabilities by adding 22 Pano AI fire detection cameras covering all 10 of PGE's HFRZs. Over 30 fire agencies have direct access to this technology, potentially improving response time to fires in the areas they serve. In addition, PGE's weather station network now consists of 52 stations providing weather data at a micro level, allowing for more precisely informed PSPS decision-making. PGE continues to move forward with non-expulsion fuse installation and other ignition prevention investments, such as tree wire and undergrounding projects. Other capital improvements include the expanded use of intelligent reclosers to reduce the number of customers impacted by PSPS events.

Lastly, in September 2022, PGE executed a PSPS event in all 10 of PGE's pre-designated HFRZs. This decision was not taken lightly, as it directly impacted customers across the PGE service territory. PGE observed damage to PGE assets from limbs and trees, indicating that the PSPS likely prevented wildfire ignitions within the PGE HFRZs during a period of extreme fire potential conditions, with Red Flag Warnings in effect from the Cascade Range to the Coast Range. Please refer to Appendix 8 (Summary of Input from Public Safety Partners and Lessons Learned Captured During the 2022 Fire Season) for lessons learned and recommendations from the PSPS event, tabletop exercises, and collaboration with PGE's Public Safety Partners.

3. Purpose and Scope

PGE's WMP is designed to provide strategic direction for the programs and activities that seek to mitigate the potential for PGE equipment, facilities, or activities to become wildfire ignition sources, and to guide PGE's compliance with all applicable laws and regulations, including the OPUC's wildfire rules. In constructing the WMP, PGE observed the following key principles:

- Prioritize public and employee safety
- Act to reduce the risk of wildfire ignitions from PGE assets
- Provide effective guidance to inform PGE's Fire Season operations
- Guide PGE's system hardening activities, increasing resistance to wildfire impacts through a systematic, risk-based approach to identifying and prioritizing system hardening and resiliency activities
- Communicate and collaborate with industry peers and Public Safety Partners, Emergency Support Function 12 (ESF-12), local emergency managers, Oregon Department of Human Services, local communities and community-based organizations, counties, Federal, Tribal, State and local governments, operators of PGE-identified critical facilities, and customers
- Maintain reliable electric service, and
- Implement PSPS events with efficiency, when necessary, and with broad public awareness.

4. Operating Environment and Service Territory

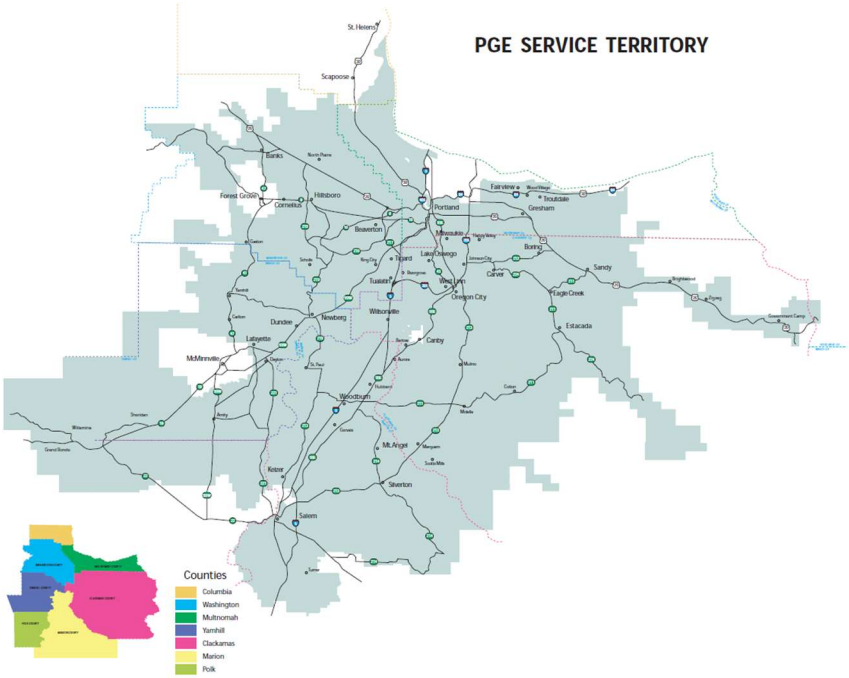
4.1 Operating Environment

Global climate change continues to alter the Pacific Northwest climate in ways that are difficult to model and predict. This reality will drive continuous evaluation and modification of PGE's WMP for the foreseeable future. In addition, the effects of climate change on California and resulting wildfires have increasingly pulled West Coast wildfire mitigation resources to the south, intensifying competition for available fire suppression, inspection, and vegetation management resources in the Pacific Northwest.

4.2 PGE Service Territory – Overview

PGE's service territory is distributed over 4,000 square miles in a combination of forested, mountainous, urban, and suburban environments. Much of the eastern and western portions of PGE's service area are forested, particularly in the Mt. Hood corridor along Highway 26, in the foothills of the Coast Range, and south toward Estacada. While the majority of PGE's service territory is located within the most densely populated area of the state, PGE's managed right-of-way (ROW) contains more than 2.2 million trees, with millions more off-ROW trees. In managing off-ROW conditions, PGE must coordinate with multiple neighboring utilities that interconnect to our system, including the Bonneville Power Administration (BPA), PacifiCorp, West Oregon Electric Cooperative, Wasco Electric Cooperative, Consumers Power, Inc., Forest Grove Light & Power, and McMinnville Water and Light.

Figure 1: PGE Service Territory



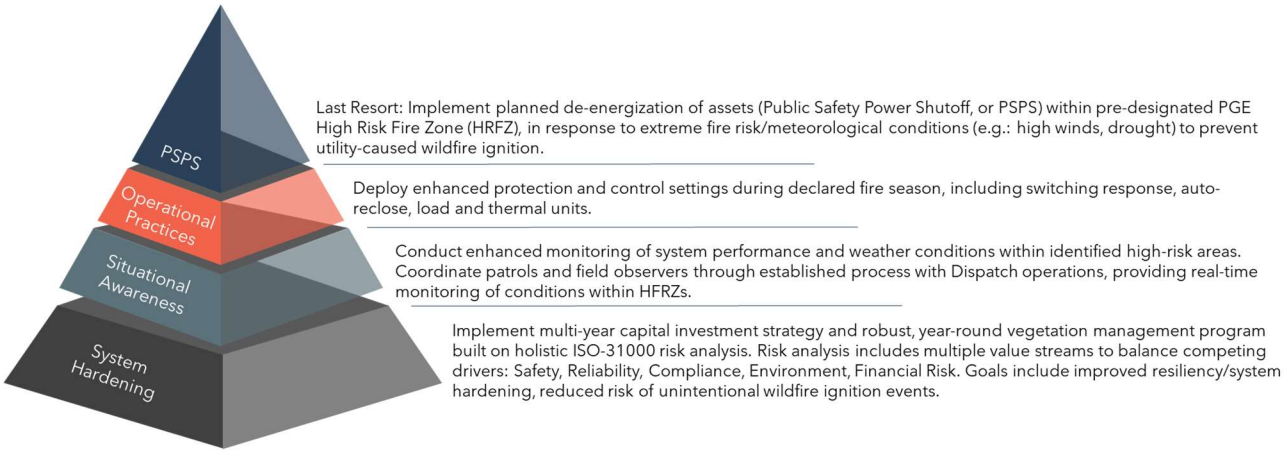
5. Wildfire Risk Mitigation Program Overview

PGE's primary wildfire risk mitigation objective is to reduce the risk of ignition from PGE assets, while limiting the impacts of specific mitigation activities, such as PSPS events, on customers. The Program can be broken down into the following four risk mitigation approaches and associated objectives:

- **PSPS:** Identify areas of heightened wildfire threat (HFRZs) within the PGE service territory and mitigate the risk of PGE-caused wildfire ignition in those areas through planned de-energizations (PSPS events) during periods of extreme fire risk.
- **Operational Practices:** Implement operational system settings, including protection systems (e.g., reclosers), line and vegetation maintenance, and using a risk-informed protection strategy to reduce risk of ignitions.
- **Situational Awareness:** Improve PGE's wildfire-related risk management and situational awareness capabilities.
- **System Hardening:** Implement a systematic, risk-informed approach to identify and prioritize system hardening, and resiliency measures to reduce the likelihood of ignitions caused by utility assets and protect PGE assets from damage.

The following figure provides a visual representation of PGE's multi-layered approach to wildfire risk mitigation:

Figure 2: PGE's Wildfire Risk Mitigation Hierarchy



PGE strives to find cost-effective ways to maximize wildfire risk reduction by applying risk assessment modeling to guide mitigation strategies. The purpose of this work is to deliver highest risk reduction per dollar spent on mitigation. Wildfire Risk Mitigation Assessment methodologies and mitigation measures are discussed in more detail in Section 6 of the WMP.

6. Wildfire Risk Assessment and Mitigation Activities

6.1 Risk Assessment Overview

PGE uses a multi-phase wildfire risk assessment program to:

- Annually identify and refine the boundaries of the HFRZs within the PGE service territory
- Quantify the likelihood that individual PGE assets could contribute to ignition of large wildfires (>100 hectares for fires in timber; >400 hectares for fires in grass or rangeland), map their location, and apply a consequences model to determine where a potential wildfire ignition would be most significant.

The annually updated HFRZ assessment enables PGE to identify the highest-risk areas within its service territory (HFRZs are discussed in Section 7, below) and prioritize wildfire mitigation actions. The model results are a key input to the development of PGE's 2023 WMP. In addition, PGE evaluates wildfire risk across PGE transmission and generation assets outside of our service territory (refer to Appendix 9, PGE Wildfire Risk Assessment Overview & Process, for additional details).

Assessment results allow PGE to evaluate susceptibility to the natural and human factors that could contribute to electric asset-caused wildfire ignitions and provide data-driven guidance for PGE's Program. A technical overview of PGE's fire behavior modeling, a component of the wildfire risk approach, is provided in Appendix 9.

6.2 Updates to 2023 Wildfire Risk Mitigation Assessment

PGE aims to improve its Wildfire Risk Mitigation Assessment methodologies through engagement with external experts, as well as through internal controls and feedback loops across the organization.

PGE engages external agencies in the validation of existing variables and development of new variables and inputs for consideration in the risk assessment process. In 2022, this engagement included workshops and field site visits with Oregon Department of Forestry (ODF), U.S. Forest Service (USFS), and local fire agencies to look at fire agency response times to ignition events and assess how vegetation and access conditions influence fire growth potential. In addition, PGE hosted virtual technical working sessions with local fire districts (Clackamas Fire District, Tualatin Valley Fire District, Multnomah County Fire District) and ODF to learn about anticipated fire response times, watershed boundaries, and detection probabilities. These engagements and variables directly informed PGE's 2023 reassessment of the HFRZ geographical boundaries as described in Section 7 of the WMP.

Through an internal post-Fire Season lessons learned process, PGE refined its Wildfire Risk Mitigation Assessment methodologies by introducing new variables layered onto the existing assessment framework. For 2023, these additional variables include:

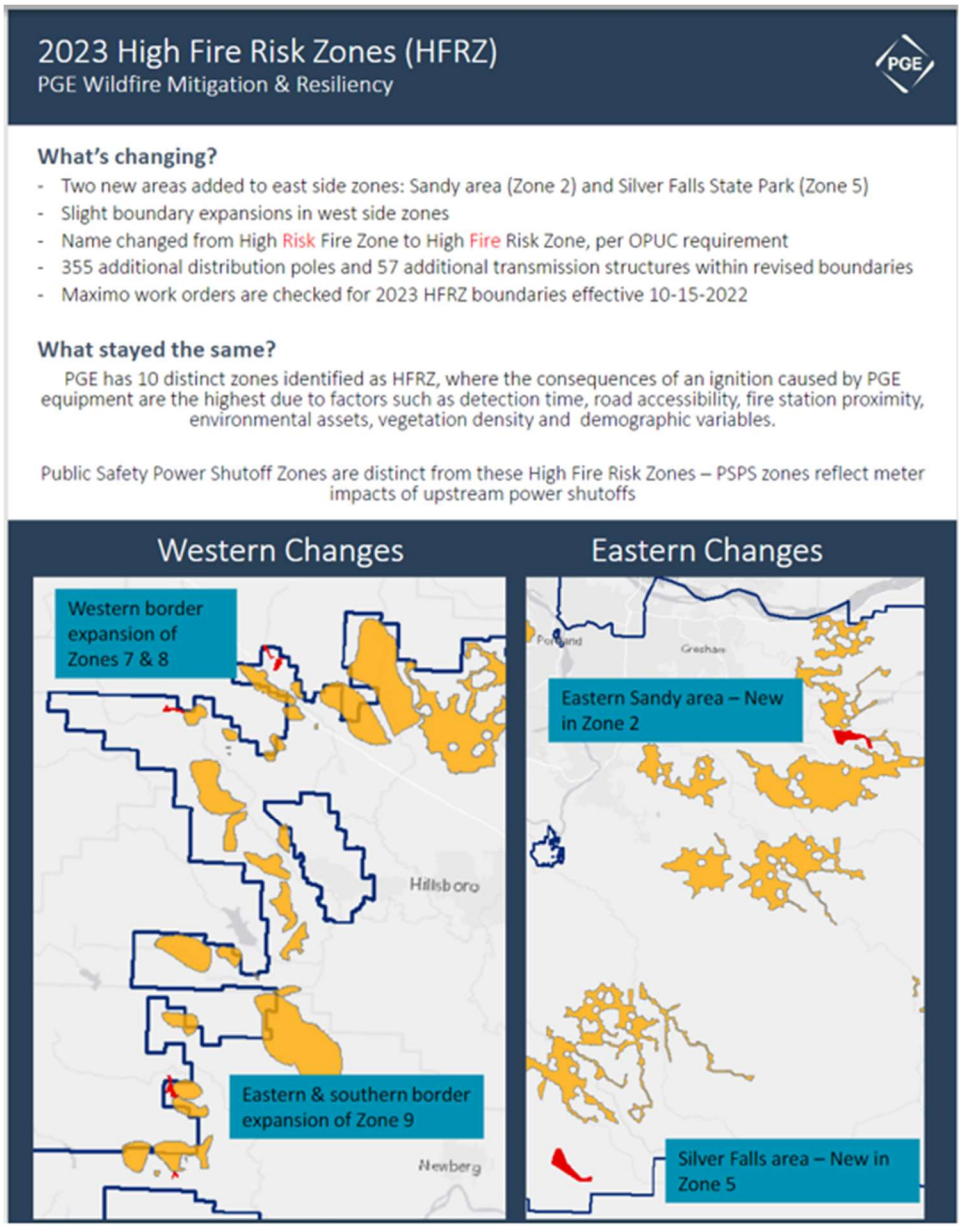
- Access/egress road density
- Detection probability

- Social vulnerability (including poverty, vehicle access, English as a second language considerations)
- Fire response time/proximity to emergency response (modelled at 10 and 15 minutes).

PGE continues to investigate improvements to data sets and analytical techniques to evolve its Wildfire Risk Mitigation Assessment methodologies and integrate fire risk into PGE's overall asset and risk management portfolios. Over the past two years, PGE has made the following changes to its baseline Wildfire Risk Mitigation Assessment:

- Began the development of a four-year wildfire risk mitigation roadmap, laying out planned mitigation activities through fiscal year 2025
- Increased the number of individual weather scenarios used to model baseline and seasonal wildfire risk (see the Wildfire Simulation Section of Appendix 9 for further details) to 216 scenarios, increasing model confidence
- Introduced new spatial variables to PGE's GIS-based wildfire risk mapping through virtual technical work sessions with local fire districts and the OPUC, including fire detection probability and estimated response time.

Figure 3: Geographic Differences Between PGE's 2022 and 2023 HFRZs



6.3 Wildfire Risk Categories

PGE's Wildfire Risk Mitigation Assessment methodologies consider baseline and seasonal wildfire risk, risk to residential areas served by PGE, and risks to generation facilities, substations, and powerlines owned by PGE. PGE uses these assessments to inform wildfire mitigation strategies that provide location-specific reliability and resiliency benefits. This holistic risk assessment approach helps PGE align specific mitigations to risk reduction areas, and to benefit a broad spectrum of regional stakeholders.

PGE seeks to align mitigation measures to risk across PGE's Program, from design and operational standards to construction practices, vegetation management, training, utility asset management, and capital investment.

6.3.1 Baseline Wildfire Risk

PGE calculates baseline equipment risk in terms of ignition probability (the annual likelihood that a given piece of equipment could cause a wildfire ignition given its type, age, condition, and location) and the consequences of ignition. These consequences evaluate how a wildfire ignited at a specific location may burn, as well as the potential magnitude of the damage it may cause. In most cases, probability values vary with age and condition of the asset, increasing as equipment ages.

6.3.2 Seasonal Wildfire Risk

Seasonal risk is integral to PGE's Wildfire Risk Mitigation Assessment. PGE's assessment of seasonal wildfire risk leverages the consequences modelled from the 216 fire weather scenarios referenced in Appendix 9. PGE also accounts for climate change variability in seasons by leveraging fuel ecology and wildfire studies for the Willamette Valley and Oregon[1]. For additional details regarding how PGE models seasonal wildfire risk, please refer to Appendix 9.

6.3.3 Risk to Residential Areas

PGE understands that ignition potential is not limited by HFRZ boundaries and models ignition points as a grid across the entire PGE footprint. PGE assesses risk to residential areas in the fire behavior models described in Appendix 9. PGE's modeling includes high-density locations as well as adjusted burn probabilities. A key factor in risk-informed decision-making is the recognition that detection probability and fire response time as a function of roads/access varies with population density.

6.3.4 Risk to PGE Equipment

PGE protects equipment and facilities within its HFRZs with established wildfire design and construction standards (e.g., replacement of wood poles with ductile iron as poles located in HFRZs that are damaged, replaced as part of non-wildfire projects, or reach end-of-life). In future iterations of PGE's Wildfire Risk Mitigation Assessment methodology, risk to PGE equipment will also be considered, as PGE adds the capability to assess which items of equipment are most likely to be damaged if a fire occurs in a given area. PGE is developing the tools required to factor information of this granularity into its Wildfire Risk Mitigation Assessment process.

[1] Studies included in PGE's Wildfire Risk Mitigation Assessment include Climate Change Increases Risk of Extreme Rainfall Following Wildfire in the Western United States (Touma, Stevenson et al 2022); Changing Wildfire, Changing Forests: the Effects of Climate Change on Fire Regimes and Vegetation in the Pacific Northwest, USA (Halofsky, Peterson and Harvey, 2020); Impacts of Climate Change on Fire Regimes and Carbon Stocks of the U.S. Pacific Northwest (Rogers et al 2011).

6.3.5 Georisk

In addition to the risk categories above, PGE models geographic wildfire risk (georisk). Georisk represents wildfire risk due to vegetation encroachment on the conductor, and/or animal contact impacting the components of the structure. Georisk is distinct from asset risk, which is defined as risk due to failed equipment. This information has been integrated into PGE's Strategic Asset Management Structures Model (Structures Model), a component of PGE's Wildfire Risk Mitigation Assessment methodology that allows PGE to evaluate wildfire risk at a more precise level.

PGE inputs asset and georisk data in to the Pyrologix[2] fire physics engine to create simulated probabilistic models that assess fire risk by location, for both long-term planning and real-time decision support. As discussed in Section 6.2, PGE continues to refine variables in coordination with external agencies. This collaboration has led PGE to add new variables for consideration in its ongoing risk analysis processes. These variables include remote sensing both LiDAR and high-definition imagery, wildfire spread distributions and situational awareness variables.

The following table details the data sources for the various inputs PGE uses to assess georisk, as well as the proposed cadence of updates to these data sources.

[2] Pyrologix is a Missoula-based wildfire threat assessment research firm that provides utility wildfire risk assessment, hazard and risk assessment, stochastic wildfire simulation, fuel treatment prioritization, fuel inventory and management, and exposure analysis modeling and analysis services.

Table 1: Georisk Modeling Data Sources and Cadence of Updates

Data Sources	Inputs	Cadence of Updates
Wildfire Modeling	Fire Propagation and Fire Behavior	Annual review • Affirm/update Subject Matter Expert (SME) assumptions/updated failure data • Landfire (geospatial layering program) calibration through Pyrologix proprietary adjustments • Flame Height • Energy Release Component (ERC) (real-time through 72 hours out) • Fuel Moisture (measured at 1hr/10hr/100hr) (real time through 72 hours out) • Live Fuel Moisture Hourly/real time • Fire Response Time • Flame Intensity • Detection Probability
	Elevation Data	Annual/semi-annual review • Affirm/update SME assumptions/updated failure data • National Survey Data • USGS • LiDAR
	Meteorological Data	Annual/semi-annual review • National weather data • PGE weather stations (Real Time)
	Burn Probability	Annual review • Affirm/Update SME assumptions/updated failure data • Landfire calibration through Pyrologix proprietary adjustments

6.4 Risk Assessment Methodologies: Data Quality & Review Frequency

PGE Wildfire Risk Mitigation Assessment methodologies include multiple statistical models that use a variety of data sources to identify the areas of highest wildfire risk within PGE's service territory. PGE's methodology is consistent with the ISO-31000 Monitoring & Review structure, which provides internal controls to enhance confidence while still considering the dynamic nature of risk.

PGE's quality assurance and quality control (QA/QC) process for finalized Asset Risk models identifies the cadence of updates and required review tasks. Required QA/QC tasks include review and affirmation of existing or updated data, subject matter expert (SME) assumptions, review of mathematical formulas, and variance testing of updates to confirm that updates are reasonable.

The following table describes the cadence of updates for the inputs used in PGE's annual wildfire risk assessment process:

Table 2: Update Cadence for Key Modeling Inputs

Data Sources	Inputs	Cadence of Updates
Annual Probability of Asset Failure	Weibull failure curve parameters	Annual review • Affirm/update SME assumptions/updated failure data
	Health indexing	Annual review • Incorporate condition data (as available)
	Demographics from database	Periodic updates as data becomes available-GIS/Maximo
	GIS data for components on structures	Annual update to address reconfiguration/replacement
Annual Probability of Asset-Caused Ignition	Probability of equipment related outage is source of ignition	Annual review • Affirm/update SME assumptions
	Probability of equipment in violation of PGE patrol/inspection guidelines	Annual review • Incorporate inspection data (as available) • Incorporate updated SME assumptions
	Equipment multipliers	Annual review • Affirm/update SME assumptions
Ignition Data	Tracking PGE caused ignitions by failure mode/driver	Weekly review • Propagates into all wildfire risk processes

Data Sources	Inputs	Cadence of Updates
Intervention Costs	Capital cost estimates for wildfire mitigation	Annual review • Affirm/update SME assumptions
Consequence of Wildfire	The wildfire consequence model developed by Pyrologix identifies structures in burnable locations and estimates the expected consequence of a large fire (i.e., min 400 hectare) started at each location.	Periodic updates as required
Predictive Outage Model	Weather data & outages to understand outage correlation with storms/wind	Annual review Machine learning model will be continuously learning with annual updates

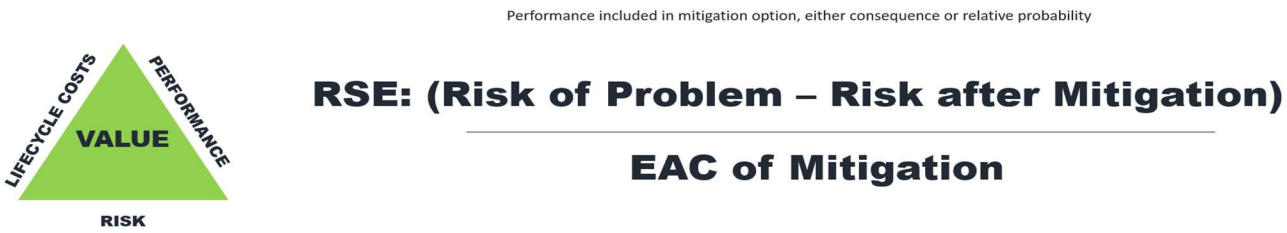
6.5 Wildfire Risk-Based Decision-Making

Climate change will continue to increase wildfire threats, requiring continual adaptation of asset management and other routine business practices. This challenging reality, combined with PGE's responsibility to maintain reliable electric service, requires a careful balance between often-competing interests and system requirements. As the complexity of this analysis increases with each passing year, PGE continues to be guided by the industry best practice of risk-informed decision-making (selecting mitigation projects based on estimated risk reduction value). As defined by Institute of Asset Management (IAM) criteria encompassed in International Organization for Standardization (ISO) 55000 standards, value is a function of lifecycle costs, performance and, ultimately, risk; Figure 4 illustrates this relationship.

Figure 4: The Value Equation

PGE factors in changing environmental conditions, impacts to the public and the environment, QA/QC on data quality, and new data sources to iterate and develop its wildfire risk mitigation strategy. PGE follows the ISO-31000 risk framework in evolving its Wildfire Risk Mitigation Assessment methodologies, and leverages both IAM and ISO concepts in value quantification to calculate Risk Spend Efficiency (RSE) across PGE's Program. This concept allows PGE to factor risk, lifecycle costs, and performance into a single process to provide guidance to understand and possibly estimate the effectiveness of mitigation measures. Lifecycle costs are represented in the equivalent annual cost (EAC) denominator.

Figure 5: The Risk Spend Efficiency Equation



NOTE: RSE = Risk Spend Efficiency, **EAC**= Equivalent Annual Cost

PGE applies RSE concepts in assessing mitigation alternatives across a wide range of PGE programs, including PSPS, vegetation management, system hardening/capital investment, and operations. PGE is continually improving its RSE assessment approach for use in both long-term and real-time planning and analysis. The following example analyses illustrate how PGE uses RSE to inform the direction of its mitigation strategies.

The illustrative examples below show the mitigation alternatives assessment for a hypothetical feeder located within a PGE HFRZ, with specified wildfire risk characteristics (heat intensity, flame height, burn probability, detection probability, response time, egress limitations, etc.) not shown.

The assessments compare the RSE outcomes for one hypothetical mitigation measure (undergrounding) vs. another (reconductoring and installation of fire-safe fuses).

Figure 6: Illustrative Risk Spend Efficiency Assessment: Undergrounding

As this hypothetical example illustrates, in this case, undergrounding the line would yield an RSE coefficient of 90 (a 90:1 risk reduction per dollar of investment).

The following figure shows the RSE assessment for a second potential mitigation measure: reconductoring and installing fire-safe fuses.

Figure 7: Illustrative Risk Spend Efficiency Assessment: Reconductoring and Fire-Safe Fuses

In this hypothetical example, undergrounding the line (Example 1) would yield a higher RSE value—risk reduction per dollar of investment—than Example 2 (reconductoring the line and installing fire-safe fuses): an RSE value of 90:1 vs. 28:1.

RSEs directionally inform selection of wildfire mitigation options for inclusion in the mitigation strategies within the HFRZs. PGE's goal is to achieve the highest estimated risk reduction value per dollar invested. This RSE assessment approach is flexible enough to allow PGE to adjust the analytical variables to account for factors such as climate change, and to incorporate findings from its ODF, USFS, and local fire agency partnerships.

PGE uses data from internal as well as external benchmarking sources. For example, a statistical understanding of how failure modes and ignition drivers for covered conductor affect risk is critical to effectively evaluating the appropriate locations to install covered conductor. Through its participation in the International Wildfire Risk Mitigation Consortium (IWRMC), PGE has leveraged the experiences of industry peers to inform its fire detection probability analysis as well as decision-making around the most effective locations for use of covered wire.

The following sections provide detail about the ways in which PGE uses risk-based decision-making in specific areas of its Program:

6.5.1 Risk-Informed Decision Making for PSPS Events

PGE uses meteorological, outage data and predictive analytics to make risk-informed decisions regarding PSPS events, as well as curtailment decisions. Before and during Fire Season, PGE reviews regional NWS forecasts, fire activity briefings, fire potential forecasts, and data from PGE weather stations[3] strategically located throughout the service territory. PGE makes its weather station data publicly available via MesoWest, for anyone needing data to improve regional forecasting and the analysis of extreme weather events.

In 2023, PGE plans to improve its risk-informed decision-making through improved situational awareness capabilities. PGE plans to install 30 new remote automated weather stations (RAWS) and deploy its four mobile weather stations, as needed, within HFRZs. As RAWS are installed they will be incorporated into PGE situational awareness intake. Site selection for RAWS will take utility, meteorology, and stakeholder requirements into consideration to ensure optimal placement, as discussed in more detail in the Research and Development section of the WMP, in late 2022 PGE operationalized a prototype of a Storm Predictive Tool that will incorporate weather data from across PGE's service territory to better inform PGE's PSPS execution decision analysis. As additional RAWS come online, the data they record is intended to further refine the Predictive Outage model.

Please refer to Section 9.2, below, for addition detail regarding PGE's PSPS decision-making process.

6.5.2 Risk-Informed Decision Making and Mitigation Actions for Vegetation Management

PGE's vegetation management strategy includes both cyclical, routine inspections, and maintenance of the entire PGE distribution system. Additionally, PGE performs Advanced Wildfire Risk Reduction (AWRR) vegetation management activities in the HFRZs within PGE's service territory. Annual AWRR activities are guided by the designated boundaries of PGE's HFRZs, data from PGE's Remote Sensing Project (which uses LiDAR and hyperspectral imagery to monitor vegetation density and proximity to PGE assets), and annual vegetation surveys. AWRR crews follow program trim specifications, which include increased removal rates and enhanced vegetation control techniques, discussed in more detail in Section 11, Vegetation Management.

The evolution of PGE's Vegetation Management program also illustrates the influence of the Wildfire Risk Mitigation Assessment methodologies on PGE's wildfire-related investment decision-making. Originally dedicated to enhancing electrical reliability through compliance with OPUC safety and clearance requirements, PGE Vegetation Management has transitioned to a dual-track program, focused on increasing system reliability and decreasing the chance of infrastructure-caused ignitions.

[3] In 2022, PGE deployed 24 additional permanent weather stations and one temporary station to increase situational and conditional awareness and provide visibility within its HFRZs, bringing the number of permanent weather stations deployed within its service territory to 52.

Use of risk-based decision-making protocols has allowed PGE's Vegetation Management program to prioritize resources.

In much the same way, cross-organizational access to data from PGE's Remote Sensing Project data allows working groups across the company to plan and implement mitigation activities using a consistent set of data and analysis, with benefits shared across PGE workflows, including design and vegetation maintenance. PGE's GIS, Strategic Assessment Management, WM&R and Vegetation Management organizations all use LiDAR data, both independently and cooperatively, to benefit operational efficiency.

6.5.3 Risk-Informed Decision Making and Mitigation Actions for System Hardening

PGE continues to leverage its SAM Structures Model and Fire-Safe Construction Standard to harden the transmission and distribution (T&D) system within its HFRZs. PGE's system hardening activities are designed to accomplish three goals:

- Reduce the risk of potential wildfire ignition caused by PGE facilities through the use of ductile iron poles, fiberglass crossarms, covered wire, transformers, and conductor undergrounding
- Reduce the impacts of a wildfire on PGE's assets by installing system hardening technologies (fire mesh, ductile iron poles, fiberglass crossarms, conductor undergrounding)
- Protect utility infrastructure during potentially disruptive natural and human-caused disasters, strengthening PGE's ability to maintain and quickly restore reliable electrical service to support disaster relief and public safety.

In working towards these goals, PGE will deploy additional reliability and wildfire risk mitigation improvements within the HFRZs. PGE is guided by its annually updated Fire-Safe Construction Standard in executing equipment replacements in HFRZs. As specified in the Fire-Safe Construction Standard, the company will evaluate the following assets for replacement, installation, or implementation, when warranted:

- Avian-safe framing and phase covers
- Replacement of wood structures with nonflammable structures (e.g.: ductile iron poles, fiberglass crossarms)
- Polymer cutouts and cutout covers
- Aging conductors in HFRZs
- Tree wire, an insulated overhead conductor designed to reduce service interruptions, which also reduces the potential for the conductor to become an ignition source
- Overhead to underground conversions on specific feeders with key wildfire response variables including fire response/detection probability and egress
- Fuse replacement with fire-safe fuses and/or ELF (non-expulsion) fuses to eliminate a potential ignition source
- Reclosers and switching devices to increase operational flexibility and minimize customer impacts through the application of wildfire operational settings

6.5.4 Risk-Informed Decision Making and Mitigation Actions for Capital Investments

PGE uses the SAM Structural Model and the RSE methodology discussed in Section 6.5, Wildfire Risk-Based Decision-Making, in assessing project alternatives and prioritization of wildfire risk mitigation investments. Based on the outcomes of this analysis, PGE's multi-year wildfire capital investment strategy ranks system hardening and situational awareness projects as the highest-value risk mitigation per dollar of investment to inform prioritization of PGE's capital budget. Please refer to Section 12, Wildfire Program Costs, for detailed information regarding year-to-year actual and planned WM&R O&M and capital expenditures.

For example, undergrounding and reconductoring feeders and distribution lines is one of the most effective ways to shield PGE equipment from vegetation and animal contacts that could lead to wildfire ignition. Table 3, below, shows the planned undergrounding and reconductoring investments currently included in PGE's 2023 wildfire capital investment strategy.

PGE is revising its 2023–2026 wildfire capital investment strategy, which distributes planned capital spending among multiple asset and mitigation classes in alignment with the Wildfire Risk Mitigation Assessment of wildfire risk change over time. The goal of this effort is to create an optimized multi-year investment framework to implement separate but interrelated mitigation strategies, based on a risk profile that incorporates a broad spectrum of wildfire risk drivers.

PGE is consistently evaluating its long-term investment strategy in response to R&D findings, risk modeling and industry experience, and will continue to optimize its investment strategy for wildfire risk mitigation based on the best available information and analysis. Tables 3 and 4, below, reflect PGE's best estimates of planned investments and timelines at the time this document was submitted; however, PGE recognizes that factors outside of the company's control or to customer advantage may require adjustments to this schedule of activities. Planned line-miles per year are targets or estimates, which may be adjusted based on a wide variety of factors aimed to reduce wildfire risk and increase system resiliency.

PGE's portfolio of planned capital investment projects offers co-benefits in addition to their wildfire mitigation value; for example, many of the PGE feeders with the highest Customers Experiencing Multiple Interruptions (CEMI) values[4] (feeders that experience multiple outages per year) are designated for hardening under this strategy. By aligning its strategy to prioritize both wildfire mitigation and CEMI, PGE is investing in outcomes that offer regional benefit beyond wildfire hardening. System hardening projects on Tribal lands, and within culturally or environmentally sensitive areas, provide the co-benefits of improved cultural resource and environmental protection.

Ultimately, upon successful completion of the measures referenced above, these system hardening investments will reduce PGE's wildfire risk while shrinking the geographic boundaries of three existing PGE HFRZs—as line-miles of PGE infrastructure are hardened over the next several years, PGE will no longer need to de-energize those circuits to prevent potential ignitions during PSPS events. PGE plans

[4] CEMI is an industry-standard metric of system reliability

to estimate these risk reduction values with a combination of volumetric mileage in a mitigated state as well as number of customer meters impacted by PSPS events.

PGE will also estimate non-wildfire-related resiliency benefits from these investments—for example, increased protection from wind/ice storm damage—using traditional asset management expected risk and net economic benefit ratios. The following tables show PGE's planned undergrounding/reconductoring projects and situational awareness/programmatic investments, by region, for 2023:

Table 3: Planned Wildfire Undergrounding/Reconductoring Investments (in Line-Miles), 2023

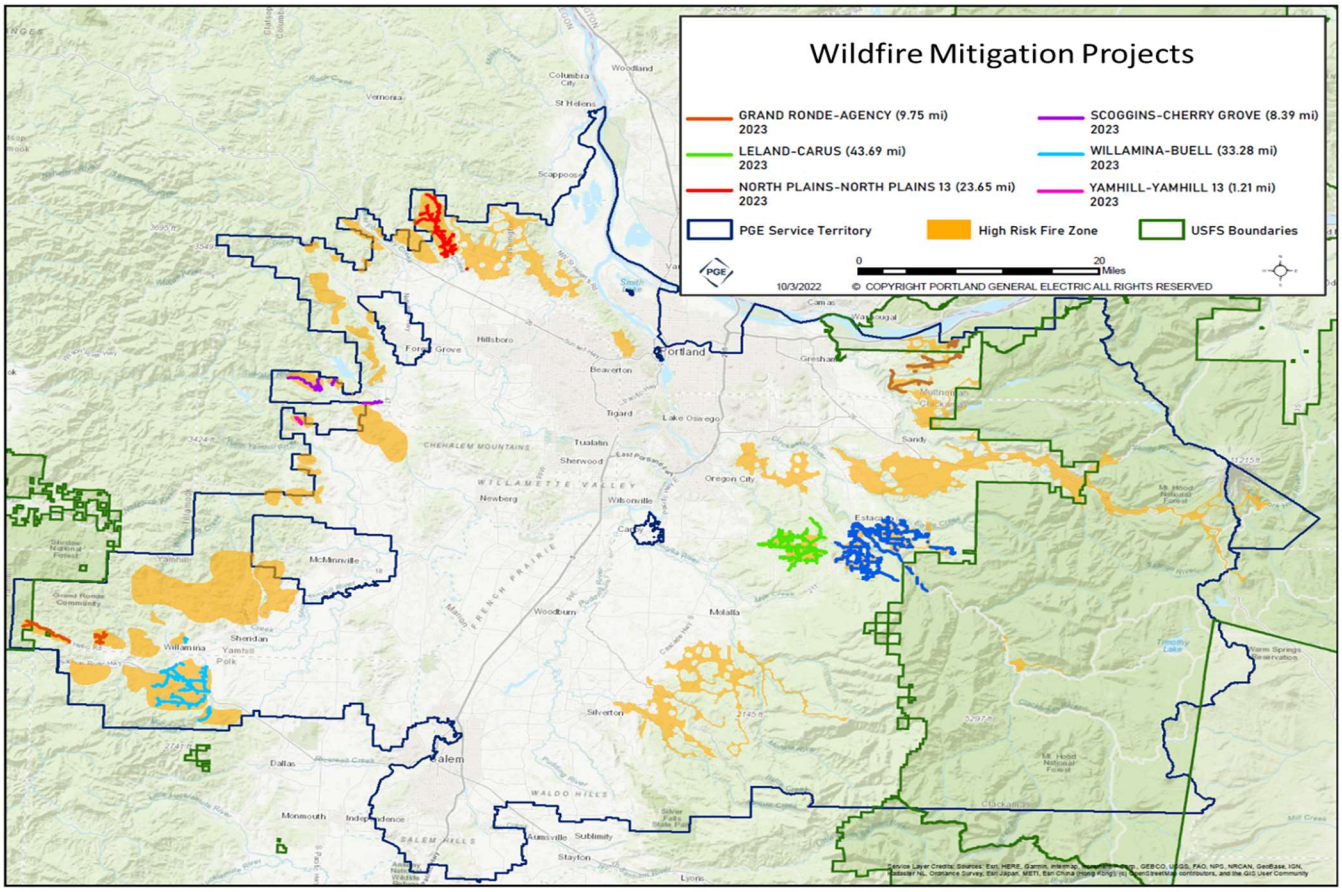
UG/RECON	2023
Grande Ronde-Agency (UG)	9.75
Scoggins-Cherry Grove (UG)	8.39
Yamhill-Yamhill 13 (UG)	0.6
North Plains (RC)	8.0
Leland-Carus (RC)	14.56
Willamina-Buell (UG)	11.09
TOTAL	**44.39**

Table 4: Planned Situational Awareness/Programmatic Investments, 2023

Programmatic	2023
AI-Equipped UHD Cameras	6
Weather Stations	30
Reclosers	50
Fire-Safe Fuses	600
Early Fault Detection (EFD)[5]	1 feeder

[5] Early Fault Detection is a technology that uses sensors to detect anomalies on the feeder in real time, allowing PGE to intervene (replace or repair) the affected component(s) prior to a failure that could cause an ignition.

Figure 8: Planned PGE Wildfire Mitigation Investments 2023



6.5.5 Risk-Informed Decision-Making and Mitigation Actions for Operations

PGE relies on a wide variety of weather and fuel models, as well as human analysis, to obtain the granularity of information required to accurately forecast and model hazardous fire weather conditions. The goal is to use these models to forecast potential hazardous fire weather conditions 7-10 days in advance. These models can provide decision-makers with a detailed understanding of the uncertainties and range of outcomes possible for a given weather pattern. Operational procedures within the HFRZs during the Fire Season are discussed in further detail in Section 8.2, System Operations During Fire Season.

In 2023, PGE will conduct further model testing and validation to assess the Storm Predictive Tool's ability to incorporate more granular and sophisticated inputs to better inform PGE's PSPS execution decision analysis and improve system alarming. For additional details regarding the Storm Predictive Tool, please refer to Section 15.4, below.

This tool should improve PGE's ability to predict potential equipment outages based on forecasted and real-time meteorological data. Once integrated with other PGE capabilities, the Storm Predictive Tool is intended to offer co-benefits to PGE's Utility Asset Management program, including increased spare equipment ordering efficiency, as well as improved spare equipment mobilization and operational standards and practices.

6.5.6 Risk-Informed Decision Making for Prioritized Opportunistic Interventions

Generally, when repairs are needed on an asset and the cost of the repair is higher than the value of the asset, the asset will be evaluated for replacement. Once crews are mobilized, there may also be reliability and economic benefits to proactive asset replacement, particularly within HFRZs. Whenever possible, PGE assesses the cost/benefit of proactive asset replacement during planned improvement/maintenance activities on other nearby assets. This approach helps PGE maintain reliable electric service and increase cost efficiency.

PGE prioritizes capital investments and maintenance activities that provide highest benefits to the system including reduced outage duration, improved asset survival and other impacts to infrastructure beyond wildfire mitigation. This multi-dimensional view allows PGE to achieve the best value risk reduction per dollar of investment.

7. High Fire Risk Zones (HFRZs)

PGE has identified areas of its service territory where vegetation, terrain, meteorology, population density and the wildland-urban interface (WUI) increase the risks associated with utility-caused wildfire ignition. For the purposes of this WMP, PGE refers to these areas as High Fire Risk Zones (HFRZs). PGE may choose to implement a proactive PSPS within a given HFRZ during periods of extreme weather wildfire threat. For 2023, PGE has identified the same 10 HFRZs as in 2022, with minor refinements, modifying the geographic boundaries of some zones and adding a total of 355 distribution poles and 57 transmission structures to the areas potentially impacted by PSPS events (see Figure 10 below for details):

HFRZ 1: Mt. Hood Corridor/Foothills
HFRZ 2: Columbia River Gorge
HFRZ 3: Oregon City
HFRZ 4: Estacada
HFRZ 5: Scott's Mills
HFRZ 6: Portland West Hills
HFRZ 7: Tualatin Mountains
HFRZ 8: North West Hills
HFRZ 9: Central West Hills
HFRZ 10: Southern West Hills

PGE relied on the ISO-31000 wildfire risk analysis framework for the 2023 HFRZ Assessment. For this assessment PGE incorporated new variables and refined boundary conditions to improve its understanding of:

- Wildfire risk
- Location based wildfire intensity and behavior
- Climate change impact projections
- Fire behavior and consequences

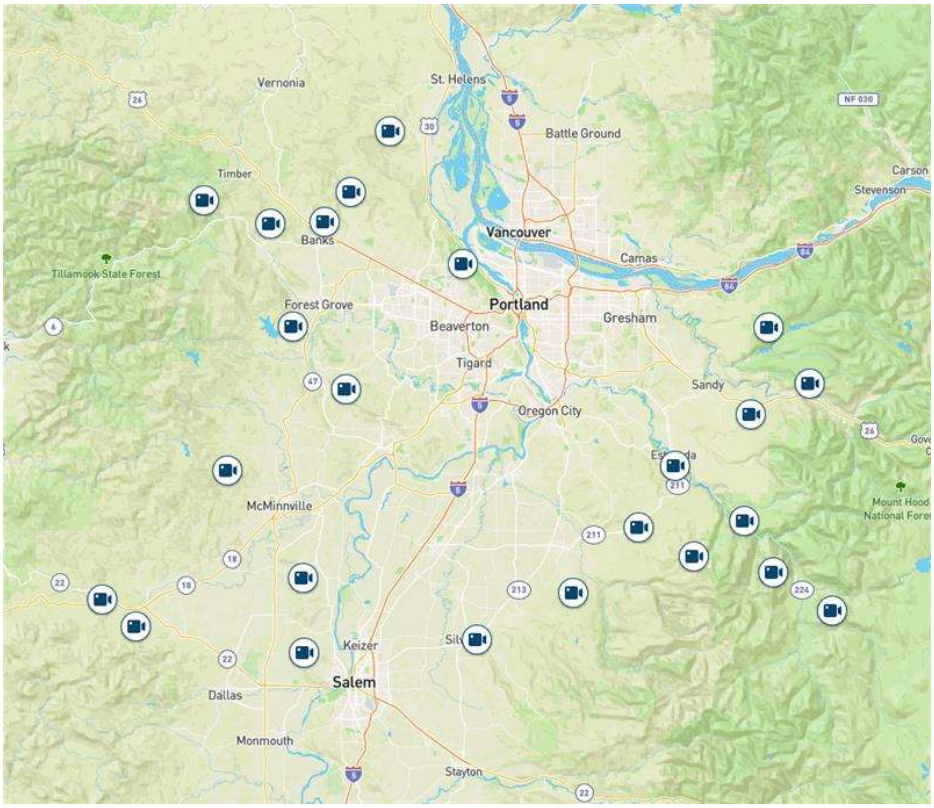
PGE's Wildfire Risk Assessment factors in the likelihood that a given PGE asset could become an ignition source, as well as the likelihood that such an ignition could spread into a large, uncontrolled fire. Additional analytical factors include vegetation density, fuels dryness, the potential for extreme weather conditions, probability of mechanical control, fire response time, detection probability and the presence of structures and other infrastructure.

In conducting the risk assessment, PGE ran thousands of scenarios in a Monte Carlo simulation to identify the areas of the PGE service territory where the risks associated with a utility-caused ignition are highest. The results of this modeling provided the basis for PGE's 2023 HFRZ analysis.

7.1 Enhanced Monitoring and Technology in HFRZs

In a partnership with the Electric Power Research Institute (EPRI), PGE installed a network of connected, intelligent fire detection cameras equipped with artificial intelligence (AI) within its HFRZs. These ultra-high-definition camera systems give PGE a 360-degree fire detection triangulation capability across its service territory, accurate to within +/- 100 yards. The Pano AI platform's machine learning algorithms automate fire detection, awareness, and notifications, helping PGE expand and improve regional fire detection resources. Under its 2023 Wildfire Capital Investment Strategy, PGE is planning to install six additional AI-equipped UHD cameras within the HFRZs (refer to Figure 9 for details regarding camera locations). For additional details on PGE's Wildfire Capital Investment Strategy, please refer to Section 12, Wildfire Program Costs.

Figure 9: 2023 PGE Pano AI Camera Locations



These camera systems are part of a larger situational awareness strategy in which PGE coordinates with federal, state, Tribal, and local fire agencies, fire management officers, and district foresters, as well as private landowners. In 2023, PGE will continue to seek ways to share access to this information with its Public Safety Partners, 30 of which currently have access to the camera network and notifications:

- Canby Fire District
- Forest Grove Fire & Rescue
- Gresham Fire & Emergency Services
- Lake Oswego Fire Department
- City of Portland Fire & Rescue
- City of Portland Water Bureau
- Clackamas Fire District #1
- Clackamas County Fire Defense Board
- The Confederated Tribes of Grande Ronde Emergency Services
- Estacada Rural Fire Protection District
- Gaston Fire District
- Hillsboro Fire & Rescue
- Hoodland Fire District
- Life Flight Network
- Marion County Fire Defense Board
- Marion Area Multi Agency Emergency Telecommunications (METCOM)
- Mt. Angel Fire District
- Multnomah County Fire Defense Board
- Oregon Department of Forestry
- Oregon State Police
- Polk County Fire Defense Board
- Sandy Fire District
- State of Oregon
- T-Mobile
- Tualatin Valley Fire & Rescue
- USFS – Mt. Hood District
- Washington County Fire Defense Board
- Washington County Consolidated Communications Agency (WCCCA)
- Yamhill County Fire Defense Board
- Yamhill Communications Agency (YCOM)

To illustrate the potential value of this technology, at 1525 on July 14, PGE's Bald Peak Pano AI camera notified users that it had detected smoke in a rural area in the western part of PGE's service territory. At 1625, PGE's High Compromise camera issued a second "detected smoke" notification and triangulated the smoke's location 6.8 miles away. The Pano AI system's initial detection and notification was 104 minutes before the regional fire reporting service issued a potential wildland fire alert, and 140 minutes before emergency services personnel were dispatched to the fire. ODF and other federal, Tribal, state, and local fire departments as well as land management agencies have provided feedback that the early detection information and triangulation accuracy obtained through PGE's Pano AI camera network is making a difference in crew deployment optimization and initial attack speed.

The following figures show PGE's 2023 HFRZs, and changes in HFRZ boundaries from 2022 to 2023.

Figure 10: PGE HFRZs 2023 vs. 2022

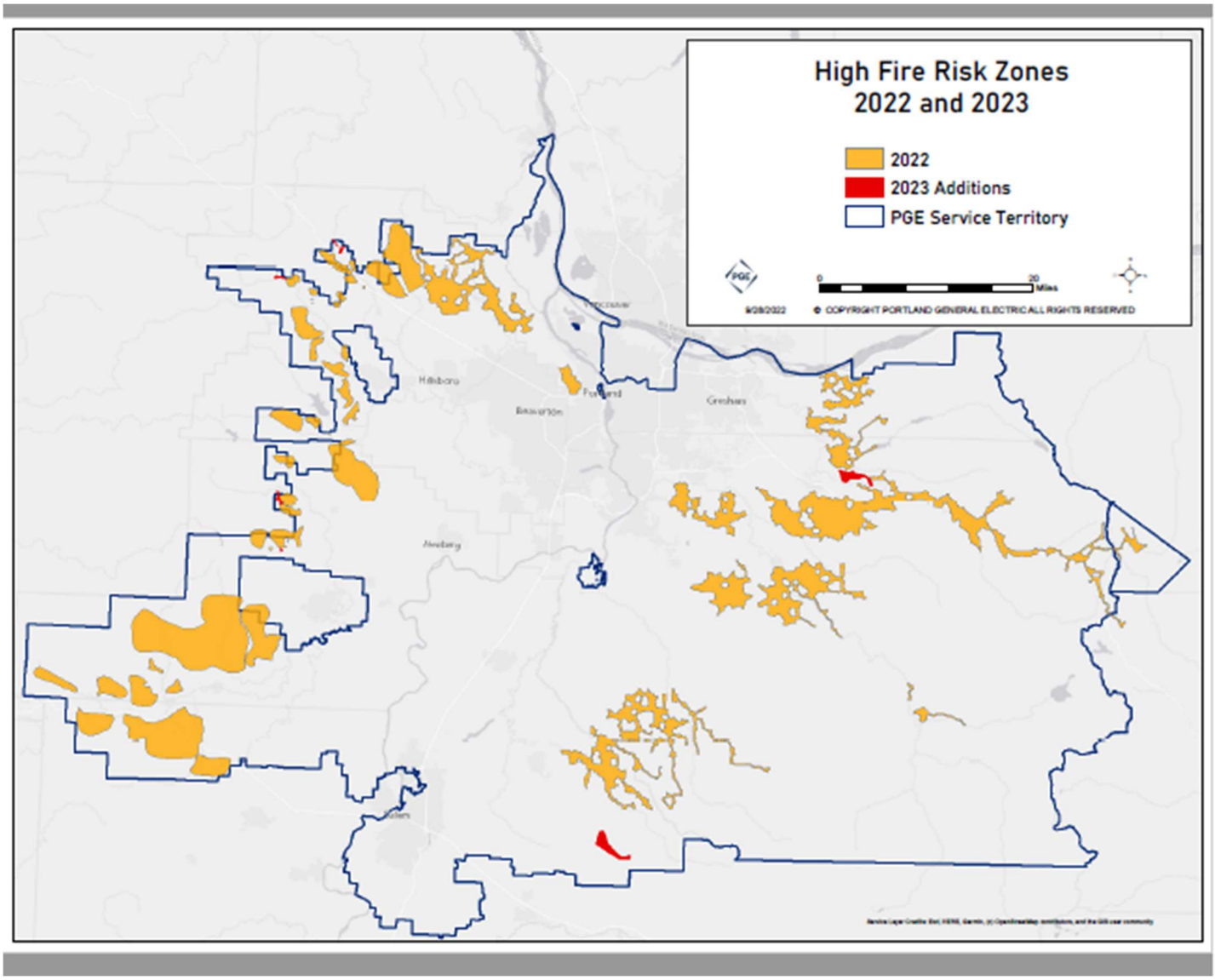


Figure 11: 2023 PGE HFRZs

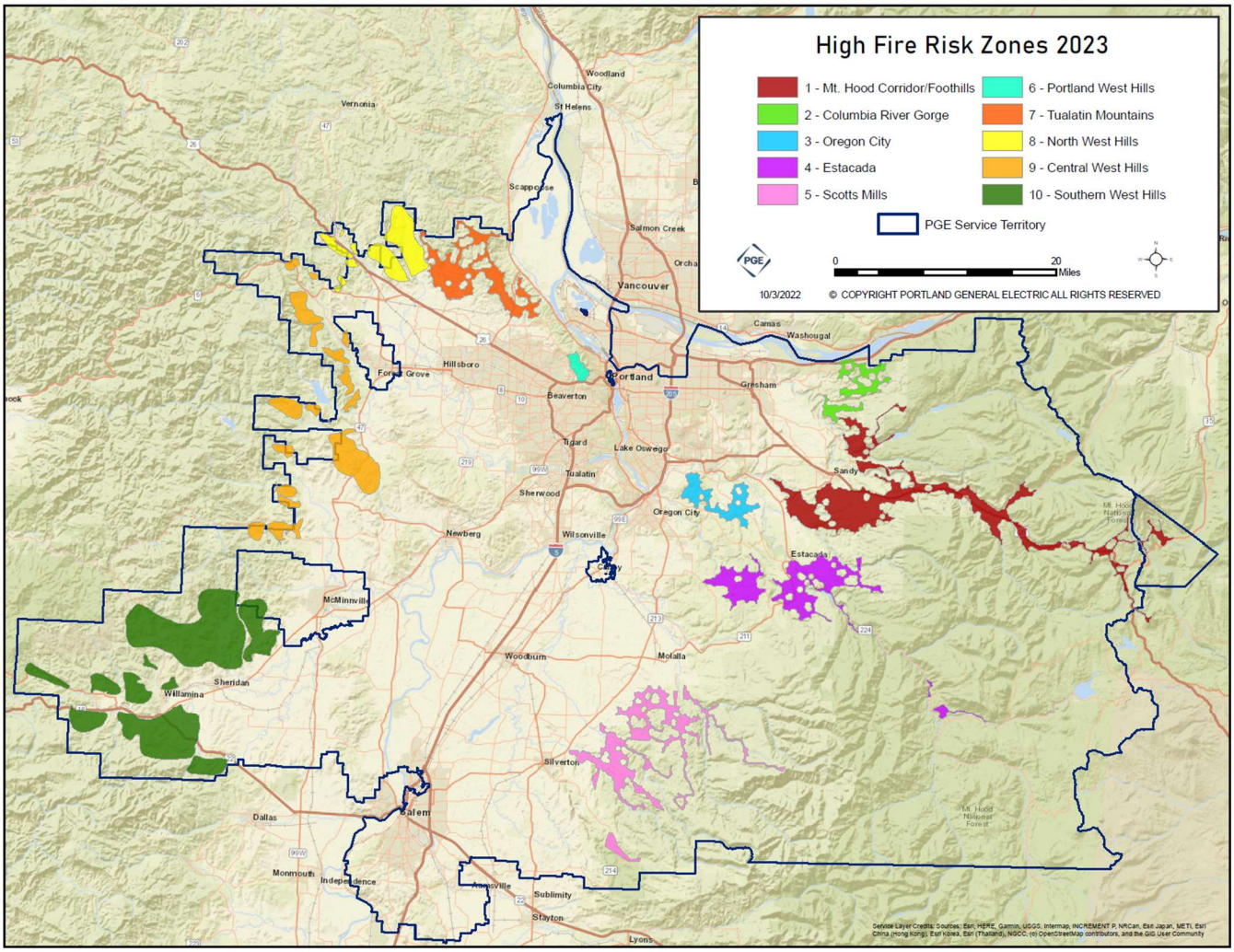


Table 5: Changes in Distribution Line-Miles Within PGE's HFRZs, 2022 vs 2023

	DISTRIBUTION LINE MILES		T&D POLES		CUSTOMERS (METERS)	
HFRZ	2022	2023 (NET CHANGE)	2022	2023 (NET CHANGE)	2022	2023 (NET CHANGE)
Zone 1	244.8	249.7 (+4.9)	7,780	7,930 (+110)	9,464	9.513 (+49)
Zone 2	24.7	24.7 (0.0)	710	710 (0)	456	456 (0)
Zone 3	47.4	47.4 (0.0)	1,268	1,268 (0)	1,743	1,743 (0)
Zone 4	138.5	138.5 (0.0)	3,727	3,726 (-1)	2,655	2,652 (-3)
Zone 5	142.7	150.7 (+8.0)	3,274	3,442 (+168)	1,927	2,000 (+73)
Zone 6	15.0	15.0 (0.0)	702	702 (0)	961	960 (-1)
Zone 7	91.6	91.6 (0.0)	2,182	2,182 (0)	1,525	1,524 (-1)
Zone 8	41.4	43.1 (+1.7)	1,025	1,068 (+43)	731	762 (+31)
Zone 9	75.4	78.4 (+3.0)	1,742	1,820 (+78)	1,005	1,049 (+44)
Zone 10	134.9	133.9 (-1.0)	3,091	3,085 (-6)	1,711	1,710 (-1)

8. Operating Protocols

8.1 Fire Season

PGE declares its own Fire Season based on a variety of factors, such as current and forecasted weather, drought status/timing and intensity, fuel availability and flammability, agency posture, and regional fire activity. PGE bases its decisions on data and information from multiple sources and considers State and Tribal Fire Season declarations within its service territory. The annual Fire Season declaration initiates a series of PGE operational changes.

PGE's Fire Season declaration:

- Changes how the company operates the PGE system, initiating fire-season-specific settings within parts of the grid, including disabling reclosing/testing capabilities, where applicable
- Initiates Fire Season operational work practices in the field
- Activates internal 24x7 Wildfire Threat Alert Notifications (Threat Alerts). Threat Alerts are a GIS-triggered, near-real-time analytical tool that alerts PGE when:
    - Any fire incident has been confirmed by the Integrated Reporting of Wildland-Fire Information (IRWIN) service within one mile of a PGE facility in the last hour (five miles for PGE Parks)
    - A Red Flag Warning has been issued covering an area within one mile of a PGE facility within the last 24 hours (five miles for PGE Parks), and
    - A confirmed fire perimeter is updated by the National Interagency Fire Center (NIFC) within one mile of a PGE facility in the last hour (five miles for PGE Parks) in the event of an expanding wildfire.

8.2 System Operations During Fire Season

Once it declares the start of Fire Season, PGE implements operational changes to reduce the risk that PGE infrastructure and operations could become ignition sources. For non-Supervisory Control and Data Acquisition (SCADA) distribution reclosing devices in PGE's HFRZs, these system changes include manually blocking the automatic test-energization of circuits following temporary faults, such as momentary tree branch contacts and lightning strikes with no damage. SCADA distribution reclosing devices are operated as shown in Table 6. Prior to re-energizing, PGE will patrol the downstream circuit to verify that the cause of the fault has been cleared.

PGE may also change settings outside of Fire Season, when the risk of wildfire danger is elevated, or when a Red Flag Warning is in effect. In these instances, PGE will proactively block automatic reclosing on SCADA-controlled devices within PGE's HFRZs.

PGE annually reviews and updates settings for protection and control devices located within PGE HFRZs. In 2023, PGE will continue to implement circuit breaker and recloser protection to minimize fault energy and reduce the risk of utility-caused ignitions during Fire Season.

Additionally, the distribution feeder breakers servicing PGE's HFRZs (those equipped with relays and SCADA) can be set one of three modes: Normal, Fire Season, or Red Flag. Those 13 kV feeders that do not have relays utilize the electronic reclosers' necessary protection settings: Normal, Wildfire, and Red Flag mode.

The tables below show the distribution system operations inside and outside of Fire Season that provide the necessary protection settings for Normal, Fire Season, and Red Flag modes.

Table 6: Distribution System Operations In and Out of Fire Season

Mode	Description	Reason
Normal	The feeder breaker will have two attempts of reclosing (an automatic test energization of the circuit following a fault event) and instantaneous (relay trips instantly when a fault occurs, with no preprogrammed delay)	Maximize reliability
Fire Season	The feeder breaker or electronic recloser will have one attempt of reclosing and trip on definite time instantaneous (a programmed delay before the relay trips).	Minimize risk of ignition
Red Flag Warning (during Fire Season)	The feeder breaker or electronic recloser trips on definite time instantaneous and reclosing is blocked.	Minimize risk of ignition

NOTE: Transmission lines located east of the Cascades that traverse PGE's HFRZs do not have specialized wildfire protective modes. As a result, they are placed in the most conservative mode of operation during PGE's declared Fire Season. Transmission lines that are not equipped with SCADA-enabled reclosing will be blocked from reclosing throughout Fire Season. Transmission lines that are equipped with SCADA-enabled reclosing will remain in automatic mode when PGE declares Fire Season. If one of these lines relays and recloses, reclosing will be blocked via SCADA and the line will be patrolled.

Table 7: Pelton & Round Butte Transmission System Operations In and Out of Fire Season

Mode	Description	Reason
Normal	Two recloses at Pelton, one reclosure at Round Butte	Maximize reliability
Fire Season & Red Flag Warning	Reclosing is blocked—reclosers open and lock out without testing the circuit by auto-reclosing.	Minimize risk of ignition

8.3 Preparedness and Training

Prior to Fire Season, PGE provides annual wildfire training to keep employees who will be working in the field during Fire Season safe. This includes non-field personnel that may go into the field on an as-needed basis. Participants receive training, either through computer-based training or a hands-on curriculum covering the use of required fire suppression tools and equipment during field deployments. Contractors who perform work in the field on behalf of PGE must also satisfy this training requirement and carry fire suppression tools and equipment. Training topics for 2023 focus on employee and contractor safety and include (but are not limited to):

- How fuels, weather, and topography impact the ignition and spread of wildfires
- What a fire weather zone forecast is, and how to interpret key factors and validate them in the field
- The suppression tools and equipment PGE, and those acting on behalf of PGE, are required to carry
- Basic suppression tactics for low-intensity ground and surface fires, and
- How to identify lookouts, communications, escape routes, and safety zones (LCES), and how this critical life safety acronym applies to all PGE Fire Season operations.

8.4 Event Response & Management

PGE closely monitors active wildfires in or near its distribution service territory and generation asset areas in Oregon and Washington. As an incident expands in size and complexity, PGE will contact the appropriate agency Incident Management Team (IMT) and may offer to embed PGE representatives at the incident command post. PGE representatives are delegated authority to make decisions that align with Corporate Incident Management Team (CIMT) and company leadership direction on PGE's behalf. The goal of this strategy is to enhance interoperability, share information, and promote collaboration with utility peers, Public Safety Partners, and state, Tribal, and local emergency managers to achieve shared objectives to serve the community and affected customers.

During a PSPS event, PGE's CIMT will follow established procedures and protocols to manage the event—see Section 9, Operations During PSPS Events, for more details. Under certain circumstances, the CIMT may execute additional de-energizations known as Preventative Outage Areas (POAs)to protect against risk of ignition or to protect life and safety. POAs are executed as needed based upon critical circumstances such as emerging meteorological events, system topology conditions, and/or interactions with PGE's Public Safety Partners during PSPS events. POAs are outside of PGE-defined PSPS Areas and do not receive pre-fire season communications. CRCs will also not be deployed for POA events.

POAs are executed under PGE's protocols for emergent de-energizations, which can occur during and outside of Fire Season. PGE personnel on-site also have authority to de-energize portions of the distribution system without requesting permission from or notifying PGE management (for example: to de-energize a downed power line). In addition, first responders may request an emergent de-energization from PGE via 911.

9. Operations During PSPS Events

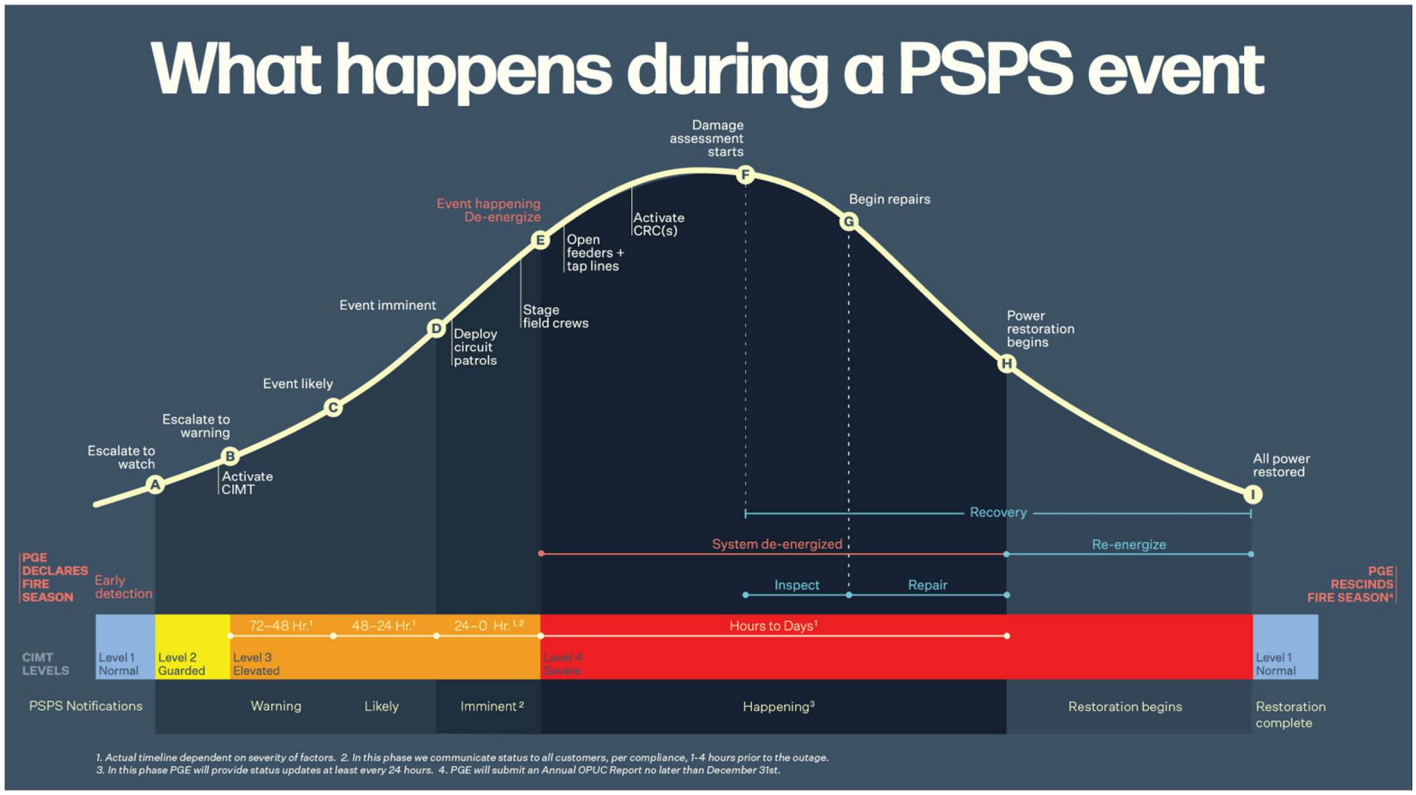
As discussed in Section 6.5.1, Risk-Based Decision-Making for PSPS Events, PGE uses meteorological and outage data and predictive analytics to decide whether to execute a PSPS event. This section provides a high-level overview of the escalating levels of a PSPS event, and the actions taken within each level. PGE maintains detailed, annually updated operational plans and protocols for PSPS events in internal documentation libraries.

The PSPS Process bell curve (Figure 12, below) correlates the various incident levels defined in internal PGE emergency operations plans to illustrate typical operations during the various phases of a PSPS event. It is intended to provide a point of reference only, as PGE may adjust operations during a PSPS event based on real-time conditions.

During an event, information including location, de-energization estimates, and estimated restoration times (ERTs) for each impacted PSPS Area can be found on PGE'S Wildfire Outages and PSPS webpage. PGE's website has the bandwidth capable of handling web traffic surges expected during PSPS events, and all web-based PSPS information will be easily readable and accessible on mobile devices.

During the 2023 Fire Season, PGE will provide multiple options to allow Public Safety Partners to access real-time GIS information pertaining to PSPS outages. These options include a link to PGE's public PSPS web layer service and an ArcGIS Online (AGOL) web map containing PSPS information as required by OAR 860-300-0060. Both the PSPS web layer service and AGOL web maps are updated simultaneously with the PSPS Area map found on PGE'S Wildfire Outages & PSPS page. PGE will continue to evaluate the customer experience with these tools and look for ways to improve that overall experience in the 2023 Fire Season.

Figure 12: PSPS Process Bell Curve

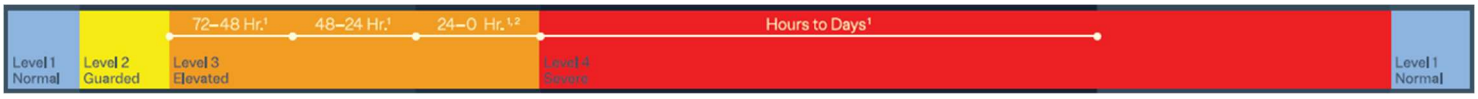


9.1 Protocols for De-Energization of Power Lines and Power System Operations During PSPS Events

As a last-resort safety measure to protect people, property, and public areas, PGE will proactively turn off power within one or more PSPS Areas when conditions threaten the ability to safely operate the grid. When PSPS events are declared, PGE takes steps to keep customers and stakeholders well-informed and strives to mitigate customer impacts by limiting the duration of the outage, as much as conditions allow.

9.2 Levels of a PSPS Event

If PGE makes the decision to execute a PSPS event, the order of operation generally follows the PSPS Process Bell Curve (Figure 12, above). PGE will adapt actual PSPS event operations as required to address evolving, dynamic, and unpredictable circumstances.



Level 1: Normal

Once Fire Season has been declared, under **Level 1: Normal** conditions, PGE closely monitors and communicates regional weather and wildfire situation/status to operational leadership. Through real-

time situational awareness monitoring, PGE can tailor operational and system changes during Fire Season, thereby increasing safety and operational efficiency.

Year-round, PGE conducts a Daily (M-F) Operations Call. Should weather or other related events warrant communications outside the normal schedule, PGE may decide to convene the Daily Operations Call on weekends or holidays. During Fire Season, this daily briefing includes, but is not limited to:

- Fire weather forecasts and fire potential specific to PGE's service territory
- Reporting of National Weather Service (NWS)-issued Fire Weather Watches and/or Red Flag Warnings
- Summary of current regional fire activity

Additionally, PGE closely monitors changing or deteriorating conditions, regularly communicating critical updates to affected business units. To assist with this, PGE maintains working relationships with fire agencies, fire management officers, district foresters and dispatch centers at the federal, state, Tribal and local levels, including the Portland office of the NWS. These partnerships provide PGE with specific, granular situational awareness, assistance with forecast modeling validation, fire suppression resource pre-positioning, and activity/growth updates for fires in proximity to PGE assets.

Level 2: Guarded

If PGE determines that current or predicted fire risk conditions warrant an escalation in planning and coordination, PGE shifts from **Level 1: Normal** to **Level 2: Guarded**, which represents a PSPS Watch posture. When this occurs, PGE will activate the PSPS Assessment Team (PAT) to monitor conditions and prepare the company to initiate the next phase of PSPS plans and procedures, if necessary. PGE also issues a preliminary notification to internal stakeholders and ESF-12 OPUC Safety Staff that PGE has moved to **Level 2: Guarded** status. Following the decision to issue a **Level 2: Guarded** notification, PGE will place the company's full CIMT on standby and build out its duty roster.

Level 3: Elevated

PGE's decision to escalate from **Level 2: Guarded** to **Level 3: Elevated** status is predicated on conditions on the ground, pace of onset of weather conditions and risk tolerance at the time. Once the decision is made to proceed to **Level 3: Elevated**, PGE will fully activate the CIMT.

Level 3: Elevated is divided into three sequential, time-boxed phases, each representing an escalated state of readiness. To the extent practicable, PGE will adhere to the following notification timeline in advance of a PSPS event:

- **PSPS Warning**: 72-48 hours prior to de-energization
- **PSPS Likely**: 48-24 hours prior to de-energization
- **PSPS Imminent**: 4-1 hours prior to de-energization

Preparation for De-Energization

During the **Level 3: Elevated** phase of the potential PSPS event, PGE closely monitors fire potential indicators, situation, and status. The CIMT develops Incident Action Plans (IAPs) for each operational period (or as directed by the CIMT's IC), including situation-specific tactics and detailed instructions for field and support personnel—for example, pre-positioning of Pre-PSPS Circuit Patrol personnel and Community Resource Centers (CRCs) in applicable PSPS Areas. Immediately prior to de-energization, PGE resources in the field move into their "Get Set" positions or designated staging areas until execution of de-energization begins.

PGE will continue to monitor fire weather conditions throughout the **Level 3: Elevated** phase. When threshold conditions indicate that a PSPS is imminent and the CIMT's Situational Unit and IC have determined that escalating to **Level 4: Severe** (Event Happening stage) is appropriate, they will request de-energization approval for the appropriate PSPS areas(s) from the Officer-In-Charge (OIC).

Level 4: Severe: (Event Happening)

Transitioning from **Level 3: Elevated** to **Level 4: Severe**, is triggered by the decision to de-energize the PSPS Area(s). Immediately thereafter, field resources are given the "Go" signal to open feeder and tap line breakers and activate CRCs. PGE will communicate the start of the de-energization, as indicated in Table 8, below.

Community Resource Centers (CRCs)

During PSPS events, PGE may establish CRCs in selected areas to provide critical restoration information, including updates and real-time information, to customers impacted by the outage(s). The CRCs also provide customers with electronic and/or medical device charging, internet access, and clean water and ice, to offset some of the impacts associated with PSPS de-energization.

PGE has identified multiple potential locations for CRCs within or near each PSPS Area, to provide the flexibility to select the location that best suits customers' needs based on event specifics. PGE may or may not activate CRCs at all pre-designated locations during a particular PSPS event—depending on the nature of the event, some CRC locations may not be needed, or it may also be possible to serve multiple PSPS-impacted areas from a common CRC location. Pre-identifying multiple CRC locations within each PSPS Area also gives PGE options if mandatory evacuations require the relocation of a CRC. PGE's goal is to locate CRCs as near as possible to the areas impacted by the de-energization, although specific circumstances may make this impractical.

PGE's decision-making process for the potential deployment of CRCs begins during the **Level 3: Elevated** PSPS Likely phase. At this phase, PGE selects the specific CRC location(s) and sets hours of operation. Whenever possible, PGE will work with community partners to make CRC resources available to impacted customers; in some instances (for example, when resources are being provided by a County, Red Cross, or other entity, when multiple PSPS Areas are served by a single CRC, or when safety concerns preclude PGE's ability to site a particular CRC), PGE may not establish a CRC in an impacted PSPS Area. PGE will notify Public Safety Partners and Adjacent Public Safety partners as soon as CRC location and activation schedules have been confirmed. PGE will make efforts to have CRCs

operational within 24 hours of de-energization, and to keep these locations operational as long as they are of benefit to customers.

Figure 13: September 2022 PGE CRC Volunteers

9.3 Communications Requirements During PSPS Events

Beginning at the **Level 3: Elevated** phase, to the extent practicable, PGE will initiate a methodical sequence of pre-event PSPS notifications and subsequent updates, delivered in 24-hour intervals, that progress from each of the three **Level 3: Elevated** phases (Warning, Likely, Imminent) through the **Level 4: Severe** Restoration Complete phase. During a PSPS event, PGE will communicate with Public Safety Partners, operators of utility-identified Critical Facilities (including Communications facilities), customers, and other stakeholders at the intervals identified in Table 8. PGE will provide priority notifications to Public Safety Partners, Adjacent Public Safety Partners, and operators of utility-identified critical facilities beginning 72-48 hour prior to de-energization, if possible.

In addition, prior to and during PSPS events, PGE makes current PSPS status information, information including location, de-energization estimates, and estimated restoration times (ERTs) for each impacted PSPS area, available on www.portlandgeneral.com's wildfire and PSPS outage webpage. All PSPS information on portlandgeneral.com will be easily readable and accessible on mobile devices.

Table 8: PSPS Notification Cadence

Notification Cadence	Audience		
	Public Safety Partners, Adjacent Public Safety Partners, Stakeholders	Utility-identified critical facilities[1]	Customers
PSPS Warning 72-48 hours prior to de-energization	✓	✓	
PSPS Likely 48-24 hours prior to de-energization	✓	✓	✓
PSPS Imminent 4-1 hours prior to de-energization	✓	✓	✓
PSPS Happening At de-energization	✓	✓	✓
Restoration Begins	✓	✓	✓
Restoration Complete	✓	✓	✓
At a minimum, status updates at 24-hour intervals until service has been restored[2]	✓	✓	✓

Notes

[1] Including Communications facilities

[2] These notifications may be required any time after initial notifications during **Level 3: Elevated** through restoration, as dictated by the event

PGE will use multiple media channels, including owned, earned and sponsored channels, to inform impacted customers, communities and stakeholders throughout the PGE service area in accordance with OAR 860-300-0050, with special attention to those within the affected PSPS Area(s). PGE will deliver notifications in multiple formats across multiple channels that may include, but are not limited to, phone calls, text messages, prepared public safety notifications distributed through Public Safety Partners, social media posts, media advisories, emails, and messages to agencies that serve diverse community populations. For PSPS outreach to customers and stakeholders, PGE aims to address the geographic and cultural demographics of the PSPS Area, including languages spoken, access to broadband, and accessibility for those who are visually or hearing impaired, through the following strategies:

- All of PGE's PSPS-related written communications are provided in English and Spanish.
- PGE Customer Service offers a Language Hotline that can answer customer questions in 200 languages.

- PGE works closely with Public Safety Partners and the broadcast and print media to provide regular PSPS-related SMS (text) messages and news reports to help customers who may not have in-home broadband access stay informed throughout the PSPS event.
- All of the PSPS-related content on the portlandgeneral.com website is designed to be ADA-A-compliant[6]; for vision- or hearing-impaired customers, PGE provides both audible and written messaging options, as well as closed-captioning on all videos posted to the website.
- Throughout the event, PGE disseminates its PSPS-related messaging via as many platforms and formats as possible to facilitate the widest possible reach—text messaging, online content, traditional media, paid advertising, written materials and customer service in multiple languages, closed captioning—and works with community-based organizations and Public Safety Partners to reach as many impacted customers as possible.

PGE recognizes the criticality of effective communication to stakeholders before, during, and after a PSPS event; to the extent practicable, the following figure provides a visual summary of PGE's PSPS notifications process.

Figure 14: PSPS Notifications Strategy

Throughout the PSPS event, PGE will provide the elements of notification information required by OAR 860-300-0050 to Public Safety Partners, Adjacent Public Safety Partners, operators of Utility-

[6] Reference to Web Content Accessibility Guidelines: https://www.w3.org/WAI/WCAG21/quickref/

identified Critical Facilities (including communications facilities), and customers as summarized in Table 9.

Table 9: Notification Information

Notification Information	Audience		
	Public Safety Partners, Adjacent Public Safety Partners, Stakeholders	Utility-Identified Critical Facilities	Customers
Date and time PSPS will be executed	√	√	√
Estimated duration of PSPS	√	√	√
Notice of when re-energization efforts will begin and when re-energization is expected to be complete	√	√	
At a minimum, status updates at 24-hour intervals until service has been restored	√	√	√
Number of customers impacted by PSPS	√		
The PSPS zone, which would include Geographic Information System shapefile(s) depicting current boundaries of the area subject to de-energization	√	√	
When feasible, the Public Utility will support Local Emergency Management efforts to send out emergency alerts	√		
A statement of impending PSPS execution, including an explanation of what a PSPS is and the risks that the PSPS would be mitigating			√
A 24-hour means of contact customers may use to ask questions or seek information			√
How to access details about the PSPS via the Public Utility's website, including education and outreach materials disseminated in advance of the annual Wildfire Season			√

Note

[1] Specifically provided to Operators of Communications Facilities located within the area(s) of the anticipated PSPS.

10. Ignition Prevention Inspections

PGE conducts annual Ignition Prevention Inspections within its 10 HFRZs, as well as in areas subject to heightened wildfire risk within PGE's right-of-way for generation and transmission assets located outside of PGE's service territory. PGE inspects each supporting structure (pole or tower) within the HFRZs or area subject to heightened risk each year – approximately 26,000 structures in all, scattered across more than 1,000 line-miles located within PGE's service territory and over 100 line-miles located outside of PGE's service territory. The following table quantifies the number of assets inspected:

Table 10: PGE Structures Surveyed 2022

Location	Structure Count	Line Miles
PGE HFRZs 1-10	25,250	1,100
PGE Generation and Transmission Assets Outside Service Territory	750	100

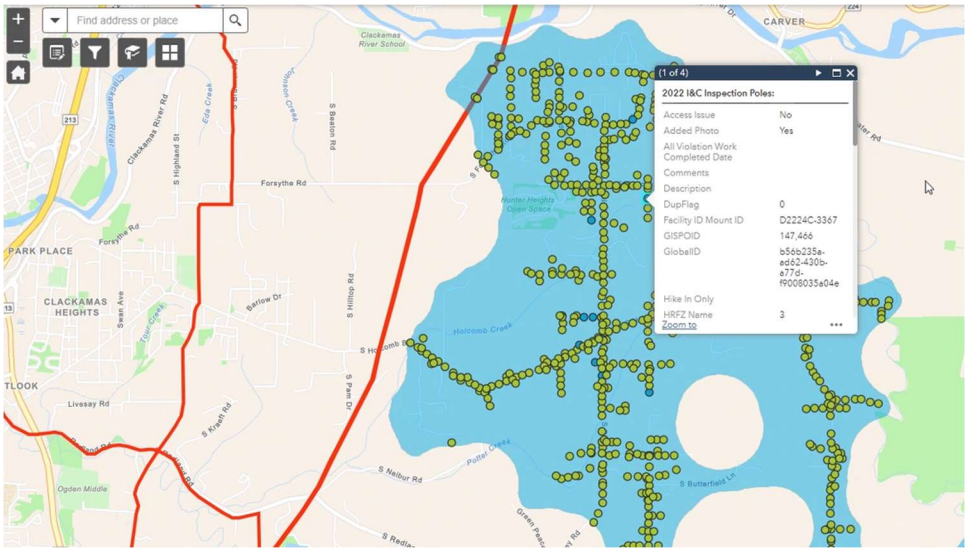
10.1 Ignition Prevention Inspection Procedures

PGE's Ignition Prevention Inspections are performed in-person. Under PGE's Inspect-Correct methodology, crews perform inspection tasks and complete most corrections during the initial visit to the structure, significantly reducing PGE's average correction times, and reducing customer impacts by eliminating the need for multiple site visits.

Within PGE's service territory, crews visually inspect distribution system support structures, lines, and equipment from the ground using binoculars or a spotting scope mounted on a tripod; physically measure vegetation and structural clearances; and sound each wooden supporting structure to detect internal damage or decay. The crew may drill the pole or capture more detailed measurements to assess the extent of damage or decay in more detail. Crews use a standard form (see Appendix 2) to consistently and repeatably record conditions during the field inspections and capture digital photos of each supporting structure using mobile GIS software.

Figure 15 illustrates the data displayed and tracked through PGE's mobile GIS structure tracking application:

Figure 15: PGE ARCGIS Online Structure Tracking Data



PGE also uses the Inspect-Correct methodology to annually inspect over 170 distribution poles located near its generation facilities in areas of heightened risk outside of the PGE service territory.

Ignition Prevention Inspections conducted outside of PGE's service territory primarily address conditions in the right-of-way (ROW) for PGE 230 kV or 500 kV transmission facilities. These inspections are performed by PGE Transmission Patrolmen with detailed knowledge of how these transmission facilities are constructed, operated, and maintained, including specialized knowledge of supporting structure bonding and grounding configurations. The PGE Transmission Patrolmen visually inspect the supporting structures, lines, and equipment from the ground using binoculars, and use drones to assess conditions in the overhead space. PGE Transmission Patrolmen also use a standard form to consistently and repeatably capture conditions during the inspections.

10.2 Ignition Prevention Inspection Standards

PGE's Ignition Prevention Inspection standards build upon several years of PGE experience in administering its Facility Inspection and Treatment to the National Electrical Safety Code (FITNES) Program, which satisfies OAR 860-024-0011 and OAR 860-024-0012. The FITNES Program inspects approximately 28,000 poles annually, or approximately 10 percent of PGE's system, for non-compliance with safety rules governing PGE's and pole occupant facilities.

PGE continues to refine its Ignition Prevention Inspection work practices through active participation in industry discussions and forums. In 2023, based on feedback received from OPUC Safety Staff, PGE will continue to include inspection standards relating to conductor attachments to trees.

PGE's Ignition Prevention Inspection standards direct inspection teams to identify conditions which, left unaddressed, could lead to vegetation or wildlife contact with energized conductors or equipment and, potentially, an ignition event. PGE's Ignition Prevention Inspection standards address the following inspection categories:

- Damaged/broken/missing/loose hardware and equipment

- Damaged conductor
- Conductor clearances
- Bonding
- Damaged/decayed poles
- Broken lashing wire
- Tree attachments
- Other potential sources of ignition

A full list of PGE's Ignition Prevention Inspection standards is found in Appendix 2. PGE will update these standards as required to reflect updated information or OPUC guidance.

PGE 's HFRZ Ignition Prevention Inspections may be combined with other safety or detailed inspections as required by OAR 860-024-0001(6). To avoid multiple inspections of the same pole each year, PGE's ignition prevention inspections may also incorporate the safety patrol standards described in OARs 860-024-0011(2)(c) and 860-024-0018(4). Depending on the facility to be inspected, PGE may also choose to accomplish both the FITNES inspection (OAR 860-024-0011(1)(b)) and ignition prevention inspection during the same site visit.

10.3 Ignition Prevention Inspection Program Oversight

PGE's Ignition Prevention Inspection Program management team oversees project management, administration, fieldwork, technical support, and management oversight and reporting.

Each year, prior to the start of the inspection season, the crews responsible for PGE's ignition prevention inspections undergo in-depth training covering the following major topic areas:

- Scope and locations of the inspections
- Inspect/Correct standards, including printed specifications showing which conditions to inspect for and correct, with diagrams and example photos
- Inspect/Correct procedures, including how to conduct the visual inspection, identify pole occupants, obtain measurements, and capture digital photos
- Inspection software, with hands-on training in use of the GIS software
- Required crew configuration, tools and equipment, and materials
- Communications protocols between PGE and the vendor conducting the inspections
- Protocols for communicating with customers prior to accessing private property
- Quality Assurance requirements
- Other requirements associated with vendor performance
- Wildfire awareness and suppression safety training

During the initial one to two weeks of the HFRZ ignition prevention inspection period, each inspection crew is accompanied by a PGE observer who verifies work performed, provides feedback, and answers questions. During the remainder of the inspection period, PGE performs weekly QA/QC of

each crew's work. New crews added during the inspection season are required to complete the same training and initial PGE observer requirements.

Ignition Prevention Inspections conducted outside of PGE's service territory but within the ROW for its 230 kV and 500 kV transmission facilities are accomplished by PGE Transmission Patrolmen and directed through monthly coordination meetings. PGE Lead Working Foremen are responsible for QA/QC of each Transmission Patrolman's work.

The Ignition Prevention Inspections Program is monitored by the assigned PGE project manager, using a GIS dashboard that monitors each supporting structure located in an HFRZ or area of heightened risk. PGE monitors inspection results daily during the inspection season.

10.4 Ignition Prevention Inspection Timing

Annual HFRZ Notifications

Per OAR 860-024-0011(2)(b), PGE will notify all Owners and Operators of Facilities of any geographic changes to the HFRZ in which their facilities are located no later than 60 days before the start of the 2023 Ignition Prevention Inspections. The number and geographical boundaries of PGE HFRZs are reassessed annually and are subject to change as system hardening projects are completed and new information and analysis becomes available.

Timing of Annual Ignition Prevention Inspections

PGE's goal is to begin its annual ignition prevention inspections as early as possible during the calendar year and to complete the inspections no later than July 31, with the majority of inspections completed prior to PGE's declaration of the start of 2023 Fire Season. Accumulated snowfall at higher elevations within the HFRZs and areas of heightened wildfire risk may delay the inspection process in some areas by hindering physical access to supporting structures and obscuring defects on conductors or equipment.

HFRZ Inspect-Correct Timeframes

PGE categorizes HFRZ corrections and specifies their mitigation timeframes as follows:

- A condition that poses an imminent danger to life or property must be repaired, disconnected, or isolated by the operator immediately upon discovery
- A condition that correlates to a heightened risk of utility-caused ignition shall be corrected no later than 180 days after discovery unless an occupant receives notification under OAR 860-028-0120(6) that the violation must be corrected in less than 180 days to alleviate a significant safety risk to any operator's employees or a potential risk to the general public
- All other conditions requiring correction shall be corrected consistent with OAR 860-024-0012.

PGE recognizes that OAR 860-024-0018 sets forth several new duties for operators of electric facilities, including requirements to address conditions not associated with PGE facilities and conditions involving supporting structures to which PGE is attached but does not own. With respect to conditions

associated with other pole occupants, PGE will comply with OAR 860-024-0018(8) – 860-024-0018(11) and utilize remediation tools afforded to Operators of electric facilities by the OPUC's High Fire Risk Zone Safety Standards.

10.5 Ignition Probability Values and Historic Ignition Tracking

In 2021, in response to new OPUC requirements, PGE created an ignition management tracking database and process. This allows PGE to evaluate the system hardening investments described in the Targeted Interventions to Reduce Wildfire Risk Section, below, in light of the risk drivers that deliver an optimized risk/spend efficiency calculation. For example, if analysis shows that georisk represents a feeder's only risk, but 99 percent of all the ignitions recorded at that site are caused by animal contact, then installing animal protection devices would likely be the appropriate risk mitigation outcome for that location.

As PGE collects risk assessment data and supplements it with lessons learned and industry best practices, it refines its ignition probability values database to create more accurate risk projections. These risk projections, based on quantifiable drivers, allow PGE to map risk velocity (risk forecasted through time) and link it to the various strategies described in Section 6.5, Wildfire Risk-Based Decision-Making, to drive highest-value risk mitigations.

10.6 Ignition Reporting Requirements

PGE tracks ignitions potentially caused by PGE equipment, as well as fires that impact PGE facilities. Relevant tracking and reporting include documentation of the initial observation and recording of ignition events in the field, as well as the specific geographic and ROW location of any impacted PGE equipment.

PGE conducts a review of any ignition events reported in the field, and documents relevant data for submission to the OPUC. In addition, PGE tracks and reports the progress of ignition event reports submitted to the OPUC and archives its OPUC ignition event reports for future compliance purposes. Historic ignition event data[7] is used to inform strategic asset management decisions, including system hardening measures, with a more granular understanding of risk. PGE plans to continue to build out this ignition tracking/reporting database as a key component of understanding ignition events by drivers.

[7] PGE has been tracking historic ignition event data since May 2021

11. Vegetation Management

PGE's vegetation management strategy has two major components: PGE's Routine Vegetation Management (RVM) program and the Advanced Wildfire Risk Reduction (AWRR) program. PGE will continue to implement a phased approach to implementation of its AWRR work within the HFRZs. One of the primary goals of PGE's Vegetation Management program is to annually inspect and mitigate identified trees within its HFRZs. PGE establishes internal targets for completion of various work scopes in line with the activities listed below.

11.1 Routine Vegetation Management (RVM) Inspection & Maintenance

Under its RVM program, PGE manages approximately 2.2 million trees within its ROW of 12,000 miles of overhead conductor. In recent years, PGE has expanded its vegetation management program to trim with increased clearances and remove more vegetation that is dead, dying, diseased, or displaying growth habits or defects that could impact overhead power lines. PGE performs cyclic patrols and trims vegetation to comply with OAR 860-024-0016 minimum conductor vegetation clearance standards. During routine maintenance inspections, PGE also patrols for and mitigates readily climbable vegetation.[8] PGE documents relevant tree trimming plans and makes them available to the OPUC upon request.

Under its RVM program, PGE inspects about one-third of its overhead distribution assets annually. Routine inspection timing may change as PGE evaluates the effectiveness of its vegetation management cycles to optimize effectiveness and efficiency. Across PGE's overhead system, routine vegetation management activities are ongoing year-round.

PGE inspectors evaluate all vegetation adjacent to PGE facilities, including PGE-owned communications facilities, for proximity, species, growth habits, strength, and overall tree health. When assessing trees along powerlines, PGE considers the following in its vegetation management prescriptions:

- Line voltage
- Location
- Line configuration
- Potential sag under various environmental conditions, and

[8] OAR 860-024-0016(1) "Readily climbable" means vegetation having both of the following characteristics: (a) Low limbs, accessible from the ground and sufficiently close together so that the vegetation can be climbed by a child or average person without using a ladder or other special equipment and (b) A main stem or major branch that would support a child or average person either within arms' reach of an uninsulated energized electric line or within such proximity to the electric line that the climber could be injured by direct or indirect contact with the line.

- Clearance requirements to avoid off-cycle trimming.

PGE inspectors create project-specific work layout for vegetation contractors to complete while moving through the system performing RVM activities. Line clearance trim specifications are designed to maintain vegetation clearances during routine wind and adverse weather conditions. At a minimum, PGE adheres to the voltage-based clearance requirements specified in OAR 860-024-0016. PGE vegetation contractors trim identified trees to PGE specifications during the three-year standardized maintenance cycle to comply with OAR Division 24 Safety Standards (Division 24), ORS 758.282 and 758.284, and ANSI A300 and OSHA Z133 guidelines.

In addition, RVM work is field-validated by PGE forestry personnel who work closely with the crews to confirm completion. PGE subjects its vegetation management activities to a detailed QA/QC process to verify that vegetation management tasks have been completed to specification. To increase RVM program effectiveness, PGE also coordinates vegetation management activities closely with external stakeholders, including USFS, ODF, Oregon Department of Transportation (ODOT), municipalities, and private landowners.

11.2 Advanced Wildfire Risk Reduction (AWRR) Vegetation Management Program for HFRZs

AWRR operations fall outside of PGE's routine maintenance and trimming operations as the AWRR scope, operational practices, inspection schedule, and cadence are all on escalated cycles. AWRR program activities are guided by the results from PGE's Wildfire Risk Assessment modeling program.

For 2023, PGE has continued to refine its vegetation management activities, including the AWRR program, to address current climatic conditions and focus on OPUC requirements. ORS 758.280-758.286 provides PGE's operational framework for AWRR-related activities, as most of this work occurs outside of designated PGE ROW, utility easements, and annual maintenance schedules.

Under the AWRR program, PGE performs annual vegetation inspections on overhead line mileage that falls within HFRZs, mitigates vegetation based upon inspection results, performs QA/QC of vegetation management work completed by crews, documents its vegetation management activities, and coordinates them with county, municipal, and other external agencies, including ODOT, ODF, and USFS.

PGE closely manages AWRR program work to verify that it is completed to PGE specifications, from the establishment of the AWRR work schedule at the beginning of the year through QA/QC of the completed work. AWRR vegetation prescriptions follow program specifications, which include more stringent inspection and maintenance cycles and tree removal guidelines than those required under Division 24.

Tree removal practices associated with AWRR are applicable to any tree within striking distance of PGE electrical infrastructure, regardless of the tree's condition. PGE classifies trees that are an imminent hazard to PGE facilities as "P1" trees. PGE classifies trees that pose a probable hazard to the line or facility as "P2." A P2 designation can refer to any tree condition that could create a hazard to a PGE line or facility—trees that are dead, dying, diseased, or damaged, or that have fungal or insect

infestation or stress, sunscald, overall poor health, mechanical damage, multiple tops, poor site conditions, conks on trunk, excavation or aggradation in the root zone, as well as trees that are located too close to PGE facilities.

In 2023, PGE will conduct as much of the AWRR Program's vegetation and P1 inspections and subsequent trimming and P1 mitigation within designated HFRZs as possible during the first six months of the year, although this work is ongoing throughout the year.

Figure 16: SlashBuster Clearing Right-of-Way

Figure 17: 105' Aerial Lift Removing Dead Tree on Border of AWRR Zone

11.3 Inspection & Maintenance Frequencies for AWRR

Table 11: PGE HFRZ Inspection & Maintenance Strategies

AWRR Mitigation	Inspection or Maintenance	Cadence	Description
Clearance and P1 Inspection	Inspection	Annual	During this inspection, PGE AWRR inspectors identify vegetation that is within 5' of high-voltage conductors, and newly established vegetation that is not suitable for a given location. Inspectors verify ongoing vegetation clearance compliance and identify any vegetation that has encroached on PGE assets since the previous inspection. AWRR inspections occur annually, outside of the RVM program's 3-year vegetation maintenance cycle. Inspectors also identify any P1 trees.
Clearance and P1 Mitigation	Maintenance	Annual	Trees/vegetation identified by the AWRR inspectors as too close, and/or wrong tree for the location are trimmed back to proper specification by tree crews. PGE mitigates all P1 hazard trees as quickly as possible, frequently within 24 hours of identification.
Enhanced Vegetation Inspection	Inspection	Annual, ongoing	PGE performs a comprehensive inspection along designated HFRZ lines for all potential P2 trees. PGE is currently tracking stems of large diameter trees within minimum approach distance that are mature and not susceptible to movement. PGE will be reviewing these trees for safety every year. In addition, AWRR inspectors identify and target specific sections of line that require more intensive clearance work, including increased side-clearance, overhang removal, selective removal of tree parts, expansion of ROW widths, ROW mowing, and whole tree removal.
Enhanced Vegetation Trimming and Mitigation	Maintenance	Annual, on-going	PGE removes or otherwise mitigates P2 trees on an ongoing basis throughout the year. Once planned, PGE enhanced vegetation trimming and removal projects are executed as seasonal conditions allow. PGE will mitigate any large-diameter trees that show decline from conditions recorded in the AWRR database appropriately. Due to the scale and logistics of P2 mitigation, some projects planned for a given year may carry over for completion in the subsequent year.

12. Expected Wildfire Program Costs

PGE develops an annual budget of implementation and administrative costs, as well as forecasted capital budgets, for the Program. The activities and expenditures generally included in these budgets include:

Wildfire-Related Operations & Maintenance (O&M):

For 2023, Program operation and maintenance (O&M) includes, but is not limited to:

- Wildfire Mitigation Program implementation
  - Wildfire training (described in Section 8)
  - Wildfire-related staff
  - Wildfire Analytics and Planning and tool development (described in Sections 5 and 6)
- Vegetation management, wildfire-related (described in Section 11)
- Support Areas
  - Community Resource Centers and costs (described in Sections 9 and 12)
  - Portable battery pilot (described in Section 15)
  - Wildfire-related outreach and education costs (described in Section 13)
  - Engineering (described in Sections 9 and 15)

Table 12: 2023 PGE Wildfire Mitigation O&M and Capital Costs

HFRZ 1-10 O&M	
Activity	**Cost (2023)**
Wildfire Mitigation Program	$4.7M
Inspections	$3.1M
Vegetation Management	$14.8M
Support Areas (Includes CRCs, Communications, Engineering, Portable Battery Pilot)	$1M
TOTAL	**$23.6M[9]**

[9] This budget is based on the 2022 General Rate Case decision dated 04/25/2022.

HFRZ 1-10 Capital	
Cost Area	**Cost (2023)**
Wildfire Mitigation & Resiliency	$9 M-$20.9 M[10]
Utility Asset Management (Project Management Office)	$5.3 M
Utility Asset Management	$0.8 M
TOTAL	**$15.1 M - $27.0 M**

For reference, as of filing this WMP, PGE's $15 million 2022 capital investments for wildfire mitigation included:

- 23 additional weather stations
- 20 AI cameras in HFRZ
- 11 miles of copper replacement (construction started fall 2022)
- 44 Smart Reclosers/TripSavers
- PGE exceeded its 2022 Fuse Replacement Program goal of 480 by installing 979 non-expulsion (fire-safe) fuses.

PGE will continue to refine its Wildfire Risk Mitigation Assessment program in 2023 and beyond and will continue to forecast its WM&R capital and O&M spending needs based on the results of that analysis. PGE's planned programs may be augmented if PGE is successful as it actively pursues State and Federal grant funding for a variety of wildfire risk reduction and resiliency improvement projects. These programs include FEMA BRIC grants and the DOE Bipartisan Infrastructure Bill (BIL) with grant funding opportunities through the Grid Resilience and Innovation Partnerships (GRIP) section. PGE is also exploring additional opportunities through the State of Oregon's formula grants under the BIL.

[10] Project designs are currently in various stages of completion

13. WMP Engagement, Public Outreach and Awareness, and Public Safety Partner Coordination

13.1 Engagement, Outreach and Coordination Overview

PGE's employs a three-pronged approach to collecting feedback, educating, and coordinating with customers and stakeholders regarding the WMP. It includes:

- WMP Engagement Strategy
- Community Outreach and Awareness Strategy
- Public Safety Partner Coordination Strategy

PGE's WMP Engagement Strategy is focused on building long-term relationship and equitable engagement with a diverse set of community members, using the guiding principle "Nothing about me without me." PGE actively seeks to understand the needs and wishes of the communities it serves.

The Community Outreach and Awareness Strategy focuses on educating customers and communities about PGE's wildfire mitigation efforts and preparing them for the possibility of wildfire or PSPS events. Outreach and awareness are year-round efforts using multiple mediums and communication channels to reach customers and community stakeholders. PGE values close working relationships with its Public Safety Partners and considers them integral to the success of a well-coordinated Wildfire Mitigation Program. PGE's Public Safety Partner Coordination Strategy outlines the format and cadence of coordination for these efforts.

13.2 2022 Public Safety Partner Coordination and Collaboration

PGE collaborated with its Public Safety Partners via multiple channels in 2022 to support development of the 2023 WMP. Those engagement channels included After Action Review (AAR) processes for both the PSPS Tabletop Exercise at PGE's Integrated Operations Center on May 13 and for the September 2022 PSPS event, as well as a PGE-facilitated Pano AI workshop with fire agencies in October.

PSPS Tabletop Exercise AAR

During the exercise, participants commented that Public Safety Partners would benefit from having input into the refinement of PGE's public notification templates, as there is specific information that external partners and stakeholders will request and need access to during a PSPS event.

Public Safety Partners expressed their appreciation that they were included in the exercise. Participants commented that it would be beneficial to conduct a functional exercise to allow all partners to work through a PSPS event collaboratively, in real time.

September 2022 PSPS Event

PGE also solicited feedback from its Public Safety Partners during the AAR process following the September 9–12, 2022 PSPS event. Some of the suggestions that PGE is working to incorporate in its 2023 Program include:

- Host a Public Safety Partner workshop to allow external stakeholders to advise and support clarification of cross-jurisdictional coordination responsibilities for alerts and warnings
- Evaluate alongside Public Safety Partners the use of Wireless Emergency Alerts for PSPS events and define policies and agreements to facilitate its successful deployment and reduce "overspray" confusion for notification recipients.
- Build a county partnership model to support Public Safety Partner-hosted locations with water and ice donations
- Hold a work session with Public Safety Partners, including ESF-12, to share information about CRCs, locations, information sharing, and other incident support services for community members
- Develop centralized dashboards, status hubs, and granular data feeds readily accessible to all stakeholders, with emphasis on dashboards targeted to all PGE employees, Public Safety Partners, and customers
- Evaluate a method to further granulate GIS data to identify the current stage of the PSPS event for each PSPS Area.

A more detailed description of PGE's engagement with Public Safety Partners and lessons learned during the September 2022 PSPS event is available in PGE's ***PSPS Annual Report*** to the OPUC.

Pano AI Partnership

On October 19, 2022, PGE held a workshop with representatives from Pano AI and six Oregon fire agencies to coordinate development opportunities for situational awareness. Participants discussed how the Pano AI wildfire camera technology is improving detection/alerting processes and decision-making, learned more about existing Pano AI capabilities, and discussed potential improvements to the platform's features and tools. For example, workshop participants explored the feasibility of capturing weather data at the camera locations to provide real-time meteorological condition information to responders. The group also discussed the potential for this technology to improve emergency evacuation processes by sharing access and data with law enforcement agencies county to county and even state to state.

13.3 2023 WMP Engagement Strategy

PGE's 2023 WMP Engagement Strategy is influenced by the community feedback captured during the 2022 program year (see Appendix 3 for comments received during PGE's 2022 WMP engagement sessions) and will focus on continuing to proactively engage and collaborate with PSPs, local communities, and customers. The annual Wildfire Mitigation planning process provides PGE with the opportunity to solicit feedback on its WMP and strengthen long-term engagement relationships with Public Safety Partners and local community members.

PGE's engagement methods are shaped by OPUC compliance rules and recommendations, as well as the iterative feedback received from Public Safety Partners, community-based organizations (CBOs), local community stakeholders and customers throughout the year. The metrics and criteria PGE uses to evaluate engagement effectiveness include quantitative metrics such as number of

participants/attendees per event and workshop ratings/scores, as well as qualitative feedback received during and after each engagement event. Although the specific schedule for these events has not been established at this time, PGE's 2023 WMP engagement activities may include:

- Anticipate contracting with a qualified communications, outreach, and public involvement consultancy with strong ties to local communities to help PGE host a series of WMP engagement sessions across the PGE service territory.
- Hosting at least one WMP engagement session within each county (or group of adjacent counties within reasonable geographic proximity), with access and functional needs considerations, in its service territory. Participants will be able to attend these public workshops in-person or virtually.
- Holding a pre-planning session with Public Safety Partners to identify any language or functional needs to be accommodated during public engagement sessions.
- Capturing WMP feedback from both in-person and virtual WMP engagement session participants to better understand the needs and concerns of those most impacted by PGE's wildfire mitigation efforts, while meeting OPUC rule requirements.
- Providing additional feedback opportunities through follow-up surveys, to further inform the 2024 WMP.

One of the main goals of PGE's WMP Engagement Strategy is to complete all engagement session planning by the end of the first quarter of 2023, with the aim of delivering these sessions as early as the second quarter of 2023. One of the key takeaways from PGE's 2022 engagement sessions was the importance of the timing of these events. PGE will focus on delivering its 2023 WMP Engagement Strategy events during the peak of Fire Season and/or when wildfire concern and activity is at its highest, rather than too early or late in the year.

PGE's 2023 WPM Engagement Strategy will consider including breakout stations/tables for PGE's Public Safety Partners, engaging American Sign Language and Spanish-speaking interpreters for the virtual or onsite events, and offering a virtual or onsite Spanish-only community engagement event.

13.4 Wildfire Community Outreach and Awareness Strategy

The goal of PGE's 2023 Wildfire Community Outreach and Awareness Strategy is to take a comprehensive and cohesive approach in communicating directly with community stakeholders and partners, customers, and the general public about PGE's wildfire mitigation efforts. The purpose of this strategy is to prepare communities for Wildfire Season by providing information about specific preparedness actions they can take, as well as steps PGE may take, including PSPS events. Outreach methods will reflect an umbrella approach that covers multiple partners, stakeholders, and channels to reach customers and communities throughout the PGE service territory. This approach will also incorporate stakeholder, Public Safety Partner, and customer feedback, as well as insights from available data about how customers are engaging with the information PGE provides. PGE is developing a strategy for expanded collaboration with Public Safety Partners and Local Communities during the 2024 WMP development process.

PGE's efforts to connect with the target audiences for its community outreach and awareness program will begin with outreach to regulators, state and emergency response agencies, PSPs and local municipalities to raise awareness about PGE's HFRZs, beginning with the annual submittal of PGE's WMP and continuing through Fire Season. In 2023, PGE will provide these entities with information about steps PGE is taking to reduce the risk of wildfire, and about opportunities to participate in one of the scheduled informational conference calls and tabletop exercises prior to PGE declaring Fire Season. PGE conducts ongoing outreach to state agencies and government officials to share vital information about PGE's wildfire mitigation efforts and potential PSPS events.

13.4.1 Wildfire Communication & Awareness Channels and Campaigns

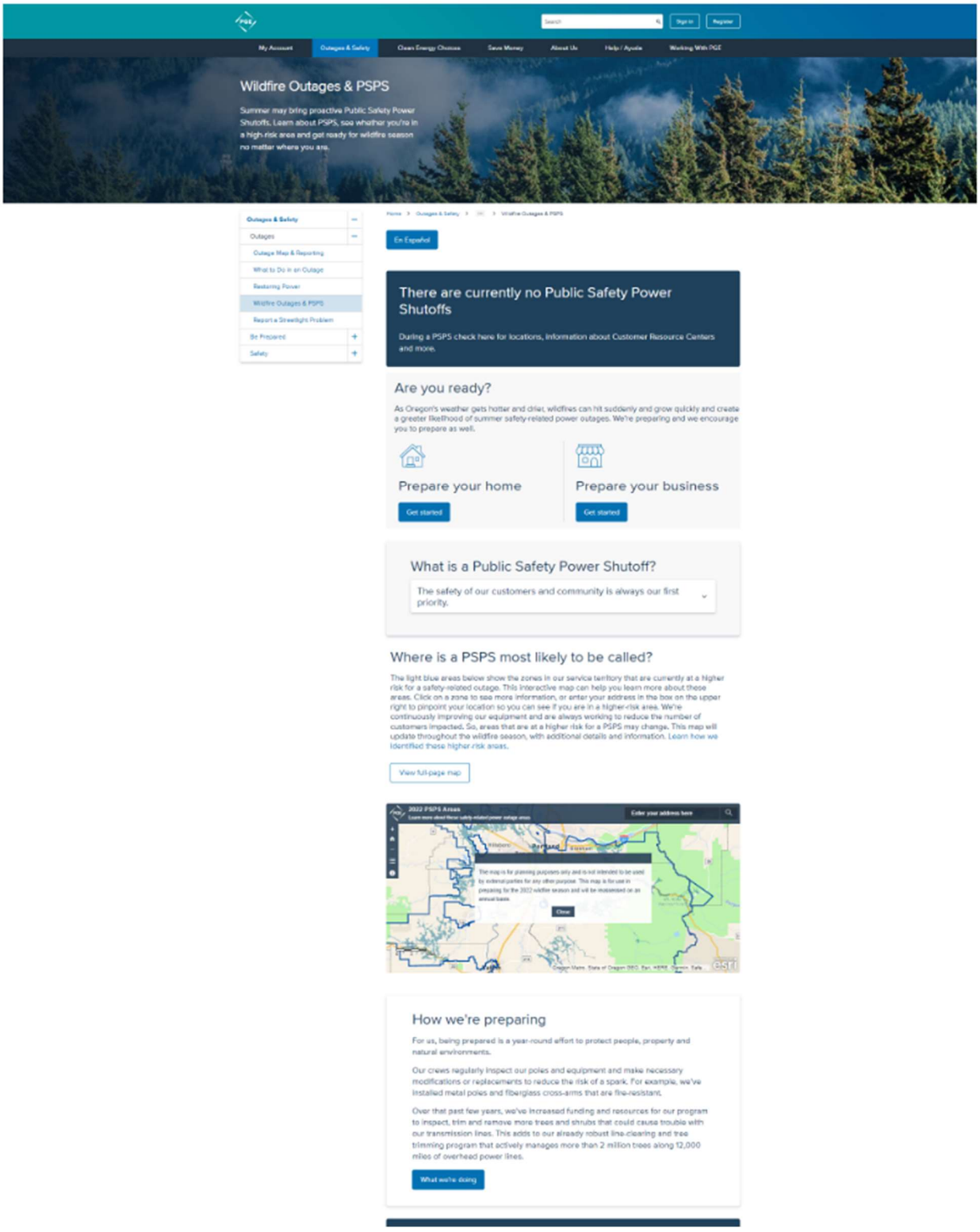
PGE employs a variety of tools and communication channels to broadly disseminate wildfire information and awareness and to ensure equitable information access for all members of the local community. For example, PGE has shared information with over 250 Community-Based Organizations (CBOs), food banks and school districts within PGE's service territory, enlisting their help in communicating with specific communities and customer groups to build awareness about the Wildfire Mitigation Program and potential PSPS events. PGE engages with CBOs by providing a toolkit (Appendix 7) of sample outage preparedness messages for use in social media, email, newsletter, and website messaging, in 15 languages (Arabic, Burmese, Chinese (simplified), Chinese (traditional), English, Farsi, Japanese, Korean, Rohingya, Romanian, Russian, Somali, Spanish, Swahili, and Vietnamese)—the most commonly spoken languages in PGE's service territory according to Oregon Census data. This learning has been validated through PGE's language line, which provides phone interpretation services in over 200 languages.

One of the main communication tools at PGE's disposal is the use of its public-facing website, (portlandgeneral.com) to communicate with all customers regarding wildfire awareness and PSPS preparedness. To provide stakeholders, partners, customers, and the public a central resource for wildfire-related information, PGE annually updates its wildfire outages web content in English and Spanish and provides a more specific set of information in 13 additional languages. The portlandgeneral.com wildfire pages provide information on the following topics:

- What is a Public Safety Power Shutoff?
- An interactive map of PGE's service territory and pre-identified PSPS areas, showing which zone (if any) is currently active. The map allows users to enter a service address to see whether it's located within the active area
- How to prepare a home or business for a PSPS event (which includes information about emergency plans, kits, and checklists)
- A high-level overview of PGE's wildfire preparation/mitigation strategy
- Information regarding how PGE's HFRZs were identified
- Factors considered in evaluating the likelihood of a PSPS event (e.g.: wind speed, temperature, humidity, the dryness of trees and brush, etc.)
- PSPS FAQs

Figures 18 and 19 provide examples of PSPS educational content found on the www.portlandgeneral.com website.

Figure 18: portlandgeneral.com's Wildfire Outages and PSPS Page (English and Spanish Versions)



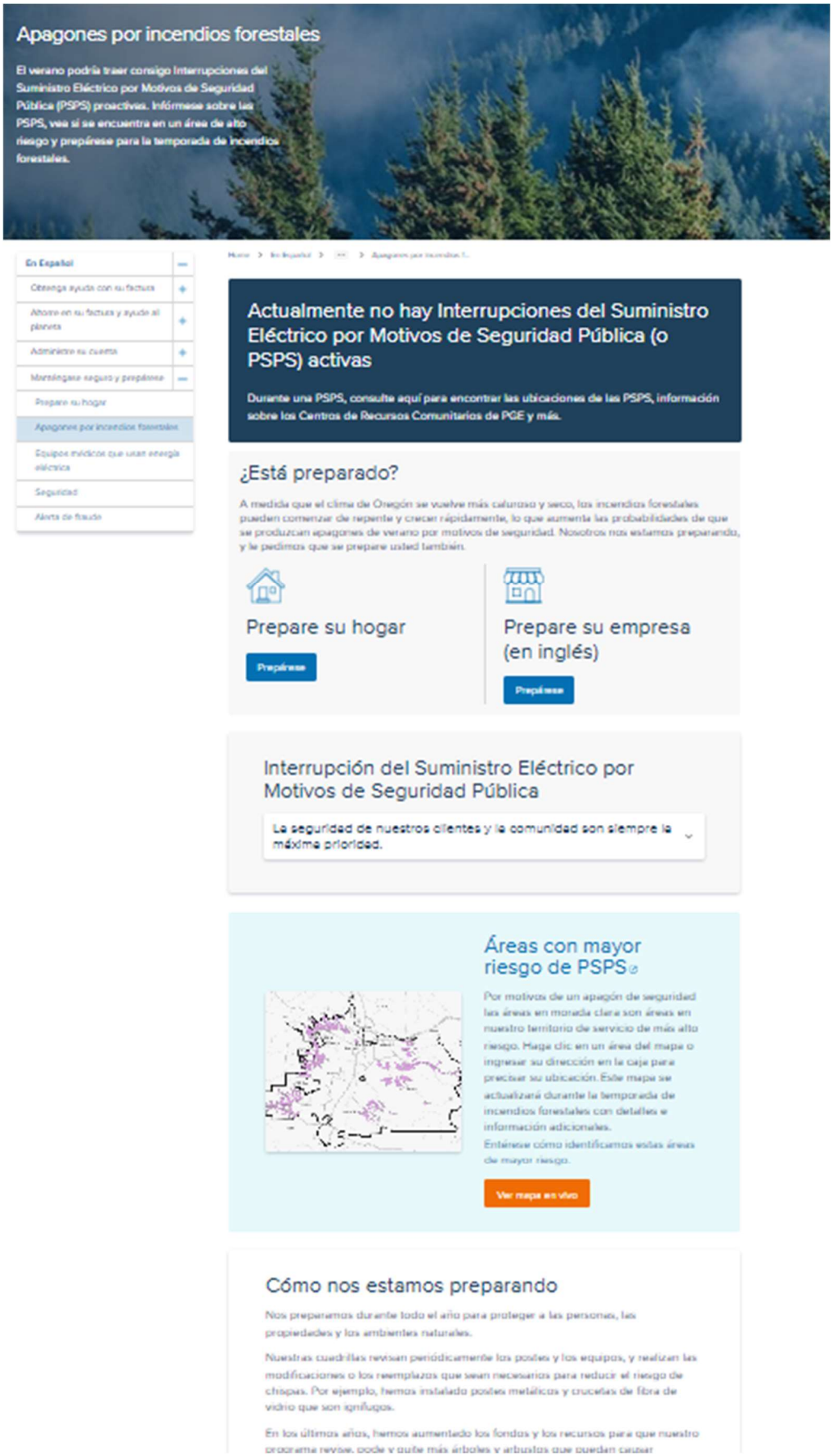
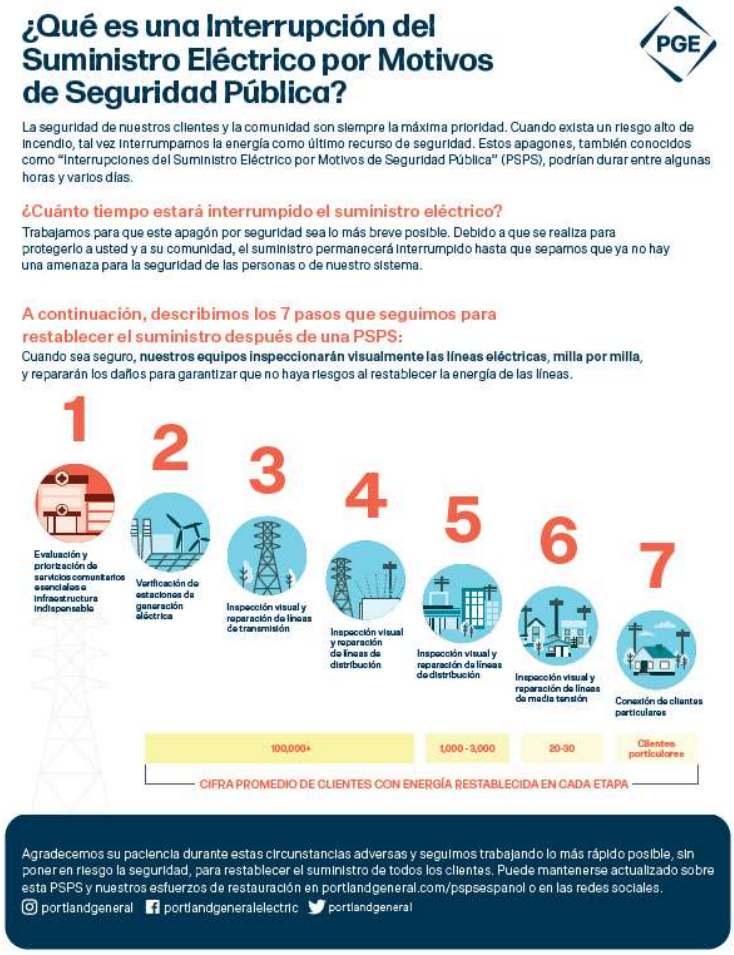

Apagones por incendios forestales
El verano podría traer consigo Interrupciones del Suministro Eléctrico por Motivos de Seguridad Pública (PSPS) proactivas. Infórmese sobre las PSPS, vea si se encuentra en un área de alto riesgo y prepárese para la temporada de incendios forestales.
En Español
Obtenga ayuda con su factura
Ahorre en su factura y ayude al planeta
Administre su cuenta
Manténgase seguro y prepárese
Prepare su hogar
Apagones por incendios forestales
Equipos médicos que usan energía eléctrica
Seguridad
Alerta de fraude
Actualmente no hay Interrupciones del Suministro Eléctrico por Motivos de Seguridad Pública (o PSPS) activas
Durante una PSPS, consulte aquí para encontrar las ubicaciones de las PSPS, información sobre los Centros de Recursos Comunitarios de PGE y más.
¿Está preparado?
A medida que el clima de Oregón se vuelve más caluroso y seco, los incendios forestales pueden comenzar de repente y crecer rápidamente, lo que aumenta las probabilidades de que se produzcan apagones de verano por motivos de seguridad. Nosotros nos estamos preparando, y le pedimos que se prepare usted también.
Prepare su hogar
Prepárese
Prepare su empresa (en inglés)
Prepárese
Interrupción del Suministro Eléctrico por Motivos de Seguridad Pública
La seguridad de nuestros clientes y la comunidad son siempre la máxima prioridad.
Áreas con mayor riesgo de PSPS
Por motivos de un apagón de seguridad las áreas en morado claro son áreas en nuestro territorio de servicio de más alto riesgo. Haga clic en un área del mapa o ingrese su dirección en la caja para precisar su ubicación. Este mapa se actualizará durante la temporada de incendios forestales con detalles e información adicionales.
Entérese cómo identificamos estas áreas de mayor riesgo.
Ver mapa en vivo
Cómo nos estamos preparando
Nos preparamos durante todo el año para proteger a las personas, las propiedades y los ambientes naturales.
Nuestras cuadrillas revisan periódicamente los postes y los equipos, y realizan las modificaciones o los reemplazos que sean necesarios para reducir el riesgo de chispas. Por ejemplo, hemos instalado postes metálicos y crucetas de fibra de vidrio que son ignífugos.
En los últimos años, hemos aumentado los fondos y los recursos para que nuestro programa revise, pode y corte más árboles y arbustos que puedan causar

Figure 19: "What Is a Public Safety Power Shutoff?" – Spanish Version



Additionally, PGE may attend wildfire preparedness events and town halls hosted by county and fire agencies, for the purpose of sharing information about the potential for wildfire-related power (PSPS) outages. In 2022, PGE attended five such events in Clackamas County and shared information and checklists for making an outage kit and preparing an emergency plan, as well as information about Public Safety Power Shutoffs, including when PGE may call them and why and what factors PGE will consider in making that determination, with reference to resources on portlandgeneral.com.

Figure 20: Flyer for 2022 PGE Community Wildfire Preparedness Events

For 2023, PSPS preparedness information provided on the www.portlandgeneral.com website will be available in 15 languages (see Section 13.4.1, above, for the full list). PGE will also provide PSPS preparedness checklists translated into multiple languages, available via the PGE website during Fire Season, as well as PSPS preparedness one-pagers to CBOs, food banks, and schools throughout the PGE service territory. In addition, throughout Wildfire Season, PGE references the Language Line on its website and customer communications. PGE Customer Resource Centers distribute fliers in multiple languages with the following message: "We speak your language. Our customer service advisors can assist you in 200+ languages. Call us at 503-228-6322."

As Wildfire Season approaches, PGE will activate a campaign to raise awareness of wildfire and the potential for PSPS events, including a Wildfire Safety Month press release in May, distributed to 280 media outlets in Oregon via FlashAlert. Additionally, PGE will send out wildfire awareness and PSPS preparedness emails and direct mail to targeted customer segments in English and Spanish.

Throughout Fire Season, PGE will issue additional press releases and/or generate media stories about wildfire preparedness, what a PSPS is, and when a PSPS may be called, using mass communications to reach broad audiences.

Additionally, PGE will share at least one communications toolkit[11] with messaging for use by Public Information Officers for cities, counties, and emergency response agencies in PGE's service area. In late spring and throughout Fire Season, PGE's Twitter and Facebook will regularly share graphics and information driving viewers to portlandgeneral.com for wildfire awareness and PSPS information. PGE has chosen these social media communications tools for breadth of reach.

In 2023, PGE plans to build on its 2022 communications, education, and preparedness campaigns, using these existing communications and educational channels as a baseline and working collaboratively with community leaders and PSPs to refine and update the direction and content as required to keep customers informed. Please refer to Appendix 4 for an inventory of PGE's 2022 efforts and channels utilized.

13.4.2 Outreach and Awareness Timing

In 2023, PGE will perform outreach and awareness activities prior to and during the 2023 Fire Season to reach customers, Operators of Critical Facilities, federal, state and local governments and elected officials, agencies, Tribes, and Public Safety Partners. Customer communications will begin in May, with cadence and medium tailored to specific target audiences including residential and business customers, key managed accounts, critical and pole customers, and customers inside and outside of PSPS areas. Communications will continue throughout Wildfire Season in the form of paid advertising (daily) and strategic direct customer outreach (every two to four weeks). Activities will follow the same seasonal timeline employed during in 2022. Refer to Appendix 5 for timeline details.

13.4.3 Outcome of 2022 Outreach and Awareness Efforts

Outcomes of 2022 outreach and awareness efforts are provided in Appendix 6, Outcomes of 2022 Outreach & Awareness Efforts.

13.5 Assessing Effectiveness of Wildfire Community Outreach and Awareness Efforts

In 2023, PGE, in partnership with its Public Safety Partners, will seek measurably equitable outcomes and metrics for its wildfire community outreach and awareness activities. Goals for PGE's community outreach and awareness activities include raising awareness for customers and other stakeholders regarding PGE's Wildfire Mitigation Program and building collaborative relationships with these groups. PGE will work to provide communications that are inclusive and meet people where they are by using languages they understand. These equitable outcomes and metrics include:

- **Outcome:** Deliver wildfire mitigation information and awareness in an approachable and accessible manner that benefits all community members

[11] Please see Appendix 7 to view sample 2022 toolkit materials.

- **Outcome:** Empower Public Safety Partners with access to timely and actionable information

PGE will measure the effectiveness of its outreach and awareness efforts through the use of surveys as well as the following metrics:

- **Customer Marketing**:
  - Site visits to our wildfire pages on portlandgeneral.com
  - Wildfire newsletter and email open and click-through rates
  - Click through rates on wildfire digital ads
- **Corporate Communications**:
  - Reach of wildfire press release
  - Breadth of coverage generated
  - Number of social media posts and engagement

Finally, PGE will use 2023 as a baseline year to start measuring customer wildfire awareness with annual surveys.

13.6 Public Safety Partner Coordination Strategy

PGE works closely with Public Safety Partners to facilitate information sharing, community outreach and wildfire preparedness and response. PGE defines Public Safety Partners as the OPUC's Emergency Support Function (ESF)-12, Local Emergency Management, Oregon Department of Emergency Management (OEM) and Oregon Department of Human Services (ODHS). PGE's Public Safety Partner Coordination Strategy is divided into three phases: prior to, during, and after Fire Season. By working in partnership with each Public Safety Partner, PGE can maximize the effectiveness of its outreach efforts and the size of the audience receiving these communications and improve operational coordination and information sharing. Meeting frequency and location will be determined in collaboration with our Public Safety Partners.

13.6.1 Prior To Fire Season

Before Fire Season, PGE will engage in joint planning processes and deliver presentations to Public Safety Partners at existing information sharing and preparedness coordination forums, as needed. PGE will include wildfire preparedness topics in one of the all-hazards quarterly summits with Public Safety Partners. PGE and ESF-12 coordinate on the location, time, and topics for quarterly summits. PGE will also coordinate with Public Safety Partners to implement the WMP Engagement Strategy.

PGE will also host at least one annual pre-Fire Season tabletop exercise with Public Safety Partners that will focus on PSPS notification procedures and processes. This tabletop will occur before the end of the second quarter of 2023 and will follow the Homeland Security Exercise and Evaluation Program (HSEEP) principles and guidelines. All Public Safety Partners will receive an invite to attend the tabletop exercise and participate in the associated AAR process. When possible, PGE will engage in exercises developed by other Public Safety Partners to improve interoperability during an actual event.

13.6.2 During Fire Season

Once PGE declares the start of the Fire Season, the company will inform its various Public Safety Partners regarding in-season operational modifications to the PGE system.

Additionally, during Fire Season, PGE enhances situational awareness monitoring and maintains a state of operational readiness. Should a new fire start or expanding fire threaten PGE infrastructure, a company representative will contact the agency and/or Incident Management Team (IMT)-identified point of contact to coordinate appropriate utility response. For all incidents, PGE acts as a cooperating partner when company infrastructure is at risk or has been impacted by a wildfire.

If an incident requires the activation of the PGE CIMT, PGE will notify impacted stakeholders and initiate in-person and virtual coordination activities. As required, PGE will deploy dedicated utility representatives to jurisdictional Emergency Operations Centers (EOCs), Emergency Coordination Centers (ECCs), or Incident Command Posts (ICPs).

After wildfire incidents, PSPS events or PGE-led tabletop or functional exercises, PGE will conduct an AAR process that is consistent with HSEEP and utility sector best practices, reviewing incident response and identifying continuous improvement action items. A detailed summary of input from our Public Safety Partners and lessons learned captured through exercises and events from 2022 can be found in Appendix 8.

13.6.3 After Fire Season

When the annual Fire Season ends, PGE will solicit feedback from Public Safety Partners about implementation of the Wildfire Mitigation Program and any opportunities for improvement. This feedback is solicited through phone calls and meetings.

14. Participation in National and International Forums

In 2023, as in previous years, PGE will be an active participant in a wide array of national and international industry forums addressing wildfire and outage-related issues.

Emergency managers from PGE, PacifiCorp, NW Natural, and BPA collaborate throughout the year as part of an Energy Emergency Management Team (EEMT). Annually, the EEMT exchanges contact information with the Northwest Coordination Center (NWCC) for emergency communications during Fire Season. Dispatch/Control Center numbers provided by the energy companies are for dispatch-to-dispatch communications. Emergency management contacts are provided for both NWCC and fire dispatch center personnel to assist with strategic decision-making and incident coordination.

In addition, PGE annually participates in a variety of industry forums that may discuss wildfire-related topics, including:

- **International Wildfire Risk Mitigation Consortium (IWRMC):** PGE participates with utilities from across the Western U.S., Canada, South America, and Australia to benchmark and share best practices for wildfire mitigation. The IWRMC is comprised of four working groups: Operations & Protocols, Risk Management, Vegetation Management, and Asset Management.

  PGE has leadership positions on the Operations & Protocols and Risk Management working groups. In 2022, PGE used this forum to benchmark its approach to wildfire risk mitigation assessment to industry best practices and accelerate its learning on capital investments while understanding the difference in the environments other industry participants experience. PGE also participated in the group to understand new technologies and their potential applicability to PGE operations, as well as vegetation management approaches from around the globe.

  Through the IWRMC, PGE is able to leverage lessons learned for specific wildfire mitigation strategies already implemented by other utilities: for example, the use of covered conductor to reduce wildfire risk. Utilities that implemented this strategy failed to account for detection, fire response, and failure modes that could result in wire-down events, increasing wildfire risk as covered conductor failed to de-energize, resulting in ignition events that were sometimes undetected for hours. This was a costly lesson learned for peer utilities, which were forced to remove and underground covered conductor in environments where that failure mode would be common. PGE customers benefit from the company's active participation in this forum as the shared data and review of mitigation strategy outcomes help PGE avoid pitfalls and select more cost-effective and successful risk mitigation measures.
- **Electric Power Research Institute (EPRI):** PGE engages with its research partners at EPRI through multiple programs to address wildfire mitigation research and is leveraging EPRI-led programs such as the Incubatenergy Network to gain knowledge of new technologies and start-ups in wildfire-related disciplines. PGE engages with EPRI at multiple leadership levels. The PGE President and CEO serves on the EPRI Board of Directors; a PGE Senior Vice President serves on the EPRI Research Advisory Council; multiple PGE Senior Managers and Directors

serve as Sector Council advisors, and dozens of PGE SMEs engage with EPRI at the program advisory and technical working group levels.

In partnership with EPRI, PGE sponsored the three-day Utility Wildfire Symposium on November 8–10, 2022, in Portland, attended by OPUC Commissioners and staff, representatives from research institutes and industry, and government officials. Attendees viewed demonstrations of wildfire-related technologies, heard presentations on current wildfire-related research, and discussed opportunities for new research projects and collaboration across participating entities.

EPRI was recently commissioned to conduct a study for the California Investor-Owned Utilities to determine which portable battery products are best-suited to back up medical devices during power outages (such as PSPS events). PGE has engaged with its research partners at EPRI to design a Portable Battery Pilot Project, in which PGE will study the feasibility of offering no-cost portable battery devices to PSPS-impacted residential customers also enrolled in PGE's medical certificate program (for additional details, please see Section 15.6, below).

- **Oregon Joint Use Association (OJUA):** PGE is active in the leadership of the OJUA, a non-profit industry workgroup whose mission involves building trust, cooperation, and organizational cohesion between utility pole owners, users, and government entities to promote the safe, efficient use of the ROW. The OJUA has featured educational presentations on the topic of wildfire mitigation at its past two annual meetings. Additionally, by administrative rule, the OJUA is an advisor to the OPUC on the adoption, amendment, or repeal of administrative rules governing utility pole owners and occupants.
- **Other National and Regional Forums:** PGE is actively engaged with industry research partners at the Western Energy Institute, Edison Energy Institute (EEI), and the U.S. Department of Energy. This is evidenced by PGE participation in the leadership of these organizations, as well as its active engagement in the industry technical sessions and conferences.
- **Regional Disaster Preparedness Organization (RDPO):** PGE actively participates in the RDPO, which encompasses the five Portland metro region counties (Multnomah, Washington, Clackamas, Columbia, and Clark), as a utility/energy sector participant and steering committee member. In this role, PGE provides the RDPO with insights and a utility perspective on issues. In addition, participation in this group has enhanced PGE's regional partnerships and provided insights into regional disaster resilience and preparedness initiatives.
- **Oregon Wildfire Detection Camera Interoperability Committee:** PGE participates in this committee, whose primary goals and objectives include developing and maintaining statewide wildfire camera detection system(s) and fostering coordination and collaboration among its members. The committee membership includes the Governor's Office, public safety agencies, fire agencies, emergency managers, USFS, Bureau of Land Management, Statewide Interoperability Coordinator, ODF (co-chair of the committee), the Oregon Hazards Lab at the University of Oregon (co-chair of the committee), Tribal representatives, and Oregon's investor-owned utilities.

PGE is also working with federal partners to support the Wildfire Working Group's interdisciplinary and interagency efforts, representing the utility sector in the President's 2022 wildfire meetings with cabinet secretaries to emphasize the need for continued leadership at the federal level on wildfires and shared responsibility on the matter, among other issues.

In 2022, PGE participated in site visits with the San Diego Gas & Electric and Southern California Edison wildfire mitigation teams. The purpose of this benchmarking trip was to accelerate PGE's learning toward mitigating wildfire risks from PGE assets, as well as how to communicate with and support our customers. The teams discussed risk analysis, incident management approaches, capital investment strategies, fire suppression tools, community resource models, and communication techniques. Some key takeaways from the visits include:

- Opportunities to leverage greater automated notification capabilities around PSPS communications
- Opportunity to develop stronger relationships with local media to broaden and deepen awareness around wildfire preparedness and PSPS communications
- Significant investments being made in reconductoring in areas where undergrounding is not feasible or cost-effective
- Southern California Edison has a robust electronic Customer Care Plan Dashboard on all impacted customers during a PSPS event, allowing them to drill down to the individual customer/meter
- Both utilities were providing grants to assist with wildfire burn opportunities
- Considerable investments were being made to acquire aviation assets (helicopters and drones) available to provide air support to combat wildfires
- The importance of robust and dedicated meteorology and wildfire communications teams.

One finding from PGE's benchmarking peer reviews is that CPUC Decision 21-06-034[12], which requires California IOUs to consider the needs of Medical Baseline and Access and Functional Needs Communities impacted by PSPS events, could have implementation and customer impacts for Northwest utilities. PGE Interviewed representatives from California IOUs to understand the findings and best practices they observed during the rapid deployment of this regulatory mandate, as well as challenges, uptake rates, and implementation best practices. These interviews led PGE to work with EPRI to create the Portable Battery Pilot Project described in Section 15.6.

[12] https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/safety-and-enforcement-division/documents/decision-phase-3-gl.pdf

15. Research & Development

PGE is undertaking a variety of wildfire-related research projects with public and private research institute and industry partners.

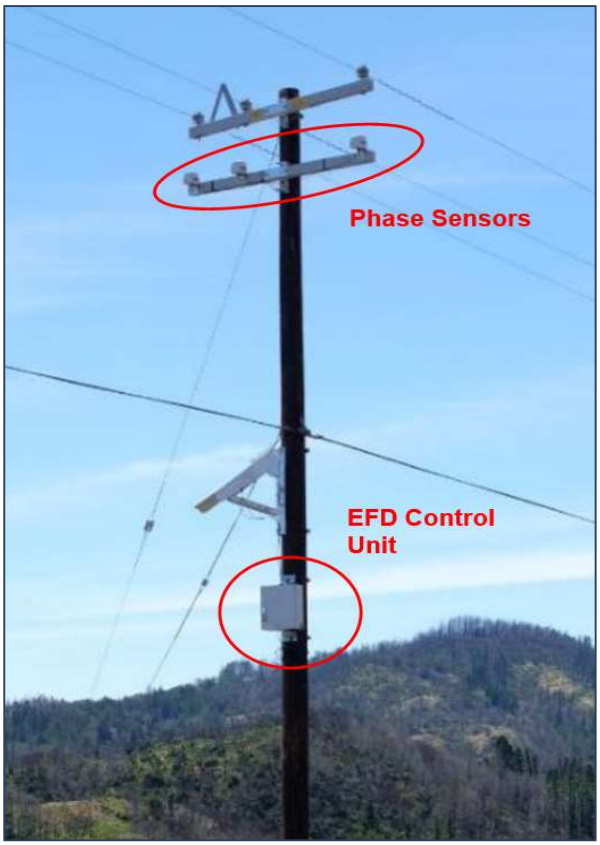
15.1 Early Fault Detection Pilot Project

As a result of its collaboration with EPRI, PGE deployed the Early Fault Detection (EFD) pilot project in 2021.[13] EFD uses sensors to detect anomalies on the feeder in real time, allowing PGE to intervene (replace or repair) the affected component(s) prior to a failure that could cause an ignition. In 2023, PGE will deploy the first of three planned EFD systems on feeders within its HFRZs and, if possible, will add further EDF systems by leveraging potential federal grant funding opportunities. In addition, in 2023 PGE will evaluate detection/response times for covered conductor equipped with an EFD system to assess the viability of this approach as an alternative to undergrounding within its HFRZs.

Figure 21: Damaged Conductor Identified by EFD System in 2022 and corrected by PGE

[13] Incubatenergy Labs 2020 Pilot Project Report: IND Technology – Early Fault Detection for Power Lines

Figure 22: Example of An Installed EFD System

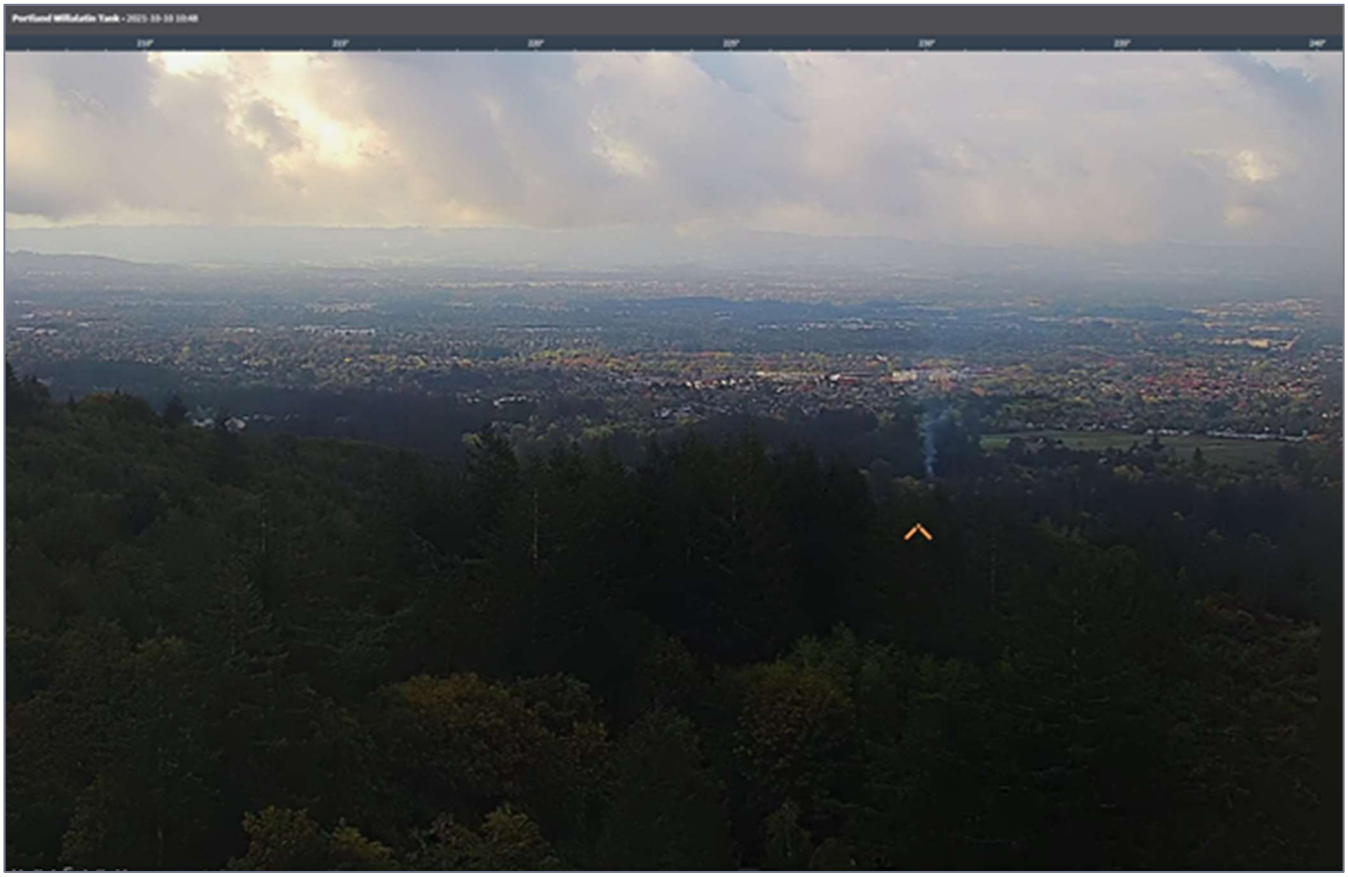


15.2 Pano AI: 360-Degree, AI-Based Imaging

In 2021, in partnership with EPRI and the City of Portland, PGE tested an artificial intelligence-enhanced ultra-high-definition (UHD) camera technology, Pano AI (Incubatenergy Labs 2021 Pilot Project Report – Pano AI – 360-Degree, AI-Based Imaging for Wildfire Situational and Locational Awareness). These cameras can detect and identify smoke through ultra-high-definition video imaging, and notify PGE if it detects a fire, in real time. As the PGE-sponsored pilot project showed, this technology has proven benefits in accelerating fire detection and response times. The cameras are now operational within all PGE HFRZs and detected multiple fires (not wildfires) in 2022.

As of 2022, PGE validated the efficacy of this technology and deployed 22 Pano AI cameras across its 10 HFRZs (see Figure 9 for locations) and plans to deploy an additional 15 cameras in 2023. PGE also provided access to these cameras to multiple Public Safety Partners, including the Columbia Cascade Interagency Communications Center (which provides camera access to USFS, ODF, U.S. Fish & Wildlife Service and other agencies), three ODF Forest Protection Districts, and the Confederated Tribes of Grande Ronde, among others. See Section 7.1, Enhanced Monitoring & Technology In HFRZs, for a full list of agencies with access to PGE's Pano AI network.

Figure 23: Smoke Detected by AI-Equipped UHD Camera



15.3 Remote Sensing Pilot Project

In 2021, PGE conducted a Remote Sensing data acquisition project for its HFRZ feeders, to support wildfire and resiliency preparedness and operational design and engineering work in 2022. The project used various high-tech geospatial imaging technologies (listed below) to provide PGE with a detailed understanding of vegetation risk, clearances to poles and wires, and ROW accessibility within PGE's HFRZs.

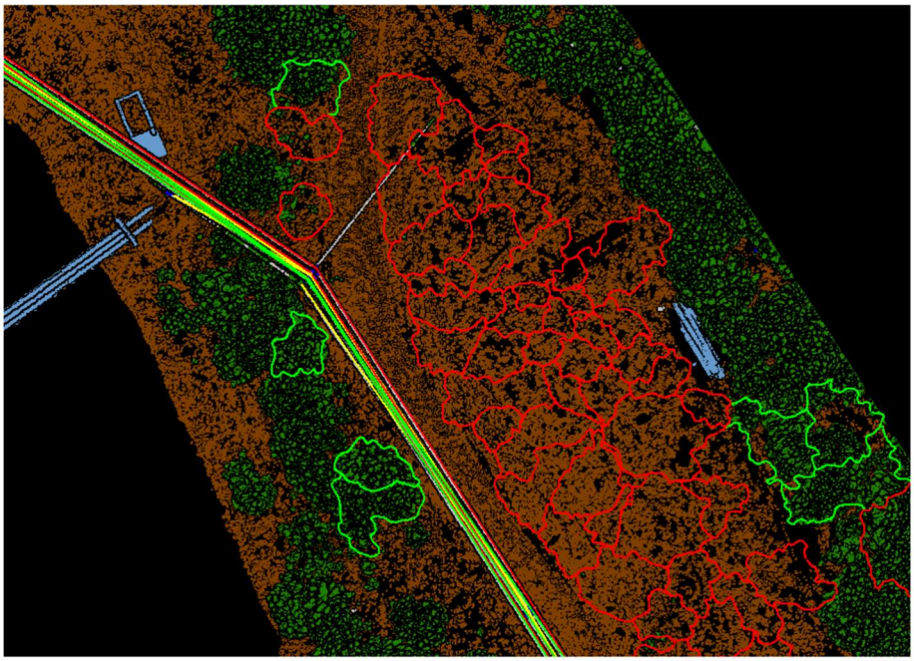
The 2021 HFRZ Remote Sensing Pilot Project produced precise mobile and aerial LiDAR imaging, spherical imagery, and satellite multispectral imagery surveys of 774 circuit-miles of conductor and nearly 15,000 poles within the PGE HFRZs.

This data and analysis have also been taken into consideration in PGE's 2023 capital planning work, which guides its wildfire investment strategy. It will also help PGE understand how much risk has been mitigated through previous years' AWRR (vegetation management) activities and is being used for 2023 vegetation management program planning.

PGE's Remote Sensing Pilot Project also provides:

- GIS-enabled analyses of vegetation clearance and vegetation health
- Consolidated pole/span inventory
- Pole/span change detection analysis (2019-2021)
- Consolidated tree threat inventory (2019 and 2021)
- Tree change detection analysis (2019-2021).

Figure 24: Sample Aerial LiDAR Imagery



Areas outlined in red show trees identified as threats in 2019 that have since been removed.

15.4 Storm Predictive Tool

In late 2022 PGE operationalized a prototype version of a Storm Predictive Tool that will assess wildfire weather risk to PGE equipment using weather data from across the PGE service territory. In 2023, PGE will conduct further model testing and validation to assess the Storm Predictive Tool's ability to incorporate more granular and sophisticated inputs to better inform PGE's PSPS execution decision analysis and improve system alarming.

When initialized in Q4 2023, this tool will significantly improve PGE's ability to predict potential equipment outages based on forecasted and real-time meteorological data. The Storm Predictive

Tool will offer co-benefits to PGE's Utility Asset Management program, including increased spare equipment ordering efficiency, spare equipment mobilization, and operational standards and practices.

15.5 5G PGE Energy Lab

PGE also leads the 5G PGE Energy Lab, focused on the development of innovative wildfire mitigation technologies. The collaboration is evaluating use cases and developing business cases for wildfire-related surveillance, sensing and data collection, and cloud storage technologies, laying the groundwork for the use of artificial intelligence-driven analysis in these disciplines. Through this collaboration group, PGE has been investigating ways to interface the emerging 5G network with Pano AI to explore how greater communications bandwidth can enhance this fire detection technology. Results from the research will guide the deployment of additional Pano AI wildfire cameras across PGE's service territory in 2023.

In September 2022, T-Mobile US announced a partnership with Pano AI and PGE to connect the network of AI-enabled cameras to T-Mobile's powerful and far-reaching 5G system. The partnership will allow PGE and Pano AI to gather high-quality video in at-risk areas and send "vast amounts"[14] of data to Pano AI's command center in real time. This project is especially important in rural and remote areas; the long range of T-Mobile's 5G network will allow the partnership to bring this state-of-the-art fire detection technology to some of the state's most vulnerable locations.

15.6 Proposed Project: Portable Battery Pilot

Based on peer benchmarking learnings from the California utilities, in 2023 PGE proposes to pilot and study a select customer offering of no-cost portable battery devices to provide backup power to PSPS-impacted residential customers also enrolled in PGE's medical certificate program. The purpose of the pilot would be to understand the customers' usage of the battery devices to back up critical medical devices, impacts on feelings of preparedness and resilience, and the customer's experience during an outage prior to and after receiving a device. The budgeted cost to provide a portable battery device to qualified customers and study the impacts for Year 1 is estimated at $100,000. PGE will file a detailed program application for an operational tariff prior to offering this option to customers.

[14] Link to article: T-Mobile US, Pano AI help detect wildfires with 5G, AI (rcrwireless.com)

Contact PGE

For information regarding PGE's wildfire mitigation program and wildfire-related emergency kits, plans, checklists, education, and preparedness information, please visit PGE's website (portlandgeneral.com), or call at 1-800-542-8818. Current situational updates, outage status, and wildfire information are also available via social media platforms (Facebook, Twitter, Instagram, and LinkedIn).

15. Revisions Log

The following table details the nature, date, and primary author of major revisions to this document. All impactful revisions—revisions that make significant changes to PGE Wildfire Mitigation strategies—will be described in the Revision Description column.

Date	Version	Revision Description
12/21/2022	1	Issued for implementation by WM&R

Appendices

Appendix 1: Oregon Wildfire Mitigation Rules In the WMP

Oregon Administrative Rules - Wildfire Mitigation Plans

Oregon Administrative Rule: Chapter 860, Division 300	
Rule Citation	**Where addressed in PGE Wildfire Mitigation Plan**
860-300-0020: **Public Utility Wildfire Mitigation Plan Filing Requirements**	
1(a)	**Section 6.1** (Risk Assessment Overview)
1(a)(A)	**Section 6.1** (Risk Assessment Overview) **Section 7** (High Fire Risk Zones)
1(a)(B)	**Section 6.1** (Risk Assessment Overview) **Appendix 9** (PGE Wildfire Risk Assessment Overview & Process)
1(b)	**Section 6.5** (Wildfire Risk-Based Making)
1(c)	**Section 6.5** (Wildfire Risk-Based Making)
1(d)	**Section 13.4** (Wildfire Community Outreach and Awareness Strategy)
1(e)	**Section 9** (Operation During PSPS Events and Protocols for De-Energization of Power Lines) **Section 9.1** (Power System Operations During PSPS Events) **Section 9.2** (Levels of a PSPS Event) **Section 9.3** (Communication Requirements During PSPS Events)
1(f)	**Section 13.4.2** (Outreach and Awareness Timing) **Appendix 5** (2022 Wildfire Outreach and Awareness Efforts)
1(g)[15]	**Section 10** (Ignition Prevention Inspections)
1(h)[16]	**Section 11** (Vegetation Management)
1(i)	**Section 12** (Wildfire Program Costs)
1(j)	**Section 14** (Participation in National and International Forums)

[15] Utility infrastructure inspection consistent with OAR 860-024-0018
[16] Vegetation management within HFRZs consistent with OAR 860-024-0016

Oregon Administrative Rule: Chapter 860, Division 300	
Rule Citation	**Where addressed in PGE Wildfire Mitigation Plan**
1(k)[17]	**Section 10** (Ignition Prevention Inspections)
2	**Section 1** (Introduction)
3	**Section 1** (Introduction)
4	Not applicable.
860-300-0030: **Risk Analysis**	
1	**Section 6.1 (Risk Assessment Overview) , 6.2** (Updates to the 2023 Wildfire Risk Mitigation Assessment) Appendix 9 (PGE Wildfire Risk Assessment Overview & Process)
1(a)	**Section 6.3** (Wildfire Risk Categories)
1(a)(A)	**Section 6.3.1** (Baseline Wildfire Risk)
1(a)(B)	**Section 6.3.2** (Seasonal Wildfire Risk)
1(a)(C)	**Section 6.3.3** (Risk to Residential Areas)
1(a)(D)	**Section 6.3.4** (Risk to PGE Equipment)
1(b)	**Section 6.2** (Updates to 2023 Wildfire Risk Mitigation Assessment)
1(c)	**Section 6.3.5** (Georisk) **Appendix 9** (PGE Wildfire Risk Assessment Overview & Process)
1(c)(A)	**Section 6.4** (Risk Assessment Methodologies: Data Quality and Review Frequency)
1(c)(B)	**Section 6.4** (Risk Assessment Methodologies: Data Quality and Review Frequency)
1(d)	**Section 6.5** (Wildfire Risk-Based Decision Making)
1(d)(A)	**Section 6.5.1** (Risk-Based Decision Making for PSPS Events)
1(d)(B)	**Section 6.5.2** (Risk-Based Decision Making and Mitigation Actions for Vegetation Management)
1(d)(c)	**Section 6.5.3** (Risk-Based Decision Making and Mitigation Actions for System Hardening)
1(d)(D)	**Section 6.5.4** (Risk-Based Decision Making and Mitigation Actions for Capital Improvements)
1(d)(E)	**Section 6.5.5** (Risk-Based Decision Making and Mitigation Actions for Operations)

[17] Ignition inspection program per OAR 860-024.

Oregon Administrative Rule: Chapter 860, Division 300	
Rule Citation	**Where addressed in PGE Wildfire Mitigation Plan**
2	**Section 6.2** (Updates to 2023 Wildfire Risk Mitigation Assessment)
860-300-0040: **Wildfire Mitigation Plan Engagement Strategies**	
1	**Section 13.3** (2023 WMP Engagement Strategy)
1(a)	**Section 13.3** (2023 WMP Engagement Strategy)
1(a)(A)	**Section 13.3** (2023 WMP Engagement Strategy)
1(a)(B)	**Section 13.3** (2023 WMP Engagement Strategy)
1(b)	**Section 13.3** (2023 WMP Engagement Strategy)
2	**Section 13,.4** (Wildfire Community Outreach and Awareness Strategy)
2(a)	**Section 13,.4** (Wildfire Community Outreach and Awareness Strategy)
2(a)(A)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(a)(B)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(a)(C)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(a)(D)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(b)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(b)(A)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(b)(B)	**Section 13.4.2** (Outreach and Awareness Timing) **Appendix 4** (Inventor of Community Outreach and Engagement Materials and Channels)
2(b)(C)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(b)(C)(i)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(b)(C)(ii)	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
3	**Section 13.5** (Assessing Effectiveness of Wildfire Community Outreach and Awareness Efforts)
4	**Section 13.6** (Public Safety Partner Coordination Strategy)
4(a)	**Section 13.6.1** (Prior to Fire Season)
4(b)	**Section 13.6.1** (Prior to Fire Season)
4(c)	**Section 13.6.1** (Prior to Fire Season)
860-300-0050: **Communications Requirements Prior, During, and After a Public Safety Power Shutoff**	

Oregon Administrative Rule: Chapter 860, Division 300	
Rule Citation	**Where addressed in PGE Wildfire Mitigation Plan**
1	**Section 9.3** (Communication Requirements During PSPS Events)
1(a)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)(A)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)(B)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)(C)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)(D)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)(E)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)(F)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)(G)	**Section 9.3** (Communication Requirements During PSPS Events)
1(b)(H)	**Section 9.3** (Communication Requirements During PSPS Events)
1(c)	**Section 9.3** (Communication Requirements During PSPS Events)
1(c)(A)	**Section 9.3** (Communication Requirements During PSPS Events)
1(c)(B)	**Section 9.3** (Communication Requirements During PSPS Events)
1(c)(C)	**Section 9.3** (Communication Requirements During PSPS Events)
1(c)(D)	**Section 9.3** (Communication Requirements During PSPS Events)
1(c)(E)	**Section 9.3** (Communication Requirements During PSPS Events)
1(d)	Not applicable
2	**Section 9.3** (Communication Requirements During PSPS Events)
2(a)	**Section 9.3** (Communication Requirements During PSPS Events)
2(a)(A)	**Section 9.3** (Communication Requirements During PSPS Events)
2(a)(B)	**Section 9.3** (Communication Requirements During PSPS Events)
2(a)(C)	**Section 9.3** (Communication Requirements During PSPS Events) **Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
2(b))	**Section 9.3** (Communication Requirements During PSPS Events)
2(b)(A)	**Section 9.3** (Communication Requirements During PSPS Events)
2(b)(B)	**Section 9.3** (Communication Requirements During PSPS Events)
2(b)(C)	**Section 9.3** (Communication Requirements During PSPS Events)
2(b)(D)	**Section 9.3** (Communication Requirements During PSPS Events)
2(b)(E)	**Section 9.3** (Communication Requirements During PSPS Events)

Oregon Administrative Rule: Chapter 860, Division 300	
Rule Citation	**Where addressed in PGE Wildfire Mitigation Plan**
2(b)(F)	**Section 9.3** (Communication Requirements During PSPS Events)
2(b)(G)	**Section 9.3** (Communication Requirements During PSPS Events)
3	**Section 9.3** (Communication Requirements During PSPS Events)
3(a)	**Section 9.3** (Communication Requirements During PSPS Events)
3(b)	**Section 9.3** (Communication Requirements During PSPS Events)
3(c)	**Section 9.3** (Communication Requirements During PSPS Events)
4	Not applicable
5	Not applicable
860-300-0060: **Ongoing Informational Requirements for Public Safety Power Shutoffs**	
1	**Section 9** (Operations During PSPS Events)
2	**Section 13.4.1** (Wildfire Communication and Awareness Channels and Campaigns)
3	**Section 9** (Operations During PSPS Events)
4	**Section 9** (Operations During PSPS Events)
860-300-0070: **Reporting Requirements for Public Safety Power Shutoffs**	
1	In the event of a PSPS event, PGE will file with the OPUC, an annual report(s) on de-energization lessons learned, no later than December 31.
2	Non-confidential versions of annual reports filed with the OPUC under this section will be made available on PGE's website.

Appendix 2: PGE Ignition Prevention Inspection Standards

The following checklist is used by PGE's Utility Asset Management organization to ensure a thorough and consistent ignition prevention inspection process for PGE assets.

1	Permanently out of service or abandoned electrical equipment
2	Blocked access roads to supporting structures
3	Abandoned/coiled service wire hanging from pole
4	Broken secondary lashing wire
5	Service/primary neutral touching guy, transformer, or pole
6	Damaged, broken, or frayed power conductor
7	Broken/cut/missing ground
8	Broken communication mainline lashing wire
9	Broken power insulator or tie wire
10	Slack, corroded, or broken power guy
11	Anchor pulled loose/not holding
12	Crossarm brace damaged/broken, missing, or loose
13	Damaged/broken/corroded/loose distribution hardware and connectors
14	Equipment leaking oil—transformer, regulator, etc.
15	Damaged/broken cutout, lightning arrestor, or similar pole-mounted equipment
16	Damper damaged, slipped, or missing
17	Service or conductor attached to tree
18	Midspan horizontal clearance to unattached pole per NESC requirements
19	Missing cotter key, insulator nut, or other line hardware
20	Power hardware, including transmission, not properly grounded/bonded
21	Midspan vertical (pole-to-pole)
22	Midspan horizontal primary (conductor close to building or sign per NESC requirements)
23	Midspan vertical
24	Low transmission or primary conductor close to neutral, secondary or communications or other equipment/conductors per NESC requirements
25	Midspan vertical—power over drivable surface
26	Midspan vertical—power over driveway or pedestrian surface
27	Midspan vertical—communications over drivable surface
28	Overloaded pole
29	Damaged or decayed pole
30	Severely leaning or washed-out pole
31	Vegetation—hazard trees, limbs laying on conductor, impaired clearances to vegetation, tree limbs burning or burned in
32	Crossarm damaged/broken

Appendix 3: Comments Received During PGE's 2022 WMP Engagement Sessions

Appendix 4: Inventory of Community Outreach and Engagement Materials and Channels (2022)

Channel	Effort/Deliverable	Campaign	Audience	Timing
Stakeholder outreach around new HFRZs with one-pager on wildfire mitigation and HFRZ information	Emails, phone calls, meetings	Wildfire Preparation & PSPS Awareness	All Stakeholders	Dec. 2021
PortlandGeneral.com wildfire and PSPS information	https://portlandgeneral.com/outages-safety/wildfire-outages https://portlandgeneral.com/en-esPanol/apagones-por-incendios-forestal https://portlandgeneral.com/outages-safety/safety/wildfire-safety https://portlandgeneral.com/outages-safety/be-prepared https://portlandgeneral.com/outages-safety/be-prepared/prepare-your-home https://portlandgeneral.com/en-esPanol/prepare-su-hogar https://portlandgeneral.com/outages-safety/be-prepared/prepare-your-business	Wildfire Preparation & PSPS Awareness	Broad awareness	March 2022 through Fire Season
Tool kit in 15 languages that provided preparedness tips and info about PSPS areas	Direct email	Wildfire Preparation & PSPS Awareness	Community-Based Organizations	June 24, 2022
Statewide press release for Wildfire Awareness Month	Press release	Wildfire Preparation	Media, public	May 9, 2022
Public Information Officers (regional and in cities/counties that have PSPS areas)	Toolkit	Wildfire Preparation + PSPS Awareness	Broad public	July 13, 2022
Advertising				
Direct customer communications & PGE newsletters				
Media engagement about wildfire preparedness & PSPS awareness	Interviews and information shared with KGW, KATU, KOIN, KPTV, Oregon Capital Chronicle, Oregon Public Broadcasting, KDRV, KTVZ, Bloomberg, Utility Dive, and others.	Wildfire preparation & PSPS Awareness	Broad public	May through Sept. 2022

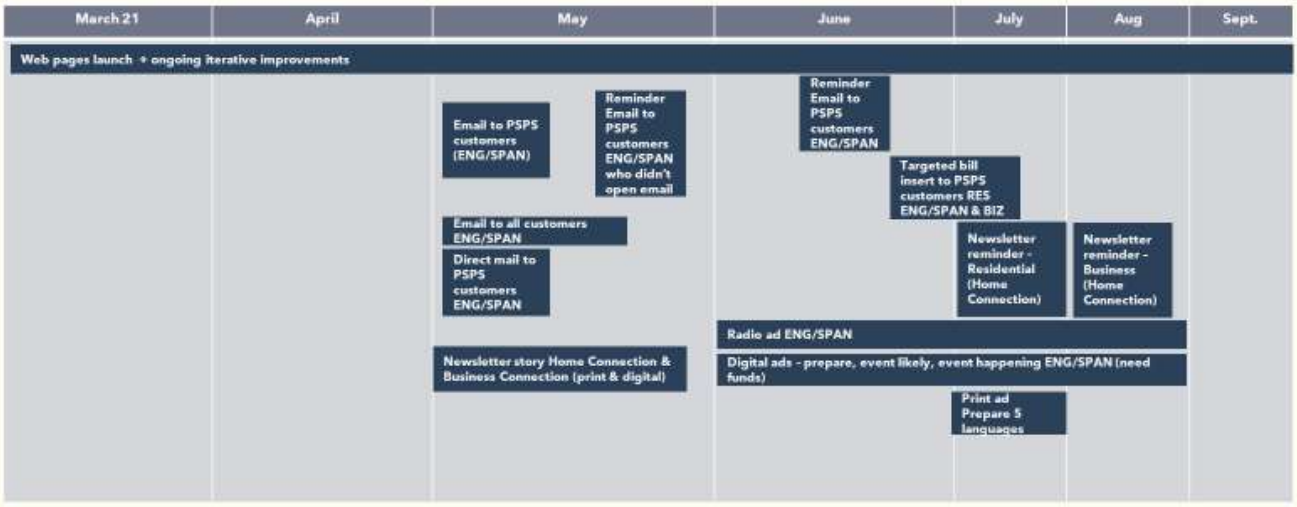
Channel	Effort/Deliverable	Campaign	Audience	Timing
Community wildfire preparedness meetings to share preparedness and PSPS information	WM&R presentations at six events focused on wildfire preparedness at the request of government officials and public safety partners. Brochures about wildfire awareness and PSPS were available in English and Spanish.	Wildfire Preparation & PSPS Awareness	Public, customers	May and June 2022
Social media posts about wildfire preparedness and PSPS	Posts on @portlandgeneral on Twitter and @portlandgeneralelectric on Facebook	Wildfire preparation & PSPS Awareness	Public, customers	May through Sept. 2022

Appendix 5: 2022 Wildfire Outreach and Awareness Timeline

Wildfire & PSPS customer comms

PGE

Prep time! Comms timeline



Digital ads

Direct mailing with brochure

+

Newsletter stories

Reminder bill insert

Print ads in 5 languages

Emails (ENG + SPA)

Web English

Web Spanish

Addtl. info in 13 languages

Wildfire event customer comms

Digital ads – Event likely (ENG + SPA)

Digital ads - Event happening (ENG + SPA)

Emails (ENG + SPA)

Web banner & PSPS active page

SP to screenshot

Expanded details

March – May

- March/April: Web pages (test pages: landing, /prepare, /preparebiz, /wildfireoutages, /psps, /wildfire) live + constant, iterative improvement
- May 10: PSPS letter/DM sent to customers with 4-panel brochure
- May 9 - 20: Email to ALL residential & biz customers, excluding customers in PSPS zone
- May 2 - 6: Email 1 to PSPS customers (RES & BIZ)
- May 23 - 27: Email 2 to PSPS customers (RES & BIZ) who didn't email open

May – September

May 1: Newsletter story in Home Connection & Business Connection

Web pages (test pages: landing, /prepare, /preparebiz, /wildfireoutages, /psps, /wildfire) live + constant, iterative improvement

- Paid and organic social
  - Run through September
- June 1: Radio ads
  - Run through September
  - Streaming targeted: 80% of spend focused on PSPS areas, 20% territory-wide
  - Terrestrial radio, focused on country and oldie stations
- June 1: Digital ads
  - Run through September
  - Targeted: 80% of spend focused on PSPS areas, 20% territory-wide
- June 27-July 11: Reminder email to PSPS customers (RES & BIZ)
- July: Print ads

Web pages (ENG/SPA/Multi lang)

Launch 3/21 with constant, iterative improvement through September

- Prepare landing – Generic landing for residential or business customers, links to preparedness pages and helpful outage information.
- Prepare your home - Educate residential customers about what they need to do to prepare for summer outages.
- Multilanguage page – Educate customers in 13 languages on how to use interactive map, how to prepare and where to get the latest information.
- Prepare your business – Educate general business and key customers about what they need to do to prepare for summer outages.
- Wildfire outages – Educate customers (and media) about wildfire threat and resulting PSPS possibility. Define a PSPS, show map of zones, answer FAQs.
- Wildfire safety - Educate stakeholders (and customers) about wildfire threat & what we're doing to keep they system safe.

Email/Direct Mail/Newsletter story

Email -

May 2 - 6 - PSPS customers - you are in a high-risk area for wildfires, here's how you prepare

- Residential English
- Business English
- Residential Spanish
- Customers with both residential and commercial accounts

May 9 - 20 - All customers - Get prepared for wildfire season

- Residential English
- Residential Spanish
- Business English

May 23-27: Reminder only to customers who didn't open first email - PSPS customers - reminder to get prepared

- Residential English
- Residential Spanish
- Business English

June 27-July 11: Reminder email to all PSPS customers (BIZ & RES)

Direct Mail

May 9 & 10: PSPS customers - you are in a high-risk area for wildfires, here's how you prepare

- PSPS residential customers English
- PSPS residential customers Spanish
- PSPS business customers English
- Customers with both residential and commercial accounts

Newsletter story in Home Connection & Business Connection

May bill cycles - Get prepared (Home Connection & Business Connection)

- Residential English
- Business English

July bill cycles: Reminder newsletter (Home Connection)

Aug. bill cycles: Reminder newsletter (Business Connection)

Targeted bill insert to PSPS customers (RES & BIZ)

- June 15 - July 15: targeted bill insert

Advertising

Digital

- English and Spanish
- June - September
- 80% of spend targeted to PSPS areas, 20% territory-wide

Radio

- English and Spanish
- June - September
- Streaming radio will target 80% of spend on PSPS areas, 20% territory-wide
- Terrestrial radio English, focused on oldie and adult contemporary or country stations
- Terrestrial radio Spanish will play on all stations in local media network, Bustos.

Print (Oregonian, Gresham Outlook, Beaverton Valley Times, Hillsboro News Times, Statesman Journal, El Latino De Hoy, + Chinese/Vietnamese/Other non-English outlets)

- July
- English will target local community papers in PSPS areas
- Spanish will run in largest local Spanish-language publication

Appendix 6: Outcomes of 2022 Outreach and Awareness Efforts

1. Wildfire Webpage Visits (May-September)

- 4,403 sessions to https://portlandgeneral.com/psps-info
- 186,177 sessions to https://portlandgeneral.com/outages-safety/wildfire-outages
- 10,168 sessions to https://portlandgeneral.com/en-esPanol/apagones-por-incendios-forestales10,168 sessions to https://portlandgeneral.com/en-esPanol/apagones-por-incendios-forestales
- 4,689 sessions to https://portlandgeneral.com/outages-safety/safety/wildfire-safety
- 27,962 sessions to https://portlandgeneral.com/outages-safety/be-prepared
- 48,805 sessions to https://portlandgeneral.com/outages-safety/be-prepared/prepare-your-home
- 3,175 sessions to https://portlandgeneral.com/en-esPanol/prepare-su-hogar3,175 sessions to https://portlandgeneral.com/en-esPanol/prepare-su-hogar
- 1,421 sessions to https://portlandgeneral.com/outages-safety/be-prepared/prepare-your-business

2. Newsletter and Email Results

Newsletter

- **Home Connection – goes to 325k+**
  - May – 40% OR; 3.12 Click-to-open rate
  - July – 50% OR; 3.47 Click-to-open rate
- **Business Connection – goes to 12k+**
  - May – 38% OR; 2.8% Click-to-open rate
  - August – 44% OR; 2.4% Click-to-open rate

Email

- **Round 1**
  - In Zone: Early May – 43% OR: 2.9% Click through rate
  - In Zone: Late May reminder – 17% OR; 1.9% Click through rate
  - Not In Zone – 48% OR; 1.4% Click through rate
- **Round 2**
  - In Zone (biz, res (Eng/Span) and biz+res) – 44% OR; 1.7% Click through rate
  - Not In Zone – 49% OR; 1.4% Click through rate

Digital Banner Ads

- *English:*
  - Impressions: 5,179,558
  - Clicks: 6972
  - Click-through rate: 0.13%
- Spanish
  - Impressions: 2,124,270
  - Clicks: 4033

    - Click-through rate: 0.19%

Pandora Digital Radio

- English
    - Impressions: 1,721,154
    - Clicks: 2038
    - Click-through rate: 0.19%
- Spanish
    - Impressions: 227,042
    - Clicks: 346
    - Click-through rate: 0.27%

Appendix 7: Toolkit for Community-Based Organizations (CBOs)—Sample Outage Preparedness Messages for Social Media, email, Newsletter and Website Messaging

Toolkit - Wildfire Preparedness

May 2022

Social media posts

English	Hot and dry weather conditions increase the risk of wildfires and the likelihood of safety-related power outages. So, PGE wants you to be prepared. Learn how to stay in the know, create an outage kit and make a plan to keep your family safe at **portlandgeneral.com/prepare.**
Arabic	إن حالات الطقس الجاف والحار تزيد من خطر نشوب الحرائق في الغابات واحتمال انقطاع التيار الكهربائي للسلامة العامة. ولهذا، تود شركة PGE إعدادك لمواجهة ذلك. تعرَّف على كيفية البقاء على علم بالمستجدات، وأَنشِئ مجموعة أدوات انقطاع التيار الكهربائي وارسم خطة للحفاظ على سلامة أسرتك عبر موقع **portlandgeneral.com/pspsinfo**.
Chinese (simplified)	炎热干燥的天气条件会增加发生野火的风险，与安全相关的停电的可能性也会增加。所以，PGE 希望您做好准备。在 **portlandgeneral.com/pspsinfo** 上学习如何了解最新情况、如何打造停电工具包以及如何制定家庭安全计划。
Chinese (traditional)	炎熱乾燥的天氣條件會增加發生野火的風險，與安全相關的停電的可能性也會增加。所以，PGE 希望您做好準備。在 **portlandgeneral.com/pspsinfo** 上學習如何瞭解最新情況、如何打造停電工具包以及如何制定家庭安全計畫。
Farsi	شرایط آب‌وهوایی گرم و خشک خطر آتش‌سوزی جنگل‌ها و احتمال قطعی برق مرتبط با ایمنی را افزایش می‌دهد. بنابراین، PGE از شما می‌خواهد آماده باشید. نحوه مطلع ماندن، تهیه کیت لوازم ضروری در زمان قطعی برق و برنامه‌ریزی برای ایمن نگه داشتن خانواده خود را در **portlandgeneral.com/pspsinfo**
Japanese	気候が熱く乾燥していると、山火事のリスクや安全に関わる停電発生の可能性が高まります。そこで、PGEから万が一に備えた準備についてご案内いたします。**portlandgeneral.com/pspsinfo**にアクセスして、ご家族皆様の安全をお守りできるよう、役立つ情報をご確認の上、停電キットを作成してください。
Korean	덥고 건조한 날씨는 산불 위험과 안전 관련 정전 가능성을 높입니다. PGE와 함께 위험에 대비하시기 바랍니다. **portlandgeneral.com/pspsinfo**에서 최신 정보를 파악하고, 정전

	키트를 만들고, 가족을 안전하게 지키기 위한 계획을 세우는 방법을 알아보십시오.
Rohingya	Goróm ar fúwana abaháwar haálot ókkol ólla bouli zoñlor-oin or hótara ar óitfaredé héfazoti-mutalek kaáren bon táka ókkol bari zargoi. Étolla, PGE é oñnorare toiyar rákito saár. Zanifuni keengori tákiba, outage kit (kaáren bon tákar saaman) toiyari ar oñnor fémelire héfazot rákibar plan ókkol zaniloiyó eçe **portlandgeneral.com/pspsinfo.**
Russian	Жаркие и засушливые погодные условия повышают риск возникновения лесных пожаров и вероятность отключения электроэнергии для обеспечения безопасности. Поэтому компания PGE хочет подготовить вас к этому. С советами о том, как оставаться в курсе событий, подготовить набор необходимых вещей на случай летних отключений электроэнергии и составить план по обеспечению безопасности своей семьи можно ознакомиться на странице **portlandgeneral.com/pspsinfo.**
Somali	Xaaladaha cimilada kulul ee qalalan ayaa kordhinaaya khatarta dabka iyo suurtagalnimada koronto jarista la xariirta badqabka. Marka, PGE waxay doonaysaa inaad diyaar garoowdo. Baro sida aad ku helayso xogtii ugu danbaysay, furo kiishada xogta ee ku saabsan koronto go'a kadibna samayso qorshe aad ku dhawrayso badqabka qoyskaaga adoo galaaya **portlandgeneral.com/pspsinfo.**
Spanish	Los climas cálidos y secos aumentan el riesgo de incendios y la probabilidad de apagones por seguridad. Por eso, PGE quiere que esté preparado. Conozca cómo estar informado, crear un kit para apagones y un plan para mantener a su familia segura en **portlandgeneral.com/prepararse.**
Swahili	Hali ya hewa ya joto na kavu huongeza hatari ya moto wa mwituni na uwezekano wa kupotea kwa nguvu za umeme kwa sababu ya usalama. Hivyo basi, PGE ingependa uwe tayari. Pata maelezo kuhusu jinsi ya kupata taarifa, kuunda zana ya kupotea kwa umeme na kuweka mpango wa kudumisha usalama wa familia yako kwenye **portlandgeneral.com/pspsinfo.**
Vietnamese	Điều kiện thời tiết nóng và khô làm tăng nguy cơ cháy rừng và khả năng cắt điện vì lý do an toàn. Do đó, PGE muốn quý vị chuẩn bị sẵn sàng. Tìm hiểu cách luôn cập nhật thông tin, tạo lập một bộ công cụ phòng khi cắt điện và lập kế hoạch giữ an toàn cho gia đình quý vị tại **portlandgeneral.com/pspsinfo.**

Newsletter or web copy

English	If extreme weather conditions threaten PGE's ability to safely operate the electrical grid, they may need to turn off power to help protect

	public safety. These last-resort safety outages are called a Public Safety Power Shutoffs, or PSPS. No one likes an outage but being prepared makes them a little easier to get through. Find tips at **portlandgeneral.com/pspsinfo.**
Arabic	إذا كانت الظروف الجوية القاسية تهدد قدرة PGEعلى تشغيل شبكة الطاقة الكهربائية بأمان، فيتعيّن عليهم فصل التيار الكهربائي للمساعدة في حماية السلامة العامة. تُعرف عمليات انقطاع التيار الكهربائي لدواعي السلامة التي يتم اللجوء إليها كحلٍّ نهائيٍّ باسمPublic Safety Power Shutoffs (انقطاع التيار الكهربائي للسلامة العامة)، أو PSPS. لا أحد يحب قطع التيار الكهربائي ولكن الاستعداد لذلك يُسهّل عملية تجاوز تلك الفترة. اطلع على النصائح على **portlandgeneral.com/pspsinfo**
Chinese (simplified)	如果极端天气条件威胁到 PGE 安全运行电网的能力，他们可能需要关闭电源，以帮助保护公共安全。这种停电是最后的手段，被称为 Public Safety Power Shutoffs（公共安全电源关闭），或 PSPS。没有人喜欢停电，但做好准备会让停电不那么难熬。在 **portlandgeneral.com/pspsinfo 上查找提示。**
Chinese (traditional)	如果極端天氣條件威脅到 PGE 安全運行電網的能力，他們可能需要關閉電源，以幫助保護公共安全。這種停電是最後的手段，被稱為 Public Safety Power Shutoffs（公共安全電源關閉），或PSPS。沒有人喜歡停電，但做好準備會讓停電不那麼難熬。在 **portlandgeneral.com/pspsinfo 上查找提示。**
Farsi	اگر شرایط آب‌وهوایی غیرعادی توانایی PGE برای اداره ایمن شبکه برق را تهدید کند، ممکن است لازم باشد آنها برای کمک به محافظت از ایمنی عمومی برق را قطع کنند. این قطعی‌های برق با هدف حفظ ایمنی، که آخرین راه‌حل هستند، Public Safety Power Shutoffs (قطعی‌های برق جهت حفظ ایمنی عمومی) یا PSPS نامیده می‌شوند. هیچ‌کس قطعی برق را دوست ندارد، اما آمادگی قبلی پشت سر گذاشتن قطعی برق را کمی آسان‌تر می‌کند. نکات را در **portlandgeneral.com/pspsinfo** پیدا کنید.
Japanese	気候の状況があまりにも過酷でPGEが送電網を安全に操作できない場合は、公衆安全を保護するために電気を停止させていただくことがあります。このような停電は最後の手段となり、Public Safety Power Shutoffs(保護停電公衆安全）またはPSPSとも呼ばれます。停電は誰もが不便を感じるものですが、停電に向けて準備をすることで少しは乗り越えやすくなります。**portlandgeneral.com/pspsinfo**にアクセスして、役立つヒントをご確認ください。
Korean	극한의 기상 조건이 PGE의 안전한 전력망 운영 능력에 위협이 되는 경우, 공공 안전을 보호하기 위해 전력 공급을 중단해야 할 수도 있습니다. 이렇게 안전을 위한 최후의 수단으로서 실시하는 정전을 Public Safety Power Shutoff(PSPS, 공공 안전 전원 차단)라고 합니다. 정전을 좋아하는 사람은 아무도 없지만 미리 준비한다면 좀 더 수월하게 대응할 수 있습니다. 관련 팁은 **portlandgeneral.com/pspsinfo**에서 제공됩니다.
Rohingya	Zodi ódorbaára abaháwar haálot é PGE ír héfazoti kaáren bebosta gorár kaabiliyotire dómkidile, ítara aám maincor héfazot ólla bouli kaáren bon gori fílit fare. Héfazotílla kaáren bon tákede é ahéri mouka íyan ore Public Safety Power Shutoffs (Páblik or Héfazoti Kaáren Bon

	Táka), yáto PSPS bouil hoó. Kiyóu kaáren no tákare fosón no gore kintu toiyar tákile cómoi iín faráite asán ó. Mocuwara ókkol tuwai so eçe **portlandgeneral.com/pspsinfo.**
Russian	Если ввиду экстремальных погодных условий компания PGE не может гарантировать безопасность эксплуатации электрической сети, компания может быть вынуждена отключить электроснабжение для обеспечения общественной безопасности. Такие крайние меры в виде аварийных отключений называются Public Safety Power Shutoffs (отключения электроэнергии для обеспечения общественной безопасности) или PSPS. Никому не нравятся подобные отключения, но их легче пережить, будучи готовым. Больше советов по ссылке **portlandgeneral.com/pspsinfo.**
Somali	Haddii xaaladaha cimilada daran ay khatar gashaan awooda PGE ee ku shaqaynta si amaan ah qalabka korontada, waxay u baahan karaan inay damiyaan korontada si loo dhawro badqabka dadwaynaha. Koronto jaristaan ah talaabada ugu danbaysa ee badqabka ayaa loogu yeeraa Public Safety Power Shutoffs (Koronto Jarista Badqabka Dadwaynaha), ama PSPS. Ma jiro qof jecel koronto goyn laakiin inaad u diyaar garoowdo ayaa yaraysa niyad jabka hadhoow imaan kara. Tilmaamo ka fiiri **portlandgeneral.com/pspsinfo.**
Spanish	Si, debido a condiciones meteorológicas extremas, se ve afectada la capacidad de PGE para operar la red eléctrica de manera segura, cortaremos la energía para contribuir a la protección de la seguridad pública. Estos apagones se realizan como último recurso de seguridad y se denominan Public Safety Power Shutoffs (Interrupciones del Suministro Eléctrico por Motivos de Seguridad Pública) o PSPS. A nadie le gustan los apagones, pero estar preparado hace que sean un poco más fáciles de sobrellevar. Encuentre consejos en **portlandgeneral.com/prepararse.**
Swahili	Ikiwa hali mbaya ya hewa inatishia uwezo wa PGEwa kuendesha gridi ya umeme kwa usalama, wanaweza kuhitaji kuzima nguvu za umeme ili kusaidia kulinda usalama wa umma. Hatua hii ya mwisho ya kupoteza umeme inajulikana kama Public Safety Power Shutoffs (Kuzima Umeme kwa Sababu ya Usalama wa Umma), au PSPS. Hakuna mtu anayependa kupotea kwa umeme lakini kuwa tayari kunarahisisha kidogo kukabili hali hii. Pata vidokezo kupitia **portlandgeneral.com/pspsinfo**.
Vietnamese	Nếu điều kiện thời tiết khắc nghiệt có nguy cơ làm trở ngại khả năng của PGE trong việc vận hành an toàn mạng lưới điện, công ty có thể cần cắt nguồn điện để giúp bảo vệ an toàn công cộng. Các biện pháp an toàn cuối cùng bằng cách cắt điện này được gọi là Public Safety Power Shutoffs (Cắt Điện Vì An Toàn Công Cộng), hay PSPS. Không ai thích rơi vào tình trạng mất điện nhưng việc chuẩn bị sẵn sàng sẽ giúp họ vượt qua điều đó dễ dàng hơn một chút. Hãy xem các lời khuyên tại **portlandgeneral.com/pspsinfo.**

PIO Toolkit

July 2022

PGE Wildfire + PSPS Toolkit

Overview

Portland General Electric (PGE) is preparing for the 2022 Wildfire Season and the possibility of proactive Public Safety Power Shutoffs (PSPS) as a tool to help protect lives and property—like we did in the Mt. Hood corridor during the September 2020 wildfires that swept across Oregon.

This year, parts of 10 areas in communities we serve are at higher risk for Public Safety Power Shutoffs, including:

1. Mt. Hood Corridor/Foothills
2. Columbia River Gorge
3. Oregon City
4. Estacada
5. Scotts Mills
6. Portland West Hills
7. Tualatin Mountains
8. North West Hills
9. Central West Hills
10. Southern West Hills

A map of those PSPS areas is at portlandgeneral.com/wildfireoutages. That page is available in English and Spanish and includes a link to portlandgeneral.com/psps-info for information and brochures about wildfire preparedness and information about PSPS's in Arabic, Burmese, Chinese (simplified and traditional), Farsi, Japanese, Korean, Romanian, Rohingya, Russian, Somali, Swahili, and Vietnamese. Our customer service advisors can also assist customers in 200+ languages.

While we have sectioned off our system to reduce the number of customers who may be impacted by a PSPS, and we are communicating broadly and directly to all who may be impacted, we would appreciate your help encouraging communities to plan and prepare.

You may use the information below on your website, in newsletters and on your social media channels. In the event that we experience extreme weather conditions that may lead to a PSPS, PGE will share information over numerous channels, including via portlandgeneral.com, PGE's social media channels, through FlashAlert and outreach to PIOs, Public Safety Partners and media in affected areas.

If you have any questions about these materials or want to make sure you're on our PIO contact list, please contact PGE via PGECommunications@pgn.com.

Wildfire Brochure

You may print and share the document attached to your email titled *PGE 2022 Wildfire + PSPS One Pager May* or post it on your website. It provides an overview of PGE's year-round focus on wildfire protection and steps customers can take to get prepared. It also includes an explanation of Public Safety Power Shutoffs, when they are called and what to expect.

Web Copy

As Oregon's weather gets hotter and drier, the possibility of wildfires and a Public Safety Power Shutoff is increasing. If you're a PGE customer, learn how to stay in the know, make a summer outage kit and a plan. Check PGE's interactive map to see if your home or business is in an area where PGE may proactively shut off power to protect public safety. Visit portlandgeneral.com/wildfireoutages.

Newsletter Copy

Hot and dry weather could lead to a Public Safety Power Shutoff, or PSPS.

As Oregon's weather changes, the summer months bring increased risk of fires. Everyone has a role to play when it comes to being prepared. If you're a PGE customer:

- ***Stay in the know** by updating your email address and phone number on your PGE account so they can stay in touch in the event of an outage.*
- ***Create an outage kit** by gathering what you'll need to keep employees, customers and your family safe if power goes out. Make sure your employees and family members know where to find it.*
- ***Make a plan** to keep your business or family safe during an outage, especially if a medical condition or water for livestock or crops requires electricity. Know where you'll go if you need to relocate.*

Social Media Copy

PGE is posting wildfire preparedness information on Twitter (@PortlandGeneral), Facebook (@PortlandGeneralElectric) and Instagram (@PortlandGeneral). Posts are available in English and Spanish.

Please use the links below to retweet on Twitter, share on Facebook and/or share to your organization's stories on Instagram. Feel free to tag us!

Also, please note that in the event we call a PSPS, we will share updates on Facebook, Instagram and Twitter and would appreciate your amplification.

Social Posts to Amplify

Please consider liking and sharing these posts on Facebook, retweeting PGE posts and sharing PGE posts as Instagram stories.

- Post on 5/11: Summertime means Prep Time! Fire Season is here – now is the time to start thinking about the proactive steps you can take to best prepare for the potential of wildfire and corresponding power outages. Learn more: bit.ly/3F4nbCm

  Twitter:
  https://twitter.com/portlandgeneral/status/1524426615660453889?s=20&t=1Bbyv8rEtWnO-vdG2_kh4w
  Facebook:
  https://www.facebook.com/PortlandGeneralElectric/posts/5873100286050493
  Instagram: https://www.instagram.com/p/CdbK1tguYks/?utm_source=ig_web_copy_link

- Post on 5/18: As Oregon's weather gets hotter and drier, wildfires can hit suddenly and grow quickly. NOW is the time to confirm your contact information is up to date in our system so that we can alert you ahead of, and throughout, potential wildfire outages.

  Twitter:
  https://twitter.com/portlandgeneral/status/1526963325371826176?s=20&t=1Bbyv8rEtWnO-vdG2_kh4w
  Facebook:
  https://www.facebook.com/PortlandGeneralElectric/posts/5893798357314019

- Post on 5/25: When wildfires hit and electricity outages occur, what's your plan? With a little planning, we can all be ready for Wildfire Season together.

  Twitter: https://twitter.com/portlandgeneral
  Facebook: https://www.facebook.com/PortlandGeneralElectric
  Instagram: *https://www.instagram.com/portlandgeneral/*

- Post on 6/1: For us, being prepared is a year-round effort to protect people, property, and natural environments. Our crews regularly inspect our poles and equipment and make necessary modifications or replacements to reduce the risk of a spark.

  Twitter: https://twitter.com/portlandgeneral
  Facebook: https://www.facebook.com/PortlandGeneralElectric
  Instagram: *https://www.instagram.com/portlandgeneral/*

Next Steps

As we move through Wildfire Season, additional toolkit content may be shared. Please reach out to PGECommunications@pgn.com if you have questions or need additional information and resources. We appreciate your help getting information out and raising awareness!

It's fire season. Be prepared.

Oregon's climate is getting hotter and drier, and that means wildfires can hit suddenly and grow quickly. If extreme weather conditions make it unsafe to keep our equipment on, we may need to turn off the power as a last-resort safety measure.

These outages, also known as a **Public Safety Power Shutoff (PSPS)**, could last several hours or multiple days, so it's important to be prepared.

You can find a map of areas that are at higher risk for safety-related outages at **portlandgeneral.com/wildfireoutages**.

Here's how you can prepare:

1 **Stay in the know** by updating your email on your PGE account so we can send you notices in the event of a safety-related outage.

2 **Create a summer outage kit** and make sure everyone in your home knows where to find it.

Some basic items include:

- Emergency phone numbers, including PGE Customer Service: 503-228-6322

  Our customer service advisors can assist you in 200+ languages.
- Flashlights or headlamps
- Battery-powered or hand-crank radio and clock or watch
- Battery-powered or hand-held fans
- Extra batteries
- Car chargers for cell phones, laptops and/or tablet computers
- Bottled water for people and animals (if you rely on electricity to pump water)
- Frozen cold packs or water frozen in bags or plastic bottles (keep ready in your freezer)

3 **Make a plan** to keep your family and your home safe during an outage.

- Plan ahead to relocate with a friend, family member or to a shelter, especially if you have a medical condition that requires electricity or if you'll need to work or learn from home during an outage.
- Plan for medical needs so you can still power medical equipment during an outage and consider enrolling in our Medical Certificate program. This will help us proactively communicate with you about outages. Visit **portlandgeneral.com/medical** or call 503-612-3838 to learn more about the program.
- Consider buying a backup generator and follow manufacturers' guidelines for its safe operation.
- Plan for feeding and watering pets or livestock if you rely on an electric pump for water.
- Get more information from your county's website or the **National Fire Protection Association**, the **Red Cross** and **Ready.gov**.

Find additional tips on how to get prepared at **portlandgeneral.com/prepare**.

Appendix 8: Summary of Input from Public Safety Partners and Lessons Learned Captured During the 2022 Fire Season

The following improvement plan includes a set of recommendations for identified actions that are based on observations presented in PSPS Tabletop AAR, Public Safety Partners communication conference calls, and September 2022 PSPS AAR. As appropriate, these actions have been incorporated throughout the 2023 WMP.

Core Capability	Objective ID	Objective
Public Information and Sharing	A	Identify what sequential and iterative notifications need to be made, the process to be taken, and who will support notifications.
	B	Identify customer communications needs and conduct appropriate stakeholder outreach.
Operational Coordination	C	Determine how the Corporate Incident Management Team (CIMT) is activated and structured.
	D	Identify key points of coordination with jurisdictional Emergency Operations Centers (EOCs).
Intelligence and Information Sharing	E	Identify what data and information are required to support decision making including identification of specific information and data products.
Operational Coordination	F	Identify primary and alternate means of communicating with internal and external partners.
	G	Identify communications/data management failure points with limited or no redundancy that could lead to failures in informing customer information needs.

Recommended actions that have been added are:

Objective ID	Opportunities for Improvement	Recommended Actions
D	Confusion in difference of communications between emergent, PSPS, restoration, etc.	Designate specific communications for Preventative Outage Area initiation, PSPS, and restoration.
D, F	Need for enhanced coordination with external partners to identify required information and updates needed during a PSPS.	Create unique templates for critical Public Safety Partners with partner input.
G	Public Safety Partners asked to expand the socialization of the PSPS plan with external partners.	Develop and socialize external facing PSPS plan elements (e.g., PSPS Bell Curve) that can be aligned with or incorporated into Public Safety Partner operational plans.

Objective ID	Opportunities for Improvement	Recommended Actions
A	Public Safety Partners identified need to coordinate timing of messaging to minimize confusion and the impact of other emergency alerts.	Coordinate with public safety partners to align notification procedures including cadence of notifications and use of mass notification systems.
All	Internal and External observations regarding vocabulary and acronym confusion.	Formalize a shared vocabulary within internal and external partners to ensure consistent messaging.
A, B	Establish and socialize triggers signaling PGE staff to send updates to Public Safety Partners	Document list of triggers to send updates to public partners to include with PSPS Playbook and NEP Tracker.
E	PGE acknowledged it is helpful when customer resource centers publicize hours of service.	Coordinate with public safety partners around messaging provided at facilities providing assistance to impacted populations (e.g., cooling centers) to support consistency and alignment of messaging
D	Align PSPS response, with cadence of communications withing the CIMT structure.	Align PSPS response in PSPS Playbook and with reference to the timing a news cycle.

The following table summarizes Lessons Learned from the September 2022 PSPS event in PGE's service territory:

Strengths	
Crisis Communications	PGE demonstrated a sincere commitment to communicate and coordinate with external partners.
Whole Community	Stakeholder communications were robust and comprehensive
	On-the-fly adjustments to community support strategies were effective
	Working collaboratively with PGE, some counties stood up their own CRCs at public locations, while PGE donated supplies to these locations for distribution to impacted communities
Operations	Additional recloser installations prior to the event enabled PGE to reduce the September 2022 PSPS event's customer impacts
	The expanded (for 2022) network of PGE weather stations provided an accurate view of meteorological conditions closer to PGE infrastructure when compared to other weather stations in the regional network
Community Resource Centers	Customers were grateful that PGE was present—CRCs are invaluable during PSPS events and a positive expression of PGE's care for the community

Opportunities for Improvement	
Crisis Communications	Advise and support Public Safety Partners to host a workshop to clarify cross-jurisdictional coordination responsibilities for alerts and warnings.
	PGE and Public Safety Partners should evaluate the use of WEA for PSPS events and define policies and agreements to facilitate its successful and beneficial deployment and reduce "overspray" confusion for notification recipients
Operations	Define additional internal controls for PSPS Areas to more precisely align appropriate PSPS boundaries and actual outage areas.
	Invest in additional tools and equipment to allow more targeted and automated control of PSPS Areas
	Update PSPS Area data to include all critical facilities with consideration for seasonality such as back-to-school dates.
	Designating additional Preventive Outage Areas, in real-time, created communications, operational, logistical and community support challenges.
	During future PSPS events, Ops will use QEWs for patrol crews; field weather observations, however, could be conducted by classifications other than QEWs.
	Cutsheets should be finalized as far as possible in advance of the PSPS event and should be named by feeder and by HFRZ. During the September 2022 PSPS event, crews had to do a lot of sorting through the cutsheets to identify the feeders that needed to be de-energized for each zone; each cutsheet should include a list of feeders within the HFRZ
Whole Community	Establish and document clear lines of responsibility between PGE and Public Safety Partners for CRCs, locations and information sharing.
	Evaluate the use of Wireless Emergency Alerts for PSPS events, with our Public Safety Partners, to reduce "overspray" confusion for notification recipients.
	Assess options to improve the PSPS map functionality and simplify the customer experience
Community Resource Centers	Review site locations using updated criteria and finalize contracts for all locations.
	Formalize CRC volunteer strategy, templates, and training.
	Supplemental employees signed up and trained in advance of the PSPS event.
	Renew contract with CRC vendor for 2023 wildfire season.
	Incorporate vendor recommendations into contract.

	Plan prior to fire season for worst-case scenario – identify CRC locations and ensure that adequate MRUs and supplies are available even if all 10 HFRZs are impacted by a PSPS event

Appendix 9: PGE Wildfire Risk Assessment Overview & Process

PGE consults with wildfire risk experts to model fire behavior while also benchmarking its risk methodology/modelling and data with local and international wildfire programs. Key terms in this process are identified below.

Ignition Potential Index

The Ignition Potential Index (IPI) is a relative measure of the propensity for weather conditions and fuel characteristics at a given location to result in a utility-related wildfire ignition that escapes initial suppression efforts to become a large and potentially damaging fire. PGE models the potential for a wildfire ignition as a function of wind speed, fuel dryness, and heat per unit area, using a model patterned after the California Public Utilities Commission's electric utility Ignition Index and Utility Threat Index. The model derives its base weather observations from gridMET, a historical 4-km resolution, gridded daily weather dataset; PGE applies downscaling and bias-correction algorithms to increase model precision and weather data accuracy. The following sections provide additional details regarding the weather factors considered in PGE's Ignition Potential Index model.

Wind Speed

PGE explored the use of two gridded historical wind speed datasets (gridMET and National Renewable Energy Laboratory (NREL)) in its Ignition Potential Index model. Neither dataset alone was sufficiently detailed to allow PGE to determine the influence of wind speed on the potential for a utility-caused ignition to result in significant fire damage. The gridMET dataset provides detailed daily wind speed grids but includes bias on annual timescales relative to other national products with finer spatial resolutions. PGE corrected this bias using the NREL annual mean wind speed dataset (Draxl et al. 2015) by deriving a daily calibration factor from the overlapping time periods of the two datasets (2007-2013). This approach allows the model to coordinate wind speed and dryness observed in gridMET using the precision of the NREL dataset. The bias correction factor was derived by dividing the mean annual NREL wind speed by the average annual gridMET wind speed during the overlapping time periods. This factor was then applied to daily gridMET wind speeds.

Schroeder Probability of Ignition

Schroeder Probability of Ignition ([SPI], Schroeder 1969) is a long-established measure of the likelihood that a competent ignition source will result in a fire start. SPI is a function of fuel temperature and moisture content. By making some simplifying assumptions, PGE calculates SPI from air temperature and relative humidity, both of which are standard weather variables included in historical summaries and weather forecasts (such as gridMET), and both can be adjusted adiabatically (occurring without loss or gain of heat) for elevation.

Heat Per Unit Area

Heat per unit area (HPA) is a measure of the heat content of the fuelbed (kJ/m2). For surface fuels, HPA is largely a function of the surface fire behavior fuel model (fuel loading by size class and

component). For crown fires, HPA also includes the proportion of canopy fuel expected to be involved in a fire.

For a given fuel complex, HPA varies with wind speed and fuel moisture content. PGE classified each day in the record into one of 27 weather types, then computed Daily HPA using a proprietary version of the FlamMap fire modeling system as a function of each cell's fuel characteristics and weather type.

During wildfire events, higher HPA values manifest in greater flame length and increased resistance to firefighter control. HPA can vary by several orders of magnitude. PGE's IPI model takes the square root of HPA to obtain an estimated flame length (flame length is roughly the square root of fireline intensity).

Conditional IPI

Conditional Ignition Potential Index (cIPI) provides PGE with a modeled representation of expected IPI for each weather type studied. The daily IPI dataset provides an assessment of fire potential based on historical observations; however, not all potential weather conditions were represented for each location in the analysis area. PGE therefore created a set of Ignition Potential indices applicable for future weather observations organized by the weather-type classification used throughout this analysis.

PGE applied this general IPI calculation with the following customizations: To calculate localized wind speed, PGE applied the downscaling factors developed to calibrate predominant winds to local, terrain-influenced wind speeds at the mid-point wind speed of each weather type. PGE calculated a mean SPI for each fuel moisture class using the daily historical record. For moisture classes with fewer than 50 observations in the historical record, PGE incorporated the SPI observations of the nearest moisture class to increase the sample size. This was necessary primarily in the northwest corner of the analysis area, where the driest moisture types rarely, if ever, occur in the historical record. PGE applied the same supplemental data approach to model the mean Large Fire Probability (LFP) for each moisture class as well.

Weather Type Probabilities

Weather type probabilities (WTP) are a set of weighting factors derived from the IPI within each weather type relative to the total IPI for a given raster cell. Rasters are matrices of cells organized into rows and columns or grids, where each cell contains a value representing information, such as temperature. Rasters are often displayed as data layers along with other geographic data on maps or used as the source data for spatial analysis.

WTPs integrate the relative ignition potential for that weather type and its relative frequency within the observed record. A weather type with high wind speed, high SPI, etc. will receive a high weighting according to the larger IPI value, but weather types with lower IPI values may also receive a higher weighting if they occur at high frequency.

Spatial Resolution

PGE used downscaling and smoothing to achieve a final cell resolution of 120 meters x 120 meters (3.56 acres). The fuel layers necessary for HPA are available at a 30-meter resolution. To resolve the spatial resolution issue, PGE resampled (using bilinear interpolation, a statistical method by which related known values are used to estimate an unknown value, using other established values located in sequence with the unknown value) the 30-meter HPA estimates for each of the 27-wind speed and fuel moisture combinations to the coarser resolutions of 120-meter and 4-kilometer (depending on the data set).

Smoothing

Data smoothing uses an algorithm to remove "noise" from a data set, such as one-time outlier data points, to allow important patterns to stand out and help the user predict trends. This relatively standard process allows PGE to resample coarse raster cells to a finer resolution—for the IPI model, from 4-kilometer (gridMET native resolution) to 120-meter. PGE used an additional custom process to remove any visible artifacts of the original 4-kilometer resolution, to maintain the fidelity of the synoptic weather processes seen in the gridMET data while achieving spatial coherence with the other provided data products at the 120-meter resolution.

For WTP, the smoothing process included a re-normalization to verify the results and ensure that the weighting factors were still valid (a fraction of the total IPI and therefore all WTP values still summed to one for a given raster cell).

Downscaling

To assess the local effects of topography on weather, PGE downscaled gridMET weather data using adiabatic[18] relationships of elevation to temperature and humidity and modeled the local topographic effect on prevalent wind direction and speeds. For each 120-meter x 120-meter cell and day in the record, PGE adjusted the observed gridMET temperature by the relative difference in elevation between the gridMET 4-kilometer cell and the finer 120-meter cell. This also changed the relative humidity at the 120-meter cell under the assumption that the same absolute water content in an area persisted under variable elevation and temperature.

To assess localized wind speeds, PGE used the WindNinja modeling system (a fluid dynamics physics model that accounts for the effects of topography on wind speed and direction) to run simulations with the prevalent wind at the eight cardinal (indicating the numerical value) and ordinal (indicating the position of the value in a series) directions. This produced eight factors that modified the 4-kilometer wind speed to show the local effects of terrain at the 120-meter resolution. For each day in the record, PGE classified the wind direction to the nearest corresponding factor and adjusted the wind speed to produce a terrain-adjusted wind speed estimate at 120-meter resolution. After

[18] "Adiabatic" refers to a process in which no heat transfer takes place.

downscaling the temperature, humidity, and wind speed, PGE then calculated daily IPI at a 120-meter resolution.

Conditional Impact

Conditional Impact (CI) is a measure of the relative impact of a wildfire (i.e., loss), given that a fire has occurred. CI is a function of fire growth potential and the vulnerability of assets and resources in the area around potential source locations. Fire growth potential is a function of fuel, weather, and topography. Vulnerability is a function of the exposure and susceptibility of homes, resources, and assets across the landscape where the fire occurred.

Unlike IPI, CI does not lend itself to a deterministic (models that produce the same exact results for a particular set of inputs) mathematical solution. To generate CI, PGE applies fire growth modeling to specific ignition locations, then ties the spatial data within the final simulated perimeters back to the ignition location. After generating the final fire-perimeter event set, PGE's model overlays each simulated wildfire with spatial data representing the impacts of wildfire—conditional losses associated with high-value resources and assets.

PGE generalized the event-set results to produce a CI raster at 120 m that represents the tendency for fires originating in that area to impact resources and assets. Thus, PGE was able to model the potential for a wildfire to result in an urban conflagration (such as the 2020 Almeda Fire in Ashland) by including burnable urban fuel models within the appropriate weather types.

Wildfire Simulation

PGE conducted wildfire simulation modeling using the Minimum Travel Time (MTT) algorithm, called Randig. Randig models short duration burn periods under constant weather conditions, assuming no suppression effects. This assumption is appropriate for modeling extreme wildfire spread events, where fire weather and fire behavior can overwhelm suppression resources. PGE applied the Randig algorithm in iterative runs using the 216 unique weather types and other parameters shown in Table 2 (weather types were derived from gridMET weather data as described above).

The following table shows example inputs for the 216 weather types included in PGE's IPI model. Each set of parameters is repeated for each of the eight cardinal direction wind bins (0, 45, 90, 135, 180, 225, 270, 315), yielding a total of 216 unique weather types. These wind speeds are banded in 9 groups of 5 mph increments.

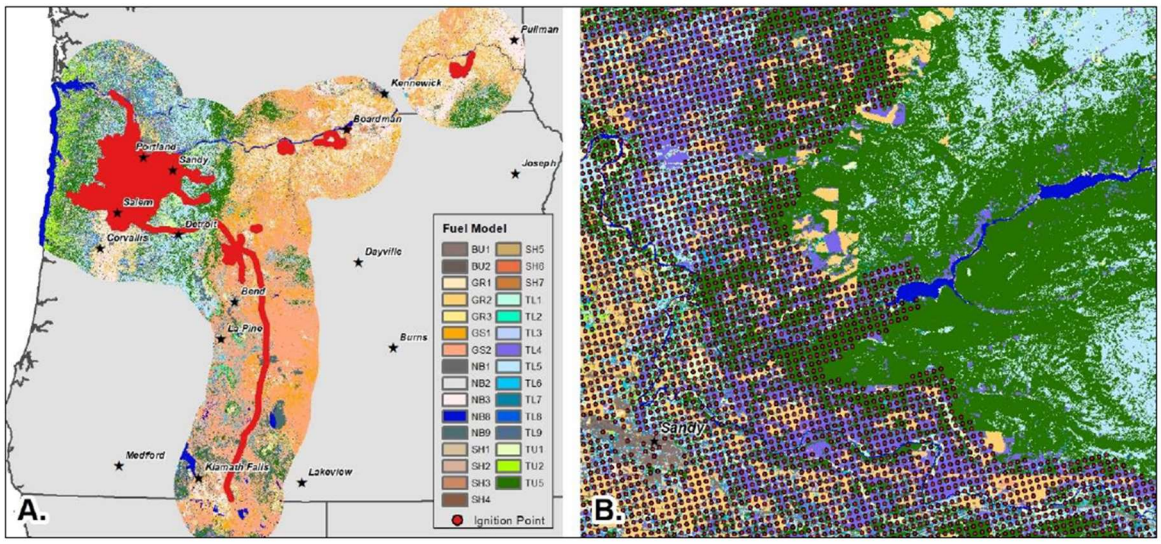
Example PGE Weather Types IPI Model Inputs

20-ft Wind Speed (mi/hr)	MC Class	1-hr MC	Live Herb MC	Live Woody MC	Duration (min)	Spot prob	Burnable Urban?
1	very dry	3%	45	80	60	10%	N
1	dry	5%	60	90	60	0%	N
1	moderate	8%	90	100	60	0%	N
5	very dry	3%	45	80	120	30%	N
5	dry	5%	60	90	120	15%	N
5	moderate	8%	90	100	120	0%	N
10	very dry	3%	45	80	180	50%	N
10	dry	5%	60	90	180	35%	N
10	moderate	8%	90	100	180	20%	N
15	very dry	3%	45	80	240	70%	Y
15	dry	5%	60	90	240	55%	N
15	moderate	8%	90	100	240	40%	N
20	very dry	3%	45	80	300	80%	Y
20	dry	5%	60	90	300	65%	Y
20	moderate	8%	90	100	300	50%	Y
25	very dry	3%	45	80	375	85%	Y
25	dry	5%	60	90	375	70%	Y
25	moderate	8%	90	100	375	55%	Y
30	very dry	3%	45	80	450	90%	Y
30	dry	5%	60	90	450	75%	Y
30	moderate	8%	90	100	450	60%	Y
35	very dry	3%	45	80	525	95%	Y
35	dry	5%	60	90	525	80%	Y
35	moderate	8%	90	100	525	65%	Y
40	very dry	3%	45	80	600	100%	Y
40	dry	5%	60	90	600	85%	Y
40	moderate	8%	90	100	600	70%	Y

The modeled weather types were further downscaled within each wildfire simulation by running Randig with both WindNinja and fuel moisture conditioning functionality. PGE used pre-calculated WindNinja grids representing terrain-adapted wind speed and direction, generated at 120 m resolution, and then up-sampled to 30 m resolution as inputs to Randig. The model applied 10 adjusted moisture contents to individual cells based on canopy cover and topography (slope and aspect).

PGE then applied the Randig algorithm to a lattice grid of ignition points across the analysis area, generating a 270 m grid of ignition points based on a one-kilometer buffer of PGE features within the analysis area. PGE removed certain points based on burnability characteristics; the resulting analysis yielded a total of 84,749 wildfire ignition points for simulation. Figure 4, below, depicts the overall extent of the wildfire simulation ignition points (Panel A) and a detailed view of the ignition lattice (Panel B) near the community of Sandy, Oregon. The red areas in the left-hand panel (left) show the general location of where ignition points are concentrated.

Figure 4: PGE Wildfire Simulation Modeling Results – Potential Ignition Points



PGE simulated each ignition point using each of the 216 weather types described above, at a 90m resolution, resulting in a total of 18,305,784 simulated fires. Modeling wildfire ignition potential at such a fine-scale resolution across such a large area is a computationally intensive exercise, occupying a series of Windows 10 machines with 48-thread CPUs for nearly 3,600 machine-hours.

Highly Valued Resources and Assets (HVRA) Impact Raster

PGE updated the Conditional Net Value Change (cNVC) or "Impact" raster using data produced originally for the Pacific Northwest Quantitative Wildfire Risk Assessment (PNRA)1. PGE adjusted response functions used in the PNRA assessment to remove the beneficial effects of fire, replacing positive values with zero. The final list of Highly Valued Resources and Assets (HVRA) includes (but is not limited to) People and Property, Timber, Wildlife, Infrastructure, and Surface Drinking Water.

All data inputs, including response to fire and relative importance weights, were leveraged from PNRA1, with one exception: the dataset and methodology used to represent housing-unit density was updated in the People and Property HVRA to use the Housing-Unit Density (HUDen) data built for the Wildfire Risk to Communities Project (Scott et al. 2020). This dataset uses population data at the census block level and Microsoft Building footprints to allocate people and homes spatially within a census block.

Additionally, to account for the potential for wildfire spread into urban areas (mapped by LANDFIRE[19] as non-burnable), PGE used an iterative smoothing process to spread distributions of flame-length

[19] LANDFIRE (Landscape Fire and Resource Management Planning Tools), is a shared, government-developed program used by the wildland fire management programs of the U.S. Forest Service and U.S. Department of the Interior, that uses landscape-scale geospatial products to support cross-boundary planning, management, and operations.

probabilities into non-burnable land cover (other than open water or ice) within 1.5 km of contiguous, burnable land cover at least 500 ha in size. These areas would otherwise have a zero probability of burning in the fire model (FSim). This allowed PGE to recalculate cNVC using response functions and relative importance values assigned by the PNRA1 project, while accounting for wildfire spread into urban areas.

Finally, PGE applied a fractional exposure value based on the distance from the burnable fuel (the source of exposure) to account for the decreased exposure of housing units within the 1.5 km distance from burnable fuel. PGE adjusted housing-unit density exposure by multiplying HUDen by the exposure mask value in each pixel. The final People and Property HVRA included housing units directly exposed to wildfire (located in burnable pixels) as well as those indirectly exposed to wildfire (within a 1.5 km distance of burnable fuel).

PGE applied these modified response functions to all other HVRA cNVC layers; the layers were otherwise unaltered from the PNRA1 project. The final cNVC map (summed for all HVRA) serves as the impact raster necessary for the spatial intersection with the simulated fire perimeters—it provides the key to unlocking and understanding the HVRA impact simulations.

Impact Raster Overlays

PGE ran an overlay script to sum the total cNVC within each simulated wildfire perimeter. The total cNVC reported within each perimeter (including spot fires) was attributed back to the original ignition location. This allowed PGE to apply cNVC values (representing the estimated HVRA impacts for each of the 216 modeled weather conditions) to each of the original 84,749 modeled (simulated) ignition points.

Rasterization

Once it had attributed impacts by fire simulation to the corresponding ignition locations, PGE applied a smoothing process to convert the vector datatype to rasters, while also gap-filling the vector data. PGE first converted each set of vector ignitions for a given weather type to a 120 m raster, using an inverse distance weighting (IDW) algorithm using the four nearest ignition points, an exponential distance weighting of 1.5, and a maximum search distance of 1,500 m. The maximum search distance was intentionally large to fill in data gaps created by the original ignition lattice falling on areas of non-burnable fuel cells, accounting for fires that do not spread beyond the ignition cell.

Wildfire Threat Index (WTI)

PGE calculates the Wildfire Threat Index (WTI) as the product of conditional IPI, CI, and the weighting of the WTP, which were calculated at the original gridMET resolution and smoothed to the coincident 120 m resolution.

The resulting WTI raster and vector data provide an estimate of relative wildfire threat across the analysis area for the range of weather conditions specified. As the product of IPI and CI, WTI allows PGE to identify locations with the greatest combination of utility-related ignition and resulting wildfire damage potentials.

Conditional Wildfire Threat Index

The overall WTI integrates the results from all 216 weather types, while a conditional WTI (cWTI) for each individual weather type provides an estimate of wildfire threat for specific weather conditions. The cWTI is simply the product of the individual weather type IPI and CI.

PGE Wildfire Risk Assessment Results by HFRZ

Zone #		1	2	3	4	5	6	7	8	9	10
Asset Density	Relative Commercial and Res Meter Count	6	2	5	3	4	8	5	4	3	3
Asset density (per SqMi)		252	147	260	194	161	497	165	88	77	51
	Share of all HFRZ assets	32	3	6	214	12	3	9	4	7	12
Land area SqMi		61	10	11	34	34	3	25	22	42	111
Weather Threat/ Pyrologix Calculations	Probability of Exceeding Manual Control	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Extreme Burn Probability		.2-.4	.2-.4	.2-.4	.2-.4	.2-.4	.2-.4	.2-.4	.2-.4	.2-.4	.2-.4
	Heat Intensity per unit area - Scenario 18	10523	13221	7778	7537	7069	8798	8570	12520	12979	12774
WTI MEAN - Scenario 118		2793110	14649487	19637320	20570382	11673496	7232637	4728634	4627615	17186568	35309464
	CI MEAN - Scenario 118	315	106	582	496	305	119	162	114	263	163
IPI MEAN - Scenario 118		80	87	82	78	97	134	141	184	218	221
Accessibility / Terrain	Fire station within 5 min	4	1	3	2	1	5	1	1	1	2
Road condition vulnerability		4	0	0	1	1	0	1	1	1	3
	Slope – Mean	477	308	129	351	319	256	231	183	176	195
Aspect – Mean		260	263	324	283	298	92	199	168	104	112
Social Indicators	% households 200% below fed poverty line	25	26	18	23	16	8	17	16	22	37
Household Disability Composition		18	13	12	15	14	8	13	11	15	20
	Hispanic or Latino	7	8	2	3	3	4	5	9	5	7
Age 65+		25	17	20	18	22	16	20	13	18	16
	Housing/transportation vulnerability	30	30	20	46	35	12	56	30	32	78
Overall social vulnerability		30	35	22	37	34	5	11	16	30	65
Ecological & Cultural Vulnerability	Critical Habitats	2	3	1	2	3	1	3	2	2	2
Cultural/historical/protected areas		3	3	3	3	2	2	1	1	2	3

Wildland / Urban Interface	% in WUI	90	75	100	90	20	85	70	70	50	50
USDF WF Risk to Communities		1778	657	146	7	69	75	28	6.3	6	7
Outage History	June-Sept outages 2017-2021 on UG	101	28	41	20	9	15	13	7	16	18
June-Sept outages 2017-2021 on UG - avg duration		2960.405	575.72	430.8725	336.616	1165.777	453.5525	257.5067	184.19	1118.426	342.285
	June-Sept outages 2017-2021 on OH	246	44	77	130	105	55	90	55	203	83
June-Sept outages 2017-2021 on OH - avg duration		1940.033	921.71	292.6325	722.6057	1259.567	659.32	547.1725	317.1633	391.9871	277.6914

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Attachment V-2.
Oregon Public Utility Commission (PUC) Order 23-221

Attached as a separate PDF

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Exhibit W

Generation of Solid Waste and Wastewater

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Table of Contents

Acronyms and Abbreviations

ASC	Application for Site Certificate
BCP	Boardman Coal Plant
BESS	battery energy storage system
BMP	best management practice
Certificate Holder / PGE	Portland General Electric Company
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
ESCP	Erosion and Sediment Control Plan
EPA	U.S. Environmental Protection Agency
gpd	gallons per day
Li-ion	lithium-ion
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
ODOE	Oregon Department of Energy
RCRA	Resource Conservation and Recovery Act
SPCC	Spill Prevention, Control, and Countermeasure

1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

Exhibit W provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(w) in support of RFA 4. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate (ASC), previous RFAs, and Oregon Department of Energy (ODOE) Final Orders to demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate Conditions and the approval standard in OAR 345-022-0120.

2.0 Description of Solid Waste and Wastewater Generation – OAR 345-021-0010(1)(w)(A)

OAR 345-021-0010(1)(w) Information about the applicant's plans to minimize the generation of solid waste and wastewater and to recycle or reuse solid waste and wastewater, providing evidence to support a finding by the Council as required by OAR 345-022-0120. The applicant must include:

OAR 345-021-0010(1)(w)(A) A description of the major types of solid waste and wastewater that construction, operation and retirement of the facility are likely to generate, including an estimate of the amount of solid waste and wastewater;

As detailed in the following sections, although the proposed changes provide for additional solid waste and wastewater needs for the Facility, Portland General Electric Company (Certificate Holder) can still comply with all Site Certificate conditions for waste minimization previously adopted by the Oregon Energy Facility Siting Council (Council) for compliance with OAR 345-022-0120. Site Certificate Conditions[1] applicable to solid waste and wastewater and that apply to the Carty Solar Farm[2] include:

- Condition 6.2: Provide portable toilets during construction.
- Condition 6.3: Implement Construction Waste Management Plan.
- Condition 6.22: Compliance with sewage disposal installation setbacks.
- Condition 6.24: Compliance with Morrow County Solid Waste Management Ordinance.
- Condition 9.1: Work in compliance with a final Erosion and Sediment Control Plan (ESCP) as required under the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Discharge General Permit 1200-C (see Exhibit I for further information).
- Condition 10.22: Implement Operations Waste Management Plan.
- Condition 10.24: Discharge sanitary wastewater in compliance county permit requirements.
- Condition 10.28: Compliance with Water Pollution Control Facilities Permit(s).
- Condition 10.32: Submit plans to ODEQ prior to constructing or modifying wastewater management treatment and disposal facilities.

2.1 Solid Waste

The following sections identify the types and quantities of solid waste anticipated to be generated throughout the Amended Carty Solar Farm. Solid waste disposal for the Amended Carty Solar Farm will be provided through a private contract with local commercial haulers.

2.1.1 Construction

Construction of the Amended Carty Solar Farm will generate a small amount of non-hazardous solid waste, which are handled by a local solid waste hauler and are managed through the implementation of measures outlined in the Construction Waste Management Plan (Site Certificate Condition 6.3). The types of solid waste will be similar to those from construction of the previously approved Carty Solar Farm and associated infrastructure, given that the same types of construction materials will be used (see Exhibit G). Note that the natural gas-fueled combined-cycle unit (Unit 1) is already operating at the Facility; thus, the materials associated with the constructed portions of the Facility are not repeated for the purposes of this analysis. In addition, the Certificate Holder

[1] Site Certificate Conditions 6.25 and 10.30 related to waste minimization are proposed for removal. See Section 6.0 of the Division 27 document, which addresses why these conditions are not applicable to the Amended Carty Solar Farm modifications as proposed by RFA 4.
[2] Third Amended Site Certificate for the Carty Generating Station (July 2022).

proposes the Amended Carty Solar Farm as a complete reconfiguration and not as an addition to the 50-MW approved Carty Solar Farm. Therefore, the quantity of materials previously documented in RFA 1 for the approved Carty Solar Farm are not repeated and are replaced by the quantities provided in this exhibit.

Waste materials generated through construction of the additional solar modules, BESS, and associated infrastructure will primarily consist of scrap metal (e.g., wire and rebar scraps), dirt and rock spoils, wood, concrete, concrete waste and other packaging materials, which are consistent with materials previously considered by Council. It is estimated that cumulative Amended Carty Solar Farm construction will produce approximately 95,000 cubic yards of waste during active construction, estimated to span approximately 24 months, which will be disposed of following the Construction Waste Management Plan consistent with Site Certificate Condition 6.3. Overall, the solid waste types and quantities from construction are typical of any large-scale construction project. To accommodate solid waste produced during construction, it has been conservatively estimated that 12 large dumpsters (8 tons each) will be required every other day during active solar module installation; otherwise, 9 dumpsters per week before and after solar module installation will be required.

Construction and grading of the access roads proposed inside the perimeter security fencing for the solar areas are expected to produce negligible amounts of dirt and rock spoils that will need disposal, because cut and fill measures are expected to balance the need for and use of soils. Foundation excavations for the solar inverter and transformer stations, BESS, and proposed collector substation are not expected to produce significant amounts of dirt and rock spoils. The majority of these materials will be spread over areas previously disturbed during construction. Materials will only be spread as appropriate, with adequate measures for soil conservation and erosion and sediment control, as required by the ESCP (Site Certificate Condition 9.1). A draft of the ESCP is included as Attachment I-1 to Exhibit I. When it is not appropriate to spread materials over previously disturbed areas, materials will be hauled to appropriate disposal sites within the Amended Carty Solar Farm; the location of such sites will be determined on an as-needed basis during construction. If off-site soil disposal is necessary, the contractors disposing of the material will obtain a signed agreement with the party receiving the earth materials and will confirm that the disposal sites have been inspected as to not disturb sensitive environmental resources.

Construction of the Amended Carty Solar Farm will create some concrete waste from the construction of foundations for the solar inverter/transformer stations, BESS, and collector substation. Note that for the construction of foundations, the PGE will buy concrete directly from licensed suppliers (i.e., with a valid water use license) in the area; an on-site batch plant is not proposed at this time. Concrete truck chutes may need to be washed down at each foundation site to prevent the concrete from hardening within the chutes. In these cases, the concrete wastewater will be washed out into a dedicated concrete washout area located within each foundation excavation consistent with Site Certificate Condition 6.3. The soil used to construct the washout area berms (along with any concrete solids) will be buried as part of the foundation backfill. This method for concrete washout water management is a regularly utilized best management practice

(BMP) for construction of solar generation facilities within the area and has been accepted by the ODEQ.

2.1.2 Operation

The increased number of solar modules, BESS, and related infrastructure proposed with the Amended Carty Solar Farm will not change the way that operational solid waste will be handled from what the Council previously considered for the Facility. An insignificant amount of solid waste is expected to be generated during the operations and maintenance (O&M) of the Amended Carty Solar Farm. This waste may include equipment and components that are replaced, packing materials for replacement components, and waste typical of a small office. It is estimated that no more than 8 cubic yards of waste will be produced monthly during operations, to be disposed of at the Finley Butte Landfill or Columbia Ridge Landfill, as identified in the ASC. The waste will be handled consistent with the Morrow County Solid Waste Management Ordinance (Site Certificate Condition 6.24) and according to the Operations Waste Management Plan (Site Certificate Condition 10.22).

The battery energy storage system (BESS) may also generate incidental waste from repair or replacement of electrical equipment. The BESS will require augmentation to compensate for degradation. Augmentation will add additional batteries to maintain output; but degraded batteries would not be removed from service. For this analysis it is assumed that batteries are only removed due to needed repair or replacement during operations, and replacement of batteries for degradation would only happen at decommissioning.

For the replacement of lithium-ion (Li-ion) batteries during operation, the Certificate Holder will follow the handling guidelines of 49 Code of Federal Regulations 173.185 (Department of Transportation Pipeline and Hazardous Material Administration) related to the shipment of Li-ion batteries. Licensed third-party battery suppliers will be responsible for transporting batteries to and from the Amended Carty Solar Farm in accordance with applicable regulations. Spent batteries will be disposed of at a facility permitted to handle them, in compliance with applicable Resource Conservation and Recovery Act (RCRA) and Toxic Substances Control Act regulations administered by the U.S. Environmental Protection Agency (EPA) or the ODEQ. Note that used Li-ion batteries may contain hazardous waste and will be handled and disposed of per the most up-to-date guidelines at the end of their life.

Repair or replacement of the solar modules and associated electrical equipment could generate incidental waste. However, a solar module typically lasts at least 25 years without significant degradation in function, and will be replaced infrequently, if at all. Operation of the solar modules and associated infrastructure will not result in a significant amount of solid waste.

2.1.3 Decommissioning

The increased number of solar modules and BESS will not change the way that decommissioning solid waste will be handled from what the Council previously considered. The anticipated working

life span of the Amended Carty Solar Farm is 25 years, after which time the Amended Carty Solar Farm may be extended, repowered, or decommissioned. Amended Carty Solar Farm decommissioning is discussed in greater detail in Exhibit X. In the event the Amended Carty Solar Farm would be decommissioned, and the site restored to a useful, non-hazardous condition for other planned uses, the amount of solid waste can be inferred from the materials inventory provided in Exhibit G. Should the Amended Carty Solar Farm be decommissioned, the components will be disassembled, and the materials will be recycled, sold for scrap, or taken to a landfill following the requirements that will be outlined in a retirement plan, per Site Certificate Condition 15.4. Such components and equipment include the solar modules, steel mounting racks, posts, and trackers; inverters, transformers, and battery energy storage modules; concrete and aggregate used for foundations and road construction; the proposed substation; and other associated structures. Ancillary components, such as concrete foundations and gravel, will be removed in a manner similar to the methodology approved in the ASC. Concrete foundations would be cut and removed to a minimum depth of 3 feet below ground. Underground cables would typically be left in place, as removing them would cause unnecessary habitat disturbance. Metals and electrical components are expected to be recycled as scrap rather than disposed of in a landfill wherever possible. The portions of concrete foundations that are removed would be disposed of as construction waste or crushed and disposed of at an appropriate location onsite (e.g. areas that already contain crushed concrete from the demolition of the Boardman Coal Plant). Otherwise, excess concrete is planned for incorporation into the foundations as opposed to disposal. Transformers and other substation equipment would be removed to be reconditioned for use elsewhere or recycled as scrap metal.

The decommissioning of the BESS will involve disposing of battery components at an off-site facility designed and approved for disposal or recycling of batteries by licensed third-party battery suppliers, who will be responsible for transporting batteries to and from the Amended Carty Solar Farm in accordance with applicable regulations. The batteries will be disposed of at the time of decommissioning in the same manner described above for operational replacement. Ancillary components of the BESS will also be removed in a manner similar to the methodology of the other concrete pads.

2.2 Wastewater

Wastewater generated by the Amended Carty Solar Farm during construction will be from the following construction activities: portable toilets, dust abatement, mixing of concrete, concrete equipment washwater, and concrete washout water. Wastewater generated by the Amended Carty Solar Farm during operation will be from the following activities: wastewater produced from the proposed O&M building and from periodic washing solar panels. This section discusses how each of these types of wastewaters will be handled throughout the life of the Amended Carty Solar Farm. The nature of the Amended Carty Solar Farm is such that it will not produce industrial wastewater.

2.2.1 Sanitary Wastewater

Sanitation during construction activities will be addressed through the provision of portable toilets located throughout the Amended Carty Solar Farm construction area at locations that will be determined by the construction contractor prior to and during construction, as described in the ASC and subsequent RFAs. Portable toilets will be provided by a licensed subcontractor, who will be responsible for servicing the toilets at regular intervals and disposing of wastewater in accordance with local jurisdictional regulations (Site Certificate Condition 6.2). The construction contractor will ensure that a sufficient number of toilets are provided, and that the licensed subcontractor complies 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 Statute 466.005.

The proposed O&M building will include toilets for use by maintenance staff during operations. The sanitary sewage will be collected and treated by the Facility's existing sanitary sewage system, which sends sewage the existing Carty septic system in compliance with county permit requirements (Site Certificate Conditions 6.22 and 10.24). The estimated 250 gallons per day (gpd) is estimated from the proposed O&M building. Once the number of additional employees is determined, if the existing system capacity is not sufficient a septic system alteration permit would be obtained from the Umatilla County Public Health Department, which issues alteration permits for septic systems in Morrow County, to increase the capacity of the existing septic system.

2.2.2 Construction

The Certificate Holder expects the volume of wastewater to be generated during construction to be approximately 81,040,000 gallons under worst-case conditions through all phases of construction. the majority used for dust control. Dust abatement and control will result in by far the most wastewater during construction (approximately 80,000,000 gallons). Other construction activities that will produce small amounts of wastewater include mixing of concrete, washing equipment and vehicles, and washing concrete trucks after delivery of concrete loads. No construction water will be discharged into wetlands, streams, and other waterways. Due to the dry conditions at the proposed Amended Carty Solar Farm and the relatively low rates of water use and application, it is expected that any excess water used during construction will be lost within or near the Approved Site Boundary through evaporation and infiltration.

The disposition of construction wastewater and the disposal of solar panel washwater during operations are allowed under the terms and conditions of the Facility's Water Pollution Control Facility (WPCF) Permit (100189) and subsequent Addendums 1 and 2, described in more detail in the next section below.

Water for dust control will be sprayed onto disturbed areas during construction and result in water loss primarily through evaporation and infiltration (Site Certificate Condition 9.3). Water trucks will be used to control dust generation throughout the construction site, in all disturbed areas including but not limited to foundation installations and trenching for collector lines in compliance

with Site Certificate Condition 9.3. Water for dust control and road compaction will be applied via tanker truck in a manner that avoids erosion and sediment discharge and is consistent with the best management practices presented in the NPDES 1200-C permit (Site Certificate Condition 9.1).

Wastewater will also be generated as concrete washout water produced during construction of foundations. Concrete truck chutes will be washed down at each foundation site to prevent the concrete from hardening within the chutes. Concrete wastewater will be handled as previously described, using BMPs for the construction, which have been accepted by ODEQ. Concrete wastewater will be washed out into a dedicated concrete washout area located within each foundation excavation and/or a dedicated concrete washout area centrally located (Site Certificate Condition 6.3). The soil used to construct the washout area berms (along with any concrete solids) will be buried as part of the foundation backfill (Site Certificate Condition 6.3).

Washing of vehicles and equipment to prevent the spread of weeds will also generate small amounts of wastewater. Vehicle and equipment washing will occur at the temporary construction areas, and wastewater from these activities will be covered by the general NPDES 1200-C stormwater permit (Site Certificate Condition 9.1). The estimated amount of wastewater for vehicle and equipment washing is expected to be minor compared to overall Amended Carty Solar Farm water use. The amount of water used for vehicle and equipment washing will be sufficiently small that it will not create runoff but will instead infiltrate into the ground.

Stormwater is not considered to be wastewater. Stormwater will be managed in accordance with the terms of the NPDES 1200-C stormwater permit (Site Certificate Condition 9.1). Stormwater will be diverted around construction sites as much as possible. Precipitation that falls on a construction site will be allowed to run back to natural drainages, with erosion and sedimentation control systems in place to maintain water quality.

2.2.3 Operation

Wastewater generated during operations will include sanitation at the proposed O&M building and solar panel washing. The disposition of sanitary sewer from the proposed O&M building is described above.

Operational wastewater sources will include periodic washing of the solar modules. Solar panel washing will continue to be in compliance with the existing Water Pollution Control Facilities Permit (Site Certificate Condition 10.28). The disposal of solar panel washwater is allowed under the terms and conditions of the Facility's Water Pollution Control Facility (WPCF) Permit (100189) issued May 2, 2013. ODEQ approved Addendum 1 to WPCF Permit 100189 on January 24, 2019, to allow construction and operation of a photovoltaic solar generating unit at the Amended Carty Solar Farm site. The issuance of Addendum 1 to WPCF Permit 100189 addressed Site Certificate Condition 10.28(ii) requiring PGE to demonstrate that ODEQ has issued a modified WPCF Permit 100189 that specifically addresses solar panel washwater.

The WPCF permit and Addendum 1 and Addendum 2 expired on April 30, 2023, but remain in effect until ODEQ acts on PGE's renewal application, which was submitted to ODEQ on February 28, 2023.

The renewal application primarily requests that ODEQ remove permit conditions that were applicable only to the operation of the Boardman Coal Plant, which is now demolished. The renewed WPCF permit will retain Condition 21 in Schedule A and Condition 1(e) in Schedule B, which allows for management and disposal of solar panel washwater by evaporation or infiltration as long as no soaps, detergents, or chemicals are added and outlines required monitoring after panel washing events.

As described in the Final Order for RFA 3, the WPCF authorizes wastewater disposal through evaporation and seepage of construction wastewater and the disposal of washwater for operational solar panel washwater.[3] Under Site Certificate Condition 10.28(ii) in the Third Amended Site Certificate, solar panel washwater is permitted to be discharged through evaporation or infiltration into the ground at the point of application and the use of chemicals, soaps, detergents and heated water is prohibited. No soaps, detergents, or chemicals will be used in the washwater.

The Certificate Holder will ensure that there is no runoff of washwater from the site or discharges to surface waters, storm sewers, or dry wells. No new operational wastewater sources will result from BESS operations.

2.2.4 Decommissioning

During retirement, wastewater will result primarily from dust control while restoring the site, if grading is required. If required, the Certificate Holder expects the volume of water for dust suppression during retirement to be less than the volume used during construction. The number of on-site workers, and generation and handling of sanitary wastewater, will be comparable to construction. Amended Carty Solar Farm retirement is discussed in greater detail in Exhibit X.

3.0 Description of Waste Management and Disposal Structures, Systems and Equipment – OAR 345-021-0010(1)(w)(B)

OAR 345-021-0010(1)(w)(B) A description of any structures, systems and equipment for management and disposal of solid waste, wastewater and storm water;

The Certificate Holder will comply with all applicable waste handling and disposal regulations on all lands associated with the Amended Carty Solar Farm. Solid waste will be stored in a manner that does not constitute a fire, health, or safety hazard until such waste can be hauled off for recycling or disposal, as appropriate. The following sections describe the handling and disposal of waste planned for the Amended Carty Solar Farm.

[3] Final Order on Request for Amendment 3, p. 77 (July 2022).

3.1 Construction

Construction will not add any new types of waste not previously contemplated for the Facility by the Council, and as a result, no new structures, systems, or equipment will be needed to manage and dispose of construction wastes that were not previously considered. All waste will be disposed of following the Construction Waste Management Plan (Site Certificate Condition 6.3). Standard construction waste bins will be kept on-site to keep construction debris until it is hauled off-site. Separate containers for small quantities of hazardous materials, such as oily rags or contaminated soil from minor spills, will be provided according to the contractor's Spill Prevention, Control, and Countermeasure (SPCC) Plan. As noted earlier, materials will be recycled as feasible.

Areas around infrastructure for the Amended Carty Solar Farm will be kept in an orderly condition throughout the construction period. Waste generated during construction will be temporarily collected at each construction site and then consolidated into larger disposal containers at the temporary construction yard(s). Disposal and recycling containers will be labeled by waste type to segregate materials as appropriate for recycling or disposal.

Disposal and recycling containers will be of adequate size, design, and number to handle the amount of waste being generated. Containers approximately 8 tons in capacity will be used to collect scrap metal, wood, and paper products, and other recyclable materials.

Solid waste generated during construction will be hauled away for recycling or disposal, as appropriate. Paper products and other materials—such as batteries, glass, metals, and plastic—will be recycled when practicable. As disposal and recycling containers reach capacity, they will be removed to disposal facilities that can handle these materials, and the containers will be replaced with empty units. Removal of the waste to appropriate disposal facilities will be done by a licensed waste hauler, under contract to the construction contractor (Site Certificate Condition 6.3). Licensed waste haulers must comply with OAR 340-093-0220 for transportation of wastes as well as the Morrow County Solid Waste Management Ordinance.

Soil and rock materials from foundation excavations will be spread within the temporary disturbance areas during construction or removed from the excavation site as soon as practicable. Most excess spoils will be incorporated into grading activities as fill material. Excess spoils would be a very small amount, and any excess spoils from excavation of the foundations will be spread out around the foundations. Disturbed soil and rock materials will be contained using appropriate BMPs as part of the NPDES 1200-C permit to prevent sedimentation release to local habitat. The construction contractor will arrange off-site disposal of excess soils if this should be necessary.

The construction contractor will submit a plan for approval by the Certificate Holder on how solid waste materials during construction activities will be reused, recycled, or disposed of in accordance with Site Certificate Condition 6.3. That plan will specify the number and types of waste containers to be maintained at construction sites and the temporary construction areas, and how wastes are to be segregated for recycling or disposal. It will also specify the names and locations of appropriate recycling and waste disposal facilities, collection requirements, and hauling requirements.

Sanitation during construction activities will be addressed through the provision of portable toilets. Other types of wastewater generated during construction will be allowed to evaporate and infiltrate into the ground as allowed under the terms and conditions of the Facility's WPCF Permit. Stormwater will be managed using BMPs in accordance with the terms of the NPDES 1200-C stormwater permit (Site Certificate Condition 9.1)

3.2 Operation

Any solid waste generated by the operation of the solar modules, BESS, and associated infrastructure will be collected by the maintenance crews and transported to off-site to facilities such as Finley Butte Landfill or Columbia Ridge Landfill that handle the disposal or recycling of these items. Wastes generated at the proposed O&M building will be collected in appropriate waste or recycling containers, to be removed by a licensed waste hauler under contract to the Certificate Holder. All operational waste will be handled according to the Operations Waste Management Plan (Site Certificate Condition 10.22) which will be consistent with Morrow County Solid Waste Management Ordinance (Site Certificate Condition 6.24).

Self-contained battery components and spent batteries will be removed and disposed of or recycled by a licensed vendor in compliance with applicable RCRA and Toxic Substances Control Act regulations administered by the EPA or ODEQ. The batteries will be handled by a licensed third-party battery supplier in accordance with applicable regulations.

Batteries may require periodic replacement if a component is found to be faulty; otherwise, the batteries are not expected to be replaced during the life of the Amended Carty Solar Farm. Modules lose their effectiveness through repeated charge/discharge cycles. To account for the degradation, additional batteries and associated equipment would be periodically augmented as needed to maintain 156 MW. However, degraded batteries would not be removed and replaced; they would continue to operate at the degraded capacity. If batteries are replaced during operations, the Amended Carty Solar Farm operator will disconnect and de-energize the battery system prior to removal from the installed racks, and package the batteries for transport to an approved facility.

The solar panel wash water will evaporate or will infiltrate into the ground near the point of use as allowed under the terms and conditions of the Facility's WPCF Permit. No additional industrial wastewater streams will be generated during operation of the solar modules. No additional structures, systems, or equipment are required for stormwater resulting from the addition of the solar modules.

3.3 Decommissioning

Waste produced from retirement activities will be managed in a similar manner to the waste produced during construction. At the end of the Amended Carty Solar Farm's useful life, it will be dismantled, and components sold for reuse or scrap as practicable. Otherwise, components will be recycled or disposed at a solid waste facility.

Once it is determined that the solar facilities will be decommissioned, the solar array will be removed and disposed of or recycled at the expected life span of 25 years. Decommissioning of the Amended Carty Solar Farm is described in Exhibit X. If continued reuse is not practical, the array will be dismantled and recycled to reclaim constituent parts, such as glass, aluminum, silicon solar cells, and metals.

The BESS will require disposal of the container structures housing the batteries and their constituent parts. The batteries will be disposed of at decommissioning in the same manner described above for operational replacement. Electrical systems and associated equipment will be disposed of as incidental waste and will be collected and recycled, as feasible. Non-recyclable wastes will be collected and transported to the Finley Butte Landfill, Columbia Ridge Landfill, or other licensed facility identified at the time of decommissioning.

4.0 Actions or Restrictions to Reduce Consumptive Water Use – OAR 345-021-0010(1)(w)(C)

OAR 345-021-0010(1)(w)(C) A discussion of any actions or restrictions proposed by the applicant to reduce consumptive water use during construction and operation of the facility;

As discussed in the ASC and subsequent RFAs, minimizing use of water for the Facility will be an important environmental consideration as the Facility moves into the construction phase. The Certificate Holder will use appropriate BMPs to reduce water use to the greatest extent feasible. Solar facility construction by nature does not afford the construction contractor significant opportunities for reducing water use. Water will be used on an as-needed basis to construct concrete foundations and pads, suppress dust on the roads (Site Certificate Condition 9.3) and other areas disturbed by grading, and wash out concrete truck chutes. Water will be used in areas of active construction or vehicle movement, only as needed for dust control. To reduce the water used for dust suppression, stabilization materials such as mulch, may be used to lengthen the interval between necessary dust control water applications. Weather and soil conditions will be regularly monitored to minimize watering while maintaining regulatory compliance for fugitive dust issues. Water for dust control will not be applied if weather conditions are such that disturbed soils will remain sufficiently damp and fugitive dust will not be created.

Water used for solar panel washing will be limited to the minimum necessary for effective panel function. Operation of the Amended Carty Solar Farm does not require consumptive water use, except for minimal amounts at the proposed O&M building similar in nature to typical office use (see Exhibit O). The water used at the proposed O&M building will meet building code requirements for water conservation practices. No additional water use, and therefore no additional actions to limit water use, will result from installation of the BESS.

5.0 Minimization and Recycling Plans – OAR 345-021-0010(1)(w)(D)

OAR 345-021-0010(1)(w)(D) The applicant's plans to minimize, recycle or reuse the solid waste and wastewater described in (A);

The changes described in RFA 4 will result in additional solid waste in the form of potential solar modules, BESS, and associated part replacements during operation, and through decommissioning at the time of retirement. These materials will be recycled where practicable and disposed at an approved disposal location where necessary consistent with Site Certificate Conditions 6.3 and 10.22. When recycling is not feasible, the materials will be sorted and stored in dumpsters or other suitable containers and transported by a licensed waste hauler to an approved disposal location where necessary (Site Certificate Conditions 6.3 and 10.22). All operational waste will be handled according to the Operations Waste Management Plan (Site Certificate Condition 10.22).

6.0 Waste-Related Impacts

6.1 Description of Impacts – OAR 345-021-0010(1)(w)(E)

OAR 345-021-0010(1)(w)(E) A description of any adverse impact on surrounding and adjacent areas from the accumulation, storage, disposal and transportation of solid waste, wastewater and stormwater during construction and operation of the facility;

Solid waste, wastewater, and stormwater for the Amended Carty Solar Farm will be generated and managed consistent with the methods and procedures that have been previously approved by the Council for the Facility, and through the Site Certificate conditions discussed throughout this exhibit. As a result, there will be no new, adverse impacts resulting from the changes proposed under RFA 4.

6.2 Evidence that Impacts are Minimal – OAR 345-021-0010(1)(w)(F)

OAR 345-021-0010(1)(w)(F) Evidence that adverse impacts described in (D) are likely to be minimal, taking into account any measures the applicant proposes to avoid, reduce or otherwise mitigate the impacts; and

As noted above, there will be no new, adverse impacts resulting from the changes proposed under RFA 4. Generation of wastes from construction will be minimized by estimating material needs and employing efficient construction practices. Waste generated during construction and operation of the Amended Carty Solar Farm will be recycled when feasible (Site Certificate Conditions 6.3 and 10.22).

Because waste generation will be minimal, there is little anticipated adverse impact on surrounding areas from solid waste or wastewater due to construction, operation, or retirement of the Amended

Carty Solar Farm. Waste will be reused or recycled; or when necessary, disposed at permitted disposal facilities. Any waste disposed on-site (e.g., excess spoils from foundations) will be inert, disposed of in a manner consistent with applicable regulations, and protective of human health and the environment.

Water will be used primarily for dust control, concrete mixing, and concrete washout. None of these activities will produce wastewater that will affect area streams, wetlands, or groundwater supplies. Sanitary waste during construction will be handled by a licensed contractor according to applicable regulations. Sanitary waste from the proposed O&M building during operation will be collected and treated by the Facility's existing septic system. The Amended Carty Solar Farm will not generate industrial wastewater or effluent.

On-site disposal of materials that qualify as clean fill ODEQ's rules and guidance will be conducted in accordance with OAR 340-093 and other applicable regulations. To meet the clean fill definition, any inert construction debris to be disposed on-site as clean fill will be separated from other debris that is not inert or that otherwise does not satisfy ODEQ's definition of clean fill.

The Certificate Holder's proposed measures to avoid, reduce, and mitigate any impacts on-site or to adjacent land include storing all cleaning products, paints and finishes, solvents, pesticides and herbicides, and other hazardous materials in containers that meet all federal, state, and local requirements for storage and containment. As identified in the ASC and maintained for RFA 4, there will be no substantial quantities of these chemicals on-site. Petroleum products, including vehicle and equipment fuels, lubricating oils, and hydraulic fluids, will not be stored in substantial quantities on-site (Site Certificate Condition 9.10), but will instead be delivered on an as-needed basis using a specialized vehicle by a licensed contractor. The Certificate Holder does propose the temporary storage of some diesel fuel on-site during construction, but this will be in aboveground storage tanks in the construction yard(s), within an area that provides for secondary containment. In addition, spill kits containing items such as absorbent pads will be located on equipment and in on-site temporary storage to ensure a quick response to spills (Site Certificate Condition 9.11). Waste disposal or recycling will be handled by a licensed contractor.

Transportation of wastes to landfills or recycling facilities will involve periodic truck trips over public and private roads between the Amended Carty Solar Farm and the Finley Butte Landfill or Columbia Ridge Landfill. Given the number and frequency of these trips, and the anticipated volume of waste materials, these trips are not anticipated to have adverse effects on the adjacent or surrounding areas (See Exhibit U for more detail on solid waste management).

6.3 Proposed Monitoring Plan – OAR 345-021-0010(1)(w)(G)

OAR 345-021-0010(1)(w)(G) The applicant's proposed monitoring program, if any, for minimization of solid waste and wastewater impacts.

The Certificate Holder will monitor construction stormwater impacts in accordance with a NPDES 1200-C construction stormwater permit issued by ODEQ, and an associated ESCP (Site Certificate Condition 9.1; see Exhibit I for further information). The ESCP describes BMPs for erosion and

sediment control, spill prevention and response procedures, proper disposal procedures, regular maintenance for vehicles and equipment, and employee training on spill prevention.

No significant impacts from solid waste and wastewater are expected from construction and operation of the Amended Carty Solar Farm. Schedule B, Condition 1.e of the WPCF permit requires inspections for runoff and erosion, and reporting of the volume of water used following each panel washing event. Waste management activities will be subject to periodic inspections to ensure compliance with applicable regulations and Site Certificate Conditions.

Exhibit X

Facility Retirement and Site Restoration

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Table of Contents

List of Attachments

Acronyms and Abbreviations

AC	alternating current
BCP	Boardman Coal Plant
BESS	battery energy storage system
Certificate Holder / PGE	Portland General Electric Company
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
MW	megawatt
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODOE	Oregon Department of Energy
RFA	Request for Amendment

1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

This Exhibit X provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(x) in support of RFA 4. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate, previous RFAs, and Oregon Department of Energy (ODOE) Final Orders to demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate conditions and the Retirement and Financial Assurance approval standard in OAR 345-022-0050.

The focus of this exhibit is on retirement and restoration of the Amended Carty Solar Farm to a useful non-hazardous condition. The exhibit does not address retirement and restoration of the natural gas-fueled combined-cycle unit (Unit 1), which is already operating at the Facility and has been addressed previously by the Oregon Energy Facility Siting Council (Council).[1] In addition, the exhibit does not address retirement and restoration of CGS infrastructure and facilities previously approved by the Council[2] with the Second Amended Site Certificate. As noted above, the Amended Carty Solar Farm is proposed as a complete reconfiguration of the Carty Solar Farm; therefore, this exhibit's analysis is proposed to replace the retirement and restoration approved by the Council[3] with the First Amended Site Certificate.

[1] Final Order on Application for Site Certificate for the Carty Generating Station, p. 88-96 (June 2012).
[2] Final Order on Request for Amendment 2 to the Site Certificate for the Carty Generating Station, p. 44-54 (November 2020).
[3] Final Order on Request for Amendment 1 to the Site Certificate for the Carty Generating Station, p. 80-85 (December 2018).

2.0 Estimated Useful Life of the Project – OAR 345-021-0010(1)(x)(A)

OAR 345-021-0010(1)(x) Information about site restoration, providing evidence to support a finding by the Council as required by OAR 345-022-0050(1). The applicant must include:

OAR 345-021-0010(1)(x)(A) The estimated useful life of the proposed facility;

For financial and engineering purposes, the Amended Carty Solar Farm is estimated to have a useful life of at least 25 years. While some components may need replacement during the operational life of the Amended Carty Solar Farm, these activities are anticipated to be routine. At the end of the estimated 25-year operational life, the solar generation and BESS may be decommissioned. The Amended Carty Solar Farm's useful life could be extended if equipment continues to function well with routine maintenance or it could be repowered with updated equipment in the same locations.

While retirement of the solar generation and BESS is possible, the need for renewable energy generation is expected to increase into the foreseeable future. Substantial changes to the Amended Carty Solar Farm associated with repowering or upgrading, if warranted, may be approved by the Council through the Site Certificate amendment procedures outlined in OAR Chapter 345 Division 27.

3.0 Actions to Restore the Site – OAR 345-021-0010(1)(x)(B)

OAR 345-021-0010(1)(x)(B) Specific actions and tasks to restore the site to a useful, non-hazardous condition;

In accordance with Site Certificate Conditions 15.4-15.6, prior to retiring the Amended Carty Solar Farm, the Certificate Holder will prepare and submit a Retirement Plan to the Council for approval.[4] The Retirement Plan will describe the activities necessary to restore the site to a useful, nonhazardous condition. After Council approval of the Retirement Plan, the Certificate Holder will obtain the necessary authorization from the appropriate regulatory agencies to proceed with restoration of the site.

The proposed final Retirement Plan will include the following specific information as required by OAR 345-027-0110(5):

- Measures to complete retirement while protecting public health, safety, and the environment.

[4] If both the natural gas-fueled combined-cycle (Unit 1) and the Amended Carty Solar Farm are retired at the same time, the retirement plan may address retirement of both (e.g. a separate retirement plan may not be prepared for each).

- Information on how impacts to fish, wildlife, and the environment will be minimized during the retirement process.
- A current detailed cost estimate and information on funding for completion of retirement.
- An updated list of property owners in accordance with OAR 345-021-0010(1)(f).

Measures to decommission the Amended Carty Solar Farm are anticipated to include the following:

- **Removal of all facilities.** Facilities to be removed will include aboveground solar and battery components, inverter and transformer pads, operations and maintenance (O&M) building, overhead collector line segment, the 300-foot-long transmission line connecting the collector substation to the existing dead-end structure, collector substation, and perimeter fencing.
    - Underground electrical cable will be removed to its lateral depth; buried lateral runs are assumed to be a minimum of 3 feet deep and will be abandoned in place.
    - Solar modules will be separated from the poles and loaded into a truck or roll-off container for off-site disposal or recycling.
    - Poles will be removed from the ground and recycled as scrap metal.
    - Transformers will be decommissioned and disposed of off-site.
    - Self-contained battery components will be removed, transported, and disposed of or recycled.
    - Battery containers and associated components will be disassembled and transported off-site via truck for disposal or recycling. Materials that cannot be salvaged will be disposed of at authorized sites (as described in Exhibit W).
    - Concrete foundations for transformers, inverters, and battery storage system are assumed to be slab on grade; thus, they will be removed in their entirety. For all foundation areas, the area will be filled with soil or gravel as part of site restoration.
- **Removal of access roads.** Decommissioned roads within the solar perimeter fencing will be regraded to restore the surface soil to a useful condition consistent with site zoning. For purposes of estimating current reclamation costs, it is assumed that pre-existing roads will not be decommissioned, but new access roads built for the Amended Carty Solar Farm will be decommissioned.
- **Site Restoration.** All Amended Carty Solar Farm locations will be restored to a useful condition consistent with site zoning. This restoration will include restoring the site to a condition suitable for agricultural uses where in the Exclusive Farm Use zoning district, and uses comparable with the surrounding land uses, intended land use, and then-current technologies.
- **Revegetation**. Vegetation will be restored to the maximum extent practicable, and all areas disturbed by construction shall be landscaped in a manner compatible with the

surroundings and proposed use. Disturbed areas may be regraded and reseeded with seed mixes, consistent with the Amended Revegetation and Noxious Weed Control Plan (see Exhibit P).

4.0 Total Costs, Estimating Methods, and Assumptions

4.1 Estimate of Cost – OAR 345-021-0010(1)(x)(C)

OAR 345-021-0010(1)(x)(C) An estimate, in current dollars, of the total and unit costs of restoring the site to a useful, non-hazardous condition;

Attachment X-1 provides a detailed retirement and restoration cost estimate for the Amended Carty Solar Farm. The total retirement and restoration cost of retirement and restoration for the Amended Carty Solar Farm is $16,234,459.63 million (in Q1 2024 dollars; see Attachment X-1).

Site Certificate Condition 15.1 in the Third Amended Site Certificate (Council 2022), involving decommissioning costs, requires modification as follows to make it consistent with Attachment X-1:

15.1 Before beginning construction, 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 initial bond or letter of credit amount for Block 1 is $7.884 million (in 3rd Quarter 2011 dollars), to be adjusted to the date of issuance, and adjusted on an annual basis thereafter, as described in sub-paragraph (b) of this condition. ~~The initial bond or letter of credit amount for the Carty Solar Farm and its supporting facilities is $2.713 million (in 3rd Quarter 2016 dollars) to be adjusted to the date of issuance, and adjusted on an annual basis thereafter, as described in sub-paragraph (b) of this condition.~~ The initial bond or letter of credit amount for the related or supporting facilities approved in Final Order on RFA2 is $13.779 million (in 4th Quarter 2020 dollars) to be adjusted to the date of issuance and submitted within 60 days of execution of the Second Amended Site Certificate, and adjusted on an annual basis thereafter, as described in sub-paragraph (b) of this condition. The initial bond or letter of credit amount for the Carty Solar Farm and its supporting facilities approved in Final Order on RFA4 is $16.234 million (in 1st Quarter 2024 dollars) to be adjusted to the date of issuance and submitted prior to beginning construction of the Carty Solar Farm, and adjusted on an annual basis thereafter, as described in sub-paragraph (b) of this condition.

a. The certificate holder may adjust the amount of the bond or letter of credit based on the final design configuration of the facility and turbine types selected by applying the unit costs and general costs presented in Site Restoration Cost Estimate of the Final Order on ASC for Unit 1; ~~Table 4 of the Final Order on RFA1 for Carty Solar Farm; and~~ Table 2 of the Final Order on RFA2; and Table [TBD] of the Final Order on RFA4 for the approved related or supporting facilities. Any revision to the restoration costs should be adjusted to the date of issuance as described in (b), and is subject to review and approval by the Department.

b. The certificate holder shall adjust the amount of the bond or letter of credit, using the following calculation and subject to approval by the Department.

i. Adjust the amount of the bond or letter of credit amount for Unit 1 (expressed in 3rd Quarter 2011 dollars), ~~Carty Solar Farm (expressed in 3rd Quarter 2016 dollars), and~~ related or supporting facilities approved in Final Order on RFA2 (expressed in 4th Quarter 2020 dollars), and Carty Solar Farm approved in Final Order on RFA4 (expressed in 1st Quarter 2024 dollars) to present value, 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 (the "Index") and using the index value and the quarterly index value applicable for Unit 1, ~~Carty Solar Farm, and~~ RFA2 facility components, and Carty Solar Farm 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 bond or letter of credit to present value.

ii. Round the resulting total to the nearest $1,000 to determine the financial assurance amount.

c. The certificate holder shall use a form of bond or letter of credit approved by the Council.

d. The certificate holder shall use an issuer of the bond or letter of credit approved by the Council.

e. The certificate holder shall describe the status of the bond or letter of credit in the annual report submitted to the Council under Condition VI.4.

f. The bond or letter of credit shall not be subject to revocation or reduction before retirement of the facility site.

[Final Order IV.G.2.9] [Mandatory Condition OAR 345-025-0006(8)] [AMD1] [AMD2] [AMD4]

4.2 Estimating Methods and Assumptions – OAR 345-021-0010(1)(x)(D)

OAR 345-021-0010(1)(x)(D) A discussion and justification of the methods and assumptions used to estimate site restoration costs; and

The scope of work and individual tasks were established using professional experience, in collaboration with the Certificate Holder's engineering staff and contractors. The Amended Carty Solar Farm retirement is broken into individual tasks that were each estimated separately to include labor requirements, equipment needs, and duration. Production rates were established using professional experience and published standards that include RS Means (Gordian 2023). Labor and equipment rates prevalent to the geographic area of the Facility were obtained based on

U.S. Department of Labor wage determinations. After the estimate was completed, typical average markups that are industry standards were applied for contingency, overhead, and fee.

Estimating methods and assumptions specific to this estimate are as follows:

- Labor costs were developed by reviewing the U.S. Department of Labor wage determinations and rates published by RS Means. Using this method, an average rate is developed that includes base wage, fringe, and payroll tax liability. The final rate used in the estimate is an average of 40 hours of standard time and 10 hours of overtime per week, assuming a 50-hour work week during decommissioning activities.
- Equipment rates used in the estimate are developed by reviewing rates published by RS Means and historical vendor quotes. Rates include fuel, maintenance, and wear and tear of ground-engaging components. The rates assume the use of rental equipment, not owned equipment.
- Mobilization and demobilization costs reflect the actual costs to mobilize equipment, facilities, and crew to the Amended Carty Solar Farm site. This amount does not include the front loading of cost from other tasks.
- Restoration is estimated on a unit cost basis, priced by task that follows the progression of work from start to finish, as illustrated in Attachment X-1. Unit costs are developed by including the labor, equipment, and production rate required for each individual task. RS Means and estimator experience are utilized to establish the crew, equipment, and production for each individual task. Several other miscellaneous costs have been approximated, including permits, engineering, signage, fencing, traffic control, utility disconnects, etc. In the context of the overall estimate, these are incidental costs that are covered in the estimate's contingency.
- Temporary facilities including four office trailers and eight Connex storage units have been included in the restoration cost. Additional management costs include portable toilets, first aid supplies, and utilities.
- Field management during construction activities has been included in the estimate. These include one Superintendent and two Field Engineers. These positions are critical to the safe and successful execution of work.
- The collector substation will be removed in its entirety. This will include fence removal, transformer oil removal and disposal, transformer dismantling and removal, control building demolition and removal, concrete foundation demolition and removal to at least 4 feet below grade, and miscellaneous materials removal. Transformer oil will be disposed of in accordance with applicable state and federal regulations. For cost estimating purposes, disposal is estimated at $4 per gallon (2023 dollars). Topsoil will be placed and the area will be reseeded.
- The O&M building will be demolished and transported off-site for disposal. The foundation will be removed to at least 4 feet below grade, and the area will be regraded and reseeded.

- For estimating purposes, the 1-milelong segment of aboveground 34.5-kilovolt collector line was assumed to be composed of wood support poles. The support poles will be removed and shipped off-site for disposal.
- Roads within the solar perimeter fences will be restored so that they become a part of the natural surroundings and are no longer recognizable or usable as a road. Road gravel will be used to backfill locations where needed. It is expected that the remaining road gravel will be accepted by local receivers with no additional disposal cost.
- Battery energy storage materials will be removed and transported off-site for recycling or disposal in accordance with applicable regulatory requirements. For cost estimating purposes, it is assumed that batteries will need to be disposed off-site, with disposal fees of $250 per ton in 2024 dollars. Refrigerant associated with heating, ventilation, and air conditioning systems will be recovered in accordance with applicable state and federal regulations. Concrete foundations are assumed to be at-grade slabs and will be fully removed.
- Removal of solar arrays will consist of fence removal, solar panel removal and disposal, and removal of electrical cabling to 3 feet below grade.
- Solar panels will be removed from the racking systems and hauled off-site for recycling or disposal. For cost estimating purposes, it is assumed that panels will not have any scrap value and disposal fees will be required.
- Underground electrical cable will be removed to its lateral depth; lateral runs are assumed to be a minimum of 3 feet deep and will be abandoned in place.
- Racking systems and posts will require off-site disposal and are assumed to have no scrap value but will require disposal fees.
- Inverters and transformers will be removed, and their slab foundations will be removed in their entirety.
- Site restoration will include the placement of approximately 1,290 cubic yards of topsoil on disturbed areas.
- Reseeding is assumed to be required for the collector substation, along with an estimated 35 percent of the areas where solar panels and associated facilities will be removed (302 acres). For cost estimating purposes, it is assumed that final seeding will utilize a mix of native grasses. Actual seed mix will be as agreed with ODOE.
- A contractor's Home Office, Project Management, Overhead, and Fee can vary widely by contractor. As such, averages were developed for the estimate and added as a percentage of total cost. These include 5 percent for Home Office and Project Management and 15 percent for Overhead and Fee.
- ODOE could incur additional costs in the case where the Certificate Holder is unable to manage the decommissioning process. Additional contingencies are included in the

restoration costs for ODOE-incurred costs, including a 1 percent Performance Bond, 10 percent Administrative and Project Management fee, and 10 percent Future Development contingency.

The Certificate Holder's proposed cost estimate will be sufficient to fund the restoration of the Amended Carty Solar Farm to a useful, nonhazardous condition (per Site Certificate Conditions 15.1-15.6). Please see Exhibit M for information on the security the Certificate Holder will provide to cover this amount.

5.0 Monitoring Plan – OAR 345-021-0010(1)(x)(E)

OAR 345-021-0010(1)(x)(E) For facilities that might produce site contamination by hazardous materials, a proposed monitoring plan, such as periodic environmental site assessment and reporting, or an explanation why a monitoring plan is unnecessary.

In the event that the Certificate Holder elects to retire the Amended Carty Solar Farm, the site will be restored to a useful, non-hazardous condition consistent with site zoning and in accordance with the final Retirement Plan approved by the Council (see Section 3.0). The Amended Carty Solar Farm is not expected to cause site contamination with hazardous materials, and no contamination monitoring plan is proposed. The Amended Carty Solar Farm components can be removed without significant risk of contamination.

Hazardous materials associated with the Amended Carty Solar Farm will largely be limited to internal battery components, which would be removed by an authorized vendor prior to removing the equipment. The Amended Carty Solar Farm will not have any underground storage tanks or on-site bulk storage of hazardous materials. Small quantities of lubricants, vehicle fuel, and herbicides might be transported over and across the site during operation, and leaks, spills and improper handling of these materials could occur. Given the small amounts of such materials used at the Amended Carty Solar Farm site, soil contamination is unlikely, and therefore a monitoring plan is unnecessary.

6.0 References

Council (Energy Facility Siting Council). 2022. Third Amended Site Certificate for the Carty Generating Station. Energy Facility Siting Council, Salem, Oregon. July 2022. 2022-08-07-CGS-AMD3-Site-Certificate.pdf (oregon.gov).

Gordian. 2023. RSMeans Data. Greenville, South Carolina. https://www.gordian.com/products/rsmeans-data-services/. Accessed September 2023.

Attachment X-1. Estimated Retirement and Restoration Cost

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Estimate Summary
TETRA TECH EC, INC.
Job Code: PGE-Carty Solar
Description: Decommissioning Estimate

CBS Position Code	Quantity	UM	Description	Cost Item UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1	1.00	Lump Sum	PGE - CARTY SOLAR RETIREMENT	0.00	Detail	U.S. Dollar	16,234,459.63	16,234,459.63
1.1	1.00	Lump Sum	Equipment & Facilities Mob / Demob	0.17	Detail	U.S. Dollar	195,841.35	195,841.35
1.1.1	1.00	Lump Sum	Equipment Mob	0.00	Detail	U.S. Dollar	81,200.00	81,200.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
UERNTRLG	Rental Equip Transp-Large		8.00	Each	U.S. Dollar	10,000.00	80,000.00
UERNTRSM	Rental Equip Transp-Small		8.00	Each	U.S. Dollar	150.00	1,200.00

1.1.2	1.00	Lump Sum	Site Facilities	0.00	Detail	U.S. Dollar	5,600.00	5,600.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
UOCONMOB	Connex Box Mob		8.00	Each	U.S. Dollar	300.00	2,400.00
UOTRLTRN	Trailer Trnsp/Setup/Trdwn		4.00	Each	U.S. Dollar	800.00	3,200.00

1.1.3	3.00	Day	Crew Mob & Site Setup	1.00	Detail	U.S. Dollar	18,173.56	54,520.67

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	900.00	30.00	Each (hourly)	U.S. Dollar	45.44	40,899.87
L010101	OPERATOR	240.00	8.00	Each (hourly)	U.S. Dollar	56.75	13,620.80

1.1.4	3.00	Day	Crew Demob & Site Cleanup	1.00	Detail	U.S. Dollar	18,173.56	54,520.67

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	900.00	30.00	Each (hourly)	U.S. Dollar	45.44	40,899.87
L010101	OPERATOR	240.00	8.00	Each (hourly)	U.S. Dollar	56.75	13,620.80

1.2	1.00	Lump Sum	Project Site Support	0.00	Detail	U.S. Dollar	621,672.83	621,672.83
1.2.1	10.00	Month	Site Facilities	0.00	Detail	U.S. Dollar	8,220.00	82,200.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
URCONNEX	Connex Box		80.00	Month	U.S. Dollar	150.00	12,000.00
UROFFTRL	Office Trailer -12x60		40.00	Month	U.S. Dollar	500.00	20,000.00
UO1STAID	1st Aid Supplies		40.00	Month	U.S. Dollar	300.00	12,000.00
UOOFFSUP	Office Supplies($/prs/mo)		40.00	Month	U.S. Dollar	55.00	2,200.00
URPRTAJH	Port-a-John Unit(s) (4)		120.00	Month	U.S. Dollar	300.00	36,000.00

1.2.2	10.00	Month	Field Management	0.05	Detail	U.S. Dollar	53,947.28	539,472.83

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L90FXX02	Field - Proj Superintendent	2,200.00	1.00	Each (hourly)	U.S. Dollar	83.18	183,000.40
RPUTRK05	F-250 4X4 3/4 TON PICKUP	6,600.00	3.00	Each (hourly)	U.S. Dollar	11.07	73,029.00
L90FEL00	Field - Engr. Tech	2,200.00	1.00	Each (hourly)	U.S. Dollar	39.57	87,062.85
L90FXX03	Field - SHSO	2,200.00	1.00	Each (hourly)	U.S. Dollar	89.26	196,380.58

1.3	1.00	Each	Substation Retirement	0.05	Detail	U.S. Dollar	167,977.15	167,977.15
1.3.1	1.00	Day	Fence Removal	1.00	Detail	U.S. Dollar	1,354.33	1,354.33

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010101	OPERATOR	10.00	1.00	Each (hourly)	U.S. Dollar	56.75	567.53
L060100	GENERAL LABORER	10.00	1.00	Each (hourly)	U.S. Dollar	45.44	454.44
RBACKH09	Deere 710J BACKHOE, 1.62CY	10.00	1.00	Each (hourly)	U.S. Dollar	33.24	332.35

1.3.2	1.00	Each	Transformer Removal	0.17	Detail	U.S. Dollar	102,049.58	102,049.58
1.3.2.1	1.00	Each	Oil Removal & Disposal	1.00	Detail	U.S. Dollar	66,283.89	66,283.89

CBS Position Code	Quantity	UM	Description	Cost Item UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.3.2.1.1	1.00	Each	Oil Removal	1.00	Detail	U.S. Dollar	908.89	908.89

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	20.00	2.00	Each (hourly)	U.S. Dollar	45.44	908.89

1.3.2.1.2	16,000.00	Gallon	Oil Disposal	0.00	Detail	U.S. Dollar	4.00	64,000.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USDISPOSAL	Disposal Fee's		64,000.00	Each	U.S. Dollar	1.00	64,000.00

1.3.2.1.3	1.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	1,375.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		1,375.00	Each	U.S. Dollar	1.00	1,375.00

1.3.2.2	1.00	Each	Dismantle & Loadout Transformer	0.20	Detail	U.S. Dollar	35,765.70	35,765.70

1.3.2.2.1	1.00	Each	Dismantle, Cut & Size	0.20	Detail	U.S. Dollar	30,265.70	30,265.70

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	200.00	4.00	Each (hourly)	U.S. Dollar	45.44	9,088.86
L010101	OPERATOR	100.00	2.00	Each (hourly)	U.S. Dollar	56.75	5,675.34
*REXCAV06A	Excav 100K w/ Bucket & Grapple	50.00	1.00	Each (hourly)	U.S. Dollar	124.54	6,226.75
*REXCAV06E	Excav 100K w/ Shear	50.00	1.00	Each (hourly)	U.S. Dollar	185.50	9,274.75

1.3.2.2.2	4.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	5,500.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		5,500.00	Each	U.S. Dollar	1.00	5,500.00

1.3.3	1.00	Each	Remove Control Building	2.00	Detail	U.S. Dollar	2,508.66	2,508.66

1.3.3.1	1.00	Each	Demo	2.00	Detail	U.S. Dollar	1,133.66	1,133.66

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	5.00	1.00	Each (hourly)	U.S. Dollar	45.44	227.22
L010101	OPERATOR	5.00	1.00	Each (hourly)	U.S. Dollar	56.75	283.77
*REXCAV06A	Excav 100K w/ Bucket & Grapple	5.00	1.00	Each (hourly)	U.S. Dollar	124.54	622.68

1.3.3.2	1.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	1,375.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		1,375.00	Each	U.S. Dollar	1.00	1,375.00

1.3.4	1.00	Day	UG Utility & Ground Removal	1.00	Detail	U.S. Dollar	1,354.33	1,354.33

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010101	OPERATOR	10.00	1.00	Each (hourly)	U.S. Dollar	56.75	567.53
L060100	GENERAL LABORER	10.00	1.00	Each (hourly)	U.S. Dollar	45.44	454.44
RBACKH09	Deere 710J BACKHOE, 1.62CY	10.00	1.00	Each (hourly)	U.S. Dollar	33.24	332.35

1.3.5	502.00	Cubic Yard	Remove Foundations To Subgrade	73.68	Detail	U.S. Dollar	27.85	13,979.03

1.3.5.1	502.00	Cubic Yard	Excavate / Remove Foundation - Various Depth	280.00	Detail	U.S. Dollar	15.87	7,968.37

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	17.93	1.00	Each (hourly)	U.S. Dollar	45.44	814.75
L010101	OPERATOR	35.86	2.00	Each (hourly)	U.S. Dollar	56.75	2,035.01
*REXCAV06C	Excav 100K w/ Hammer	17.93	1.00	Each (hourly)	U.S. Dollar	160.97	2,885.87

CBS Position Code	Quantity	UM	Description	Cost Item UM/Day	Cost Source	Currency	Unit Cost	Total Cost
*REXCAV06A	Excav 100K w/ Bucket & Grapple		17.93	1.00 Each (hourly)	U.S. Dollar		124.54	2,232.73
1.3.5.2	502.00	Cubic Yard	Concrete Transport Offsite	100.00	Detail	U.S. Dollar	11.97	6,010.66
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
RDUTRK06	CAT D350D, 18CY-24CY		50.20	1.00 Each (hourly)	U.S. Dollar		74.29	3,729.36
L080940	TEAMSTER		50.20	1.00 Each (hourly)	U.S. Dollar		45.44	2,281.30
1.3.6	1.00	Each	Misc. Material Disposal	0.00	Detail	U.S. Dollar	2,575.00	2,575.00
1.3.6.1	1.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	1,375.00
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
USTRUCKING	Trucking Sub			1,375.00 Each	U.S. Dollar		1.00	1,375.00
1.3.6.2	20.00	Ton	Disposal Cost	0.00	Detail	U.S. Dollar	60.00	1,200.00
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
USDISPOSAL	Disposal Fee's			1,200.00 Each	U.S. Dollar		1.00	1,200.00
1.3.7	1.00	Each	Restore Yard	0.16	Detail	U.S. Dollar	44,156.22	44,156.22
1.3.7.1	3.20	Acre	Remove Aggregate / Backfill / Regrade	1.60	Detail	U.S. Dollar	2,115.37	6,769.18
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
L060100	GENERAL LABORER		40.00	2.00 Each (hourly)	U.S. Dollar		45.44	1,817.77
L010101	OPERATOR		40.00	2.00 Each (hourly)	U.S. Dollar		56.75	2,270.13
REXCAV06B	Gradall - Excavator		20.00	1.00 Each (hourly)	U.S. Dollar		75.73	1,514.57
*RDOZER08	CAT D6 LGP Dozer		20.00	1.00 Each (hourly)	U.S. Dollar		58.34	1,166.70
1.3.7.2	1,290.00	Cubic Yard	Vegetative Cover	300.00	Detail	U.S. Dollar	27.74	35,787.04
1.3.7.2.1	1,290.00	Cubic Yard	Topsoil, Delivered	0.00	Detail	U.S. Dollar	20.00	25,800.00
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
IMSOIL	Topsoil			1,290.00 Cubic Yard	U.S. Dollar		20.00	25,800.00
1.3.7.2.2	1,290.00	Cubic Yard	Placement	300.00	Detail	U.S. Dollar	7.74	9,987.04
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
L010101	OPERATOR		86.00	2.00 Each (hourly)	U.S. Dollar		56.75	4,880.79
RDOZER08	CAT D6N XL		86.00	2.00 Each (hourly)	U.S. Dollar		59.38	5,106.25
1.3.7.3	3.20	Acre	Re-Seed With Native Vegetation	0.00	Detail	U.S. Dollar	500.00	1,600.00
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
USLANDSCAPE	Landscape Sub			3.20 Acre	U.S. Dollar		500.00	1,600.00
1.4	1.00	Lump Sum	Transmission Line Retirement	0.45	Detail	U.S. Dollar	10,944.13	10,944.13
1.4.1	300.00	Linear Feet	Conductor Removal	1,500.00	Detail	U.S. Dollar	2.09	627.39
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
L060100	GENERAL LABORER		8.00	4.00 Each (hourly)	U.S. Dollar		45.44	363.55
L010101	OPERATOR		2.00	1.00 Each (hourly)	U.S. Dollar		56.75	113.51
*RXMISC14	MAN LIFT GAS 125ft		2.00	1.00 Each (hourly)	U.S. Dollar		53.52	107.04
RLIFTS05	JCB 508C, 8,000lbs FRKLFT		2.00	1.00 Each (hourly)	U.S. Dollar		21.65	43.29
1.4.2	1.00	Each	Structure Removal	1.00	Detail	U.S. Dollar	5,391.45	5,391.45
1.4.2.1	1.00	Each	Cut / Lower Structure	2.00	Detail	U.S. Dollar	1,914.80	1,914.80
Resource Code	**Description**		**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
L060100	GENERAL LABORER		20.00	4.00 Each (hourly)	U.S. Dollar		45.44	908.89

CBS Position Code	Quantity	UM	Description	Cost Item UM/Day	Cost Source	Currency	Unit Cost	Total Cost
L010101	OPERATOR		5.00	1.00 Each (hourly)	U.S. Dollar		56.75	283.77
*RXMISC14	MAN LIFT GAS 125ft		5.00	1.00 Each (hourly)	U.S. Dollar		53.52	267.60
*RXMISC23	GROVE RT 200 TON		5.00	1.00 Each (hourly)	U.S. Dollar		90.91	454.55
1.4.2.2	1.00	Each	Cut / Size Structure & Loadout	2.00	Detail	U.S. Dollar	2,101.65	2,101.65

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	30.00	6.00	Each (hourly)	U.S. Dollar	45.44	1,363.33
L010101	OPERATOR	5.00	1.00	Each (hourly)	U.S. Dollar	56.75	283.77
*RXMISC23	GROVE RT 200 TON	5.00	1.00	Each (hourly)	U.S. Dollar	90.91	454.55
1.4.2.3	1.00 Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	1,375.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		1,375.00	Each	U.S. Dollar	1.00	1,375.00

Notes: **********
Assume 9 ton per steel structure and cable span
****

1.4.3	1.00 Each	Remove Foundations To Subgrade	0.98	Detail	U.S. Dollar	4,925.29	4,925.29
1.4.3.1	1.00 Each	Excavate / Remove Foundation - Various Depth	1.00	Detail	U.S. Dollar	4,898.95	4,898.95

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	20.00	2.00	Each (hourly)	U.S. Dollar	45.44	908.89
L010101	OPERATOR	20.00	2.00	Each (hourly)	U.S. Dollar	56.75	1,135.07
*REXCAV06C	Excav 100K w/ Hammer	10.00	1.00	Each (hourly)	U.S. Dollar	160.97	1,609.65
*REXCAV06A	Excav 100K w/ Bucket & Grapple	10.00	1.00	Each (hourly)	U.S. Dollar	124.54	1,245.35
1.4.3.2	1.65 Cubic Yard	Concrete Transport Offsite	75.00	Detail	U.S. Dollar	15.96	26.34

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
RDUTRK06	CAT D350D, 18CY-24CY	0.22	1.00	Each (hourly)	U.S. Dollar	74.29	16.34
L080940	TEAMSTER	0.22	1.00	Each (hourly)	U.S. Dollar	45.44	10.00
1.5	1.00 Lump Sum	Collector Line Retirement	0.05	Detail	U.S. Dollar	69,243.18	69,243.18
1.5.1	5,280.00 Linear Feet	Conductor Removal	528.00	Detail	U.S. Dollar	6.72	35,494.56
1.5.1.1	1.00 Lump Sum	Cut / Lower Cable, Size & Loadout	0.10	Detail	U.S. Dollar	31,369.56	31,369.56

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	400.00	4.00	Each (hourly)	U.S. Dollar	45.44	18,177.72
L010101	OPERATOR	100.00	1.00	Each (hourly)	U.S. Dollar	56.75	5,675.34
*RXMISC14	MAN LIFT GAS 125ft	100.00	1.00	Each (hourly)	U.S. Dollar	53.52	5,352.00
RLIFTS05	JCB 508C, 8,000lbs FRKLFT	100.00	1.00	Each (hourly)	U.S. Dollar	21.65	2,164.50
1.5.1.2	3.00 Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	4,125.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		4,125.00	Each	U.S. Dollar	1.00	4,125.00
1.5.2	30.00 Each	Utility Pole Removal	3.08	Detail	U.S. Dollar	1,124.95	33,748.63
1.5.2.1	30.00 Each	Cut / Lower Pole	5.00	Detail	U.S. Dollar	570.74	17,122.23

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	240.00	4.00	Each (hourly)	U.S. Dollar	45.44	10,906.63
L010101	OPERATOR	60.00	1.00	Each (hourly)	U.S. Dollar	56.75	3,405.20
RHYDCR05	GROVE RT600E 40 TON	60.00	1.00	Each (hourly)	U.S. Dollar	46.84	2,810.40
1.5.2.2	30.00 Each	Size & Loadout	8.00	Detail	U.S. Dollar	356.71	10,701.40

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost

CBS Position Code	Quantity	UM	Description	Hours	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
			Cost Item						
L060100	GENERAL LABORER			150.00	4.00 Each (hourly)	U.S. Dollar		45.44	6,816.65
L010101	OPERATOR			37.50	1.00 Each (hourly)	U.S. Dollar		56.75	2,128.25
RHYDCR05	GROVE RT600E 40 TON			37.50	1.00 Each (hourly)	U.S. Dollar		46.84	1,756.50
1.5.2.3	3.00	Each	Trucking - Per Load		0.00	Detail	U.S. Dollar	1,375.00	4,125.00
Resource Code	**Description**			**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
USTRUCKING	Trucking Sub				4,125.00 Each	U.S. Dollar		1.00	4,125.00
1.5.2.4	30.00	Ton	Disposal Cost		0.00	Detail	U.S. Dollar	60.00	1,800.00
Resource Code	**Description**			**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
USDISPOSAL	Disposal Fee's				1,800.00 Each	U.S. Dollar		1.00	1,800.00
Notes:	**********								
	Assumption: 30 poles x 2000' per pole								
	**********								
1.6	1.00	Lump Sum	O&M Building Removal		0.11	Detail	U.S. Dollar	46,179.48	46,179.48
1.6.1	1.00	Day	Excavate, Cut & Cap Utilities		1.00	Detail	U.S. Dollar	1,354.33	1,354.33
Resource Code	**Description**			**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
L060100	GENERAL LABORER			10.00	1.00 Each (hourly)	U.S. Dollar		45.44	454.44
L010101	OPERATOR			10.00	1.00 Each (hourly)	U.S. Dollar		56.75	567.53
RBACKH09	Deere 710J BACKHOE, 1.62CY			10.00	1.00 Each (hourly)	U.S. Dollar		33.24	332.35
1.6.2	1.00	Lump Sum	Interior Demo & Removal		0.33	Detail	U.S. Dollar	15,820.37	15,820.37
1.6.2.1	3.00	Day	Interior Demo		1.00	Detail	U.S. Dollar	3,373.46	10,120.37
Resource Code	**Description**			**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
L060100	GENERAL LABORER			120.00	4.00 Each (hourly)	U.S. Dollar		45.44	5,453.32
L010101	OPERATOR			30.00	1.00 Each (hourly)	U.S. Dollar		56.75	1,702.60
*RXMISC19	Material Handler			30.00	1.00 Each (hourly)	U.S. Dollar		98.82	2,964.45
1.6.2.2	60.00	Ton	Material T&D		0.00	Detail	U.S. Dollar	95.00	5,700.00
Resource Code	**Description**			**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
USTRUCKING	Trucking Sub				3,900.00 Each	U.S. Dollar		1.00	3,900.00
USDISPOSAL	Disposal Fee's				1,800.00 Each	U.S. Dollar		1.00	1,800.00
1.6.3	2.00	Day	Structure Demo		1.00	Detail	U.S. Dollar	10,178.14	20,356.28
1.6.3.1	2.00	Day	Structure Demo		1.00	Detail	U.S. Dollar	6,053.14	12,106.28
Resource Code	**Description**			**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
*REXCAV06A	Excav 100K w/ Bucket & Grapple			20.00	1.00 Each (hourly)	U.S. Dollar		124.54	2,490.70
*REXCAV06E	Excav 100K w/ Shear			20.00	1.00 Each (hourly)	U.S. Dollar		185.50	3,709.90
L010101	OPERATOR			40.00	2.00 Each (hourly)	U.S. Dollar		56.75	2,270.13
L060100	GENERAL LABORER			80.00	4.00 Each (hourly)	U.S. Dollar		45.44	3,635.54
1.6.3.2	6.00	Each	Trucking - Per Load		0.00	Detail	U.S. Dollar	1,375.00	8,250.00
Resource Code	**Description**			**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**
USTRUCKING	Trucking Sub				8,250.00 Each	U.S. Dollar		1.00	8,250.00
Notes:	**********								
	Assumption: 45,000 lbs per load								
	**********								
1.6.4	242.00	Cubic Yard	Remove Foundations To Subgrade		71.43	Detail	U.S. Dollar	35.74	8,648.51
1.6.4.1	242.00	Cubic Yard	Excavate / Remove Foundation - Various Depth		250.00	Detail	U.S. Dollar	17.78	4,302.29
Resource Code	**Description**			**Hours**	**Quantity UM**	**Currency**		**Unit Cost**	**Total Cost**

CBS Position Code	Quantity	UM	Description	Cost Item UM/Day	Cost Source	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER		9.68	1.00 Each (hourly)	U.S. Dollar		45.44	439.90
L010101	OPERATOR		19.36	2.00 Each (hourly)	U.S. Dollar		56.75	1,098.74
*REXCAV06C	Excav 100K w/ Hammer		9.68	1.00 Each (hourly)	U.S. Dollar		160.97	1,558.14
*REXCAV06A	Excav 100K w/ Bucket & Grapple		9.68	1.00 Each (hourly)	U.S. Dollar		124.54	1,205.50

Notes: **********
Assume monolithic slab on grade
****

1.6.4.2	242.00	Cubic Yard	Concrete Transport Offsite	100.00	Detail	U.S. Dollar	17.96	4,346.22

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
RDUTRK06	CAT D350D, 18CY-24CY	24.20	1.00	Each (hourly)	U.S. Dollar	74.29	1,797.82
L080940	TEAMSTER	24.20	1.00	Each (hourly)	U.S. Dollar	45.44	1,099.75
L010101	OPERATOR	12.10	0.50	Each (hourly)	U.S. Dollar	56.75	686.72
RFELWH09	CAT 966F LOADER, 4.25CY	12.10	0.50	Each (hourly)	U.S. Dollar	62.97	761.94

1.7	156.00	MW	DC Storage Retirement	0.44	Detail	U.S. Dollar	13,675.75	2,133,417.15
1.7.1	4,514.00	Linear Feet	Fence Removal	5,124.80	Detail	U.S. Dollar	1.36	6,154.57
1.7.1.1	4,514.00	Linear Feet	Fence Removal	5,124.80	Detail	U.S. Dollar	1.06	4,779.57

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010101	OPERATOR	26.42	3.00	Each (hourly)	U.S. Dollar	56.75	1,499.68
L060100	GENERAL LABORER	52.85	6.00	Each (hourly)	U.S. Dollar	45.44	2,401.68
RBACKH09	Deere 710J BACKHOE, 1.62CY	26.42	3.00	Each (hourly)	U.S. Dollar	33.24	878.22

1.7.1.2	1.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	1,375.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		1,375.00	Each	U.S. Dollar	1.00	1,375.00

1.7.2	156.00	MW	Battery Removal & Disposal	3.71	Detail	U.S. Dollar	2,880.31	449,328.44
1.7.2.1	42.00	Day	Remove Batteries, Load For Transport	1.00	Detail	U.S. Dollar	3,159.56	132,701.44

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	2,520.00	6.00	Each (hourly)	U.S. Dollar	45.44	114,519.64
RLIFTS05	JCB 508C, 8,000lbs FRKLFT	840.00	2.00	Each (hourly)	U.S. Dollar	21.65	18,181.80

1.7.2.2	45.00	Each	Transport Batteries	0.00	Detail	U.S. Dollar	1,480.60	66,627.00
1.7.2.2.1	45.00	Each	Roll Off Liners	0.00	Detail	U.S. Dollar	105.60	4,752.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
UODCLINER	Rolloff Liner		45.00	Each	U.S. Dollar	105.60	4,752.00

1.7.2.2.2	45.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	61,875.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		61,875.00	Each	U.S. Dollar	1.00	61,875.00

1.7.2.3	1,000.00	Ton	Disposal Fee's	0.00	Detail	U.S. Dollar	250.00	250,000.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USDISPOSAL	Disposal Fee's		250,000.00	Each	U.S. Dollar	1.00	250,000.00

1.7.3	156.00	MW	Structure & Components Removal	0.76	Detail	U.S. Dollar	9,384.47	1,463,976.81
1.7.3.1	20.00	Day	Refrigerant Recovery	1.00	Detail	U.S. Dollar	1,275.93	25,518.56

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010110	Craft - MEP	400.00	2.00	Each (hourly)	U.S. Dollar	63.80	25,518.56

CBS Position Code	Quantity	UM	Description	Cost Item UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.3.2	8,000.00	Ton	Structure Demo	43.33	Detail	U.S. Dollar	118.71	949,708.25

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
*REXCAV06A	Excav 100K w/ Bucket & Grapple	1,846.15	1.00	Each (hourly)	U.S. Dollar	124.54	229,910.77
*REXCAV06E	Excav 100K w/ Shear	1,846.15	1.00	Each (hourly)	U.S. Dollar	185.50	342,452.31
L010101	OPERATOR	3,692.31	2.00	Each (hourly)	U.S. Dollar	56.75	209,550.83
L060100	GENERAL LABORER	3,692.31	2.00	Each (hourly)	U.S. Dollar	45.44	167,794.34

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.3.3	330.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	453,750.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		453,750.00	Each	U.S. Dollar	1.00	453,750.00

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.3.4	33,000.00	Gallon	Glycol Recovery & Disposal	0.00	Detail	U.S. Dollar	1.06	35,000.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USLIQUID	Liquids T&D		35,000.00	Each	U.S. Dollar	1.00	35,000.00

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.4	30.00	Each	Transformer Removal	0.80	Detail	U.S. Dollar	2,650.08	79,502.50
1.7.4.1	30.00	Each	Disconnect Electrical	1.00	Detail	U.S. Dollar	1,203.06	36,091.71

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010110	Craft - MEP	300.00	1.00	Each (hourly)	U.S. Dollar	63.80	19,138.92
L060100	GENERAL LABORER	300.00	1.00	Each (hourly)	U.S. Dollar	45.44	13,633.29
RPUTRK05	F-250 4X4 3/4 TON PICKUP	300.00	1.00	Each (hourly)	U.S. Dollar	11.07	3,319.50

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.4.2	30.00	Each	Loadout Inverter & Transformer	4.00	Detail	U.S. Dollar	759.53	22,785.79

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	300.00	4.00	Each (hourly)	U.S. Dollar	45.44	13,633.29
L010101	OPERATOR	75.00	1.00	Each (hourly)	U.S. Dollar	56.75	4,256.50
RHYDCR06	GROVE RT880 73 TON	75.00	1.00	Each (hourly)	U.S. Dollar	65.28	4,896.00

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.4.3	15.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	20,625.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		20,625.00	Each	U.S. Dollar	1.00	20,625.00

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.5	58.00	Each	Inverter Removal	0.80	Detail	U.S. Dollar	2,318.19	134,454.84
1.7.5.1	58.00	Each	Disconnect Electrical	1.00	Detail	U.S. Dollar	1,203.06	69,777.31

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010110	Craft - MEP	580.00	1.00	Each (hourly)	U.S. Dollar	63.80	37,001.91
L060100	GENERAL LABORER	580.00	1.00	Each (hourly)	U.S. Dollar	45.44	26,357.69
RPUTRK05	F-250 4X4 3/4 TON PICKUP	580.00	1.00	Each (hourly)	U.S. Dollar	11.07	6,417.70

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.5.2	58.00	Each	Loadout Inverter & Transformer	4.00	Detail	U.S. Dollar	759.53	44,052.53

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	580.00	4.00	Each (hourly)	U.S. Dollar	45.44	26,357.69
L010101	OPERATOR	145.00	1.00	Each (hourly)	U.S. Dollar	56.75	8,229.24
RHYDCR06	GROVE RT880 73 TON	145.00	1.00	Each (hourly)	U.S. Dollar	65.28	9,465.60

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.7.5.3	15.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	20,625.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		20,625.00	Each	U.S. Dollar	1.00	20,625.00

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
1.8	1.00	Lump Sum	Solar Array Retirement	0.01	Detail	U.S. Dollar	7,170,337.22	7,170,337.22
1.8.1	77,794.00	Linear Feet	Fence Removal	5,124.80	Detail	U.S. Dollar	1.31	101,620.87
1.8.1.1	77,794.00	Linear Feet	Fence Removal	5,124.80	Detail	U.S. Dollar	1.06	82,370.87

CBS Position Code	Quantity	UM	Description	Cost Item UM/Day	Cost Source	Currency	Unit Cost	Total Cost

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010101	OPERATOR	455.40	3.00	Each (hourly)	U.S. Dollar	56.75	25,845.32
L060100	GENERAL LABORER	910.79	6.00	Each (hourly)	U.S. Dollar	45.44	41,390.42
RBACKH09	Deere 710J BACKHOE, 1.62CY	455.40	3.00	Each (hourly)	U.S. Dollar	33.24	15,135.13

1.8.1.2	14.00 Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	19,250.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		19,250.00	Each	U.S. Dollar	1.00	19,250.00

1.8.2	390,879.00 Each	Solar Panel Removal & Disposal	10,000.00	Detail	U.S. Dollar	7.41	2,896,798.81

1.8.2.1	390,879.00 Each	Solar Panel Removal	10,000.00	Detail	U.S. Dollar	3.06	1,194,603.81

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
RLIFTS05	JCB 508C, 8,000lbs FRKLFT	3,908.79	10.00	Each (hourly)	U.S. Dollar	21.65	84,605.76
L010101	OPERATOR	3,908.79	10.00	Each (hourly)	U.S. Dollar	56.75	221,836.93
L060100	GENERAL LABORER	19,543.95	50.00	Each (hourly)	U.S. Dollar	45.44	888,161.13

Notes: **********
Assumed production: 20 panels per laborer per hour,
Includes packaging and preparing for shipment offsite.
****

1.8.2.2	625.00 Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	859,375.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		859,375.00	Each	U.S. Dollar	1.00	859,375.00

Notes: **********
Assumption: 45,000 lbs per load
****

1.8.2.3	14,047.00 Ton	Disposal Cost	0.00	Detail	U.S. Dollar	60.00	842,820.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USDISPOSAL	Disposal Fee's		842,820.00	Each	U.S. Dollar	1.00	842,820.00

Notes: **********
Assumption: 390,879 modules x 71.87 lbs each
****

1.8.3	1.00 Lump Sum	Solar Rack (Trackers) & Post Removal	0.01	Detail	U.S. Dollar	4,171,917.53	4,171,917.53

1.8.3.1	14,477.00 Each	Solar Rack (Trackers) & Post Removal	160.00	Detail	U.S. Dollar	257.21	3,723,667.53

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010101	OPERATOR	14,477.00	16.00	Each (hourly)	U.S. Dollar	56.75	821,618.25
L060100	GENERAL LABORER	14,477.00	16.00	Each (hourly)	U.S. Dollar	45.44	657,897.13
*REXCAV06A	Excav 100K w/ Bucket & Grapple	7,238.50	8.00	Each (hourly)	U.S. Dollar	124.54	901,446.60
*REXCAV06E	Excav 100K w/ Shear	7,238.50	8.00	Each (hourly)	U.S. Dollar	185.50	1,342,705.56

Notes: **********
Assumed production: .5 hour per rack per crew. Crew to include
1 excavator w/shear, 1 excavator w/grapple, 2 operators and 2
laborers. Includes post removal and sizing of steel for sale as scrap,
and loadout to haul trucks. 27 modules per rack/post assembly
****

1.8.3.2	326.00 Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	448,250.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		448,250.00	Each	U.S. Dollar	1.00	448,250.00

Notes: **********
Assumption: 45,000 lbs per load
****

1.9	44.00 Each	Solar Inverter / Transformer Removal	0.50	Detail	U.S. Dollar	5,616.16	247,111.15

CBS Position Code	Quantity	UM	Description	UM/Day	Cost Source	Currency	Unit Cost	Total Cost
			Cost Item					
1.9.1	44.00	Each	Disconnect Electrical	1.00	Detail	U.S. Dollar	1,203.06	52,934.51

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L010110	Craft - MEP	440.00	1.00	Each (hourly)	U.S. Dollar	63.80	28,070.42
L060100	GENERAL LABORER	440.00	1.00	Each (hourly)	U.S. Dollar	45.44	19,995.49
RPUTRK05	F-250 4X4 3/4 TON PICKUP	440.00	1.00	Each (hourly)	U.S. Dollar	11.07	4,868.60

1.9.2	44.00	Each	Loadout Inverter & Transformer	1.00	Detail	U.S. Dollar	3,038.11	133,676.64

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	1,760.00	4.00	Each (hourly)	U.S. Dollar	45.44	79,981.97
L010101	OPERATOR	440.00	1.00	Each (hourly)	U.S. Dollar	56.75	24,971.47
RHYDCR06	GROVE RT880 73 TON	440.00	1.00	Each (hourly)	U.S. Dollar	65.28	28,723.20

1.9.3	44.00	Each	Trucking - Per Load	0.00	Detail	U.S. Dollar	1,375.00	60,500.00

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
USTRUCKING	Trucking Sub		60,500.00	Each	U.S. Dollar	1.00	60,500.00

1.10	2,360.00	Cubic Yard	Remove Inverter / Transformer Foundations	73.68	Detail	U.S. Dollar	27.85	65,718.16

1.10.1	2,360.00	Cubic Yard	Excavate / Remove Foundation	280.00	Detail	U.S. Dollar	15.87	37,460.87

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	84.29	1.00	Each (hourly)	U.S. Dollar	45.44	3,830.31
L010101	OPERATOR	168.57	2.00	Each (hourly)	U.S. Dollar	56.75	9,566.99
*REXCAV06C	Excav 100K w/ Hammer	84.29	1.00	Each (hourly)	U.S. Dollar	160.97	13,567.05
*REXCAV06A	Excav 100K w/ Bucket & Grapple	84.29	1.00	Each (hourly)	U.S. Dollar	124.54	10,496.52

1.10.2	2,360.00	Cubic Yard	Concrete Transport Offsite	100.00	Detail	U.S. Dollar	11.97	28,257.29

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
RDUTRK06	CAT D350D, 18CY-24CY	236.00	1.00	Each (hourly)	U.S. Dollar	74.29	17,532.44
L080940	TEAMSTER	236.00	1.00	Each (hourly)	U.S. Dollar	45.44	10,724.85

1.11	1,148.00	Cubic Yard	Remove BESS Foundations	73.68	Detail	U.S. Dollar	27.85	31,967.99

1.11.1	1,148.00	Cubic Yard	Excavate / Remove Foundation	280.00	Detail	U.S. Dollar	15.87	18,222.49

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
L060100	GENERAL LABORER	41.00	1.00	Each (hourly)	U.S. Dollar	45.44	1,863.22
L010101	OPERATOR	82.00	2.00	Each (hourly)	U.S. Dollar	56.75	4,653.77
*REXCAV06C	Excav 100K w/ Hammer	41.00	1.00	Each (hourly)	U.S. Dollar	160.97	6,599.57
*REXCAV06A	Excav 100K w/ Bucket & Grapple	41.00	1.00	Each (hourly)	U.S. Dollar	124.54	5,105.94

1.11.2	1,148.00	Cubic Yard	Concrete Transport Offsite	100.00	Detail	U.S. Dollar	11.97	13,745.50

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
RDUTRK06	CAT D350D, 18CY-24CY	114.80	1.00	Each (hourly)	U.S. Dollar	74.29	8,528.49
L080940	TEAMSTER	114.80	1.00	Each (hourly)	U.S. Dollar	45.44	5,217.01

1.12	1.00	Lump Sum	Site Restoration - Partial Site Seeding	0.03	Detail	U.S. Dollar	350,901.80	350,901.80

1.12.1	64,944.00	Linear Feet	Site Roads - Removal & Restoration	3,600.00	Detail	U.S. Dollar	1.74	113,010.09

Resource Code	Description	Hours	Quantity	UM	Currency	Unit Cost	Total Cost
*RDOZER08	CAT D6 LGP Dozer	360.80	2.00	Each (hourly)	U.S. Dollar	58.34	21,047.27
L010101	OPERATOR	902.00	5.00	Each (hourly)	U.S. Dollar	56.75	51,191.52
RDUTRK06	CAT D350D, 18CY-24CY	360.80	2.00	Each (hourly)	U.S. Dollar	74.29	26,803.83
*RFELWH08C	CAT 980 LOADER	180.40	1.00	Each (hourly)	U.S. Dollar	77.43	13,967.47

CBS Position Code	Quantity UM	Description	Cost Item UM/Day	Cost Source	Currency	Unit Cost	Total Cost

Notes: **********
Assume topsoil for restoration available onsite.
12.3 miles
****

1.12.2	302.00 Acre	Spot Grade Disturbed Areas	16.00	Detail	U.S. Dollar	287.72	86,891.70

Resource Code	Description	Hours	Quantity UM	Currency	Unit Cost	Total Cost
*RDOZER08	CAT D6 LGP Dozer	755.00	4.00 Each (hourly)	U.S. Dollar	58.34	44,042.93
L010101	OPERATOR	755.00	4.00 Each (hourly)	U.S. Dollar	56.75	42,848.78

Notes: **********
Assumtion: 862 acres total property area.
Assume that 35% of the area distrubed by construction will be regraded.
****

1.12.3	302.00 Acre	Re-Seed With Native Vegetation - Roads & Areas Disturbed By Construction	0.00	Detail	U.S. Dollar	500.00	151,000.00

Resource Code	Description	Hours	Quantity UM	Currency	Unit Cost	Total Cost
USLANDSCAPE	Landscape Sub		302.00 Acre	U.S. Dollar	500.00	151,000.00

Notes: **********
Assumtion: 862 acres total property area.
Assume that 35% of the area distrubed by construction will be re-seeded.
****

1.13	1.00 Lump Sum	Contractor Markups	0.00	Detail	U.S. Dollar	2,305,597.15	2,305,597.15
1.13.1	1.00 Lump Sum	Home Office, Project Management (5% Of Cost)	0.00	Detail	U.S. Dollar	555,565.60	555,565.60

Resource Code	Description	Hours	Quantity UM	Currency	Unit Cost	Total Cost
USMARKUP5	5% Markup		11,111,312.00 Each	U.S. Dollar	0.05	555,565.60

1.13.2	1.00 Lump Sum	Contractor OH & Fee (15% Of Cost)	0.00	Detail	U.S. Dollar	1,750,031.55	1,750,031.55

Resource Code	Description	Hours	Quantity UM	Currency	Unit Cost	Total Cost
USMARKUP	15% Markup		11,666,877.00 Each	U.S. Dollar	0.15	1,750,031.55

1.14	1.00 Lump Sum	ODOE Applied Contingencies	0.00	Detail	U.S. Dollar	2,817,550.89	2,817,550.89
1.14.1	1.00 Lump Sum	1% Performance Bond	0.00	Detail	U.S. Dollar	134,169.09	134,169.09

Resource Code	Description	Hours	Quantity UM	Currency	Unit Cost	Total Cost
UODOE1	ODOE 1% Markup		13,416,909.00 Each	U.S. Dollar	0.01	134,169.09

1.14.2	1.00 Lump Sum	10% Administrative and Project Management	0.00	Detail	U.S. Dollar	1,341,690.90	1,341,690.90

Resource Code	Description	Hours	Quantity UM	Currency	Unit Cost	Total Cost
UODOE2	ODOE 10% Markup		13,416,909.00 Each	U.S. Dollar	0.10	1,341,690.90

1.14.3	1.00 Lump Sum	10% Future Development Contingency	0.00	Detail	U.S. Dollar	1,341,690.90	1,341,690.90

Resource Code	Description	Hours	Quantity UM	Currency	Unit Cost	Total Cost
UODOE2	ODOE 10% Markup		13,416,909.00 Each	U.S. Dollar	0.10	1,341,690.90

Report Total:	16,234,459.63

Category	Total
Labor	4,287,260.43
Rented Equipment	3,366,254.17
Supplies	18,952.00
Materials	25,800.00
Subcontract	5,678,042.15
Travel-Risk-Adj	35,000.00
ODCs	2,823,150.89

CBS Position Code	Description	Forecast (T/O) Quantity	Unit of Measure	Unit Cost	Total Cost (Forecast)
1	**PGE - CARTY SOLAR RETIREMENT**	**1.00**	**Lump Sum**	**$16,234,459.63**	**$16,234,459.63**
1.1	**Equipment & Facilities Mob / Demob**	**1.00**	**Lump Sum**	**$195,841.35**	**$195,841.35**
1.1.1	Equipment Mob	1.00	Lump Sum	$81,200.00	$81,200.00
1.1.2	Site Facilities	1.00	Lump Sum	$5,600.00	$5,600.00
1.1.3	Crew Mob & Site Setup	3.00	Day	$18,173.56	$54,520.67
1.1.4	Crew Demob & Site Cleanup	3.00	Day	$18,173.56	$54,520.67
1.2	**Project Site Support**	**1.00**	**Lump Sum**	**$621,672.83**	**$621,672.83**
1.2.1	Site Facilities	10.00	Month	$8,220.00	$82,200.00
1.2.2	Field Management	10.00	Month	$53,947.28	$539,472.83
1.3	**Substation Retirement**	**1.00**	**Each**	**$167,977.15**	**$167,977.15**
1.3.1	Fence Removal	1.00	Day	$1,354.33	$1,354.33
1.3.2	Transformer Removal	1.00	Each	$102,049.58	$102,049.58
1.3.3	Remove Control Building	1.00	Each	$2,508.66	$2,508.66
1.3.4	UG Utility & Ground Removal	1.00	Day	$1,354.33	$1,354.33
1.3.5	Remove Foundations To Subgrade	502.00	Cubic Yard	$27.85	$13,979.03
1.3.6	Misc. Material Disposal	1.00	Each	$2,575.00	$2,575.00
1.3.7	Restore Yard	1.00	Each	$44,156.22	$44,156.22
1.4	**Transmission Line Retirement**	**1.00**	**Lump Sum**	**$10,944.13**	**$10,944.13**
1.4.1	Conductor Removal	300.00	Linear Feet	$2.09	$627.39
1.4.2	Structure Removal	1.00	Each	$5,391.45	$5,391.45
1.4.3	Remove Foundations To Subgrade	1.00	Each	$4,925.29	$4,925.29
1.5	**Collector Line Retirement**	**1.00**	**Lump Sum**	**$69,243.18**	**$69,243.18**
1.5.1	Conductor Removal	5,280.00	Linear Feet	$6.72	$35,494.56
1.5.2	Utility Pole Removal	30.00	Each	$1,124.95	$33,748.63
1.6	**O&M Building Removal**	**1.00**	**Lump Sum**	**$46,179.48**	**$46,179.48**
1.6.1	Excavate, Cut & Cap Utilities	1.00	Day	$1,354.33	$1,354.33
1.6.2	Interior Demo & Removal	1.00	Lump Sum	$15,820.37	$15,820.37
1.6.3	Structure Demo	2.00	Day	$10,178.14	$20,356.28
1.6.4	Remove Foundations To Subgrade	242.00	Cubic Yard	$35.74	$8,648.51
1.7	**DC Storage Retirement**	**156.00**	**MW**	**$13,675.75**	**$2,133,417.15**
1.7.1	Fence Removal	4,514.00	Linear Feet	$1.36	$6,154.57
1.7.2	Battery Removal & Disposal	156.00	MW	$2,880.31	$449,328.44
1.7.3	Structure & Components Removal	156.00	MW	$9,384.47	$1,463,976.81
1.7.4	Transformer Removal	30.00	Each	$2,650.08	$79,502.50
1.7.5	Inverter Removal	58.00	Each	$2,318.19	$134,454.84
1.8	**Solar Array Retirement**	**1.00**	**Lump Sum**	**$7,170,337.22**	**$7,170,337.22**
1.8.1	Fence Removal	77,794.00	Linear Feet	$1.31	$101,620.87
1.8.2	Solar Panel Removal & Disposal	390,879.00	Each	$7.41	$2,896,798.81
1.8.3	Solar Rack (Trackers) & Post Removal	1.00	Lump Sum	$4,171,917.53	$4,171,917.53
1.9	**Solar Inverter / Transformer Removal**	**44.00**	**Each**	**$5,616.16**	**$247,111.15**
1.9.1	Disconnect Electrical	44.00	Each	$1,203.06	$52,934.51
1.9.2	Loadout Inverter & Transformer	44.00	Each	$3,038.11	$133,676.64
1.9.3	Trucking - Per Load	44.00	Each	$1,375.00	$60,500.00

1.10	**Remove Inverter / Transformer Foundations**	**2,360.00**	**Cubic Yard**	**$27.85**	**$65,718.16**
1.10.1	Excavate / Remove Foundation	2,360.00	Cubic Yard	$15.87	$37,460.87
1.10.2	Concrete Transport Offsite	2,360.00	Cubic Yard	$11.97	$28,257.29
1.11	**Remove BESS Foundations**	**1,148.00**	**Cubic Yard**	**$27.85**	**$31,967.99**
1.11.1	Excavate / Remove Foundation	1,148.00	Cubic Yard	$15.87	$18,222.49
1.11.2	Concrete Transport Offsite	1,148.00	Cubic Yard	$11.97	$13,745.50
1.12	**Site Restoration - Partial Site Seeding**	**1.00**	**Lump Sum**	**$350,901.80**	**$350,901.80**
1.12.1	Site Roads - Removal & Restoration	64,944.00	Linear Feet	$1.74	$113,010.09
1.12.2	Spot Grade Disturbed Areas	302.00	Acre	$287.72	$86,891.70
1.12.3	Re-Seed With Native Vegetation - Roads & Areas Disturbed By Construction	302.00	Acre	$500.00	$151,000.00
1.13	**Contractor Markups**	**1.00**	**Lump Sum**	**$2,305,597.15**	**$2,305,597.15**
1.13.1	Home Office, Project Management (5% Of Cost)	1.00	Lump Sum	$555,565.60	$555,565.60
1.13.2	Contractor OH & Fee (15% Of Cost)	1.00	Lump Sum	$1,750,031.55	$1,750,031.55
1.14	**ODOE Applied Contingencies**	**1.00**	**Lump Sum**	**$2,817,550.89**	**$2,817,550.89**
1.14.1	1% Performance Bond	1.00	Lump Sum	$134,169.09	$134,169.09
1.14.2	10% Administrative and Project Management	1.00	Lump Sum	$1,341,690.90	$1,341,690.90
1.14.3	10% Future Development Contingency	1.00	Lump Sum	$1,341,690.90	$1,341,690.90

Exhibit Y

Noise

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Acronyms and Abbreviations

AC	alternating current
BESS	battery energy storage system
Certificate Holder / PGE	Portland General Electric Company
CGS/ Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
dB	decibel
dBA	A-weighted decibel
FHWA	Federal Highway Administration
Hz	hertz
ISO	International Organization for Standardization
kV	kilovolt
L_{10}	intrusive noise level
L_{50}	median sound level
L_{90}	residual sound level
L_{eq}	equivalent sound level
L_{max}	maximum sound level
L_n	statistical sound level
L_w	sound power level
MVA	megavolt ampere
MW	megawatt
NSR	noise sensitive receptor
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
RFA	Request for Amendment
UTM	Universal Transverse Mercator

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1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

This Exhibit Y was prepared to meet the submittal requirements in Oregon Administrative Rules (OAR) 345-021-0010(1)(y). Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate, previous RFAs, and Oregon Department of Energy Final Orders to demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate Conditions and the Noise Control Regulations in OAR 340-035-0035.

The Amended Carty Solar Farm will comply with the existing Site Certificate Conditions 13.1-13.3 related to prevention and mitigation of noise in the Third Amended Site Certificate (Council 2022). No new noise sensitive receptors (NSRs) are located closer than those previously analyzed for the Facility as described in greater detail below (see Section 1.2).

This exhibit does not address noise analysis previously provided for the natural gas-fueled combined-cycle unit (Unit 1), which is already operating at the Facility and has been addressed previously by the Oregon Energy Facility Siting Council (Council).[1] In addition, the exhibit does not address noise analysis for of CGS infrastructure and facilities previously approved by the Council[2] with the Second Amended Site Certificate. As noted above, the Amended Carty Solar Farm is proposed as a complete reconfiguration of the Carty Solar Farm; therefore, this exhibit's analysis is

[1] Final Order on Application for Site Certificate for the Carty Generating Station, p. 173-179 (June 2012).
[2] Final Order on Request for Amendment 2, p. 73-75 (November 2020).

proposed to replace the noise analysis approved by the Council[3] with the First Amended Site Certificate.

1.1 Acoustic Terminology

Airborne sound is described as the rapid fluctuation or oscillation of air pressure above and below atmospheric pressure, creating a sound wave. Sound is characterized by properties of the sound waves, which are frequency, wavelength, period, amplitude, and velocity. Noise is defined as unwanted sound. A sound source is defined by a sound power level (L_w), which is independent of any external factors. The acoustic sound power is the rate at which acoustical energy is radiated outward and is expressed in units of watts. Sound energy travels in the form of a wave, a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure. A sound pressure level is a measure of this fluctuation and can be directly determined with a microphone or calculated from information about the source sound power level and the surrounding environment through predictive acoustic modeling. While the sound power of a source is strictly a function of the total amount of acoustic energy being radiated by the source, the sound pressure levels produced by a source are a function of the distance from the source and the effective radiating area or physical size of the source. In general, the magnitude of a source's sound power level is always considerably higher than the observed sound pressure level near a source since the acoustic energy is being radiated in various directions.

Sound levels are presented on a logarithmic scale to account for the large pressure response range of the human ear and are expressed in units of decibels (dB). A dB is defined as the ratio between a measured value and a reference value usually corresponding to the lower threshold of human hearing defined as 20 micropascals. Conversely, sound power is commonly referenced to 1 picowatt, which is one trillionth of a watt. Broadband sound includes sound energy summed across the frequency spectrum. In addition to broadband sound pressure levels, analysis of the various frequency components of the sound spectrum is often completed to determine tonal characteristics. The unit of frequency is hertz (Hz), which corresponds to the rate in cycles per second that sound pressure waves are generated. Typically, a sound frequency analysis examines 11 octave bands (or 33 1/3 octave) ranging from 20 Hz (low) to 20,000 Hz (high). This range encompasses the entire human audible frequency range. Since the human ear does not perceive every frequency with equal loudness, spectrally varying sounds are often adjusted with a weighting filter. The A-weighted filter is applied to represent the frequency response of the human auditory system. Sound exposure in acoustic assessments is commonly measured and calculated as A-weighted dB (dBA). Unweighted sound levels are referred to as linear. Linear dB are used to determine a sound's tonality and to engineer solutions to reduce or control noise as techniques are different for low and high frequency noise.

Sound levels can be measured, modeled and presented in various formats. The sound metrics that were employed in the following noise assessment have the following definitions:

[3] Final Order on Request for Amendment 1, p. 125-127 (December 2018).

- L_{eq}: Conventionally expressed in dBA, the L_{eq} is the energy-averaged, A-weighted sound level for the complete time period. It is defined as the steady, continuous sound level over a specified time, which has the same total sound energy as the actual varying sound levels over the specified period.
- L_n: This descriptor identifies the sound level that is exceeded "n" percent of the time over a measurement period (e.g., L_{90} = sound level exceeded 90 percent of the time). The sound level exceeded for a small percent of the time, L_{10}, closely corresponds to short-term, higher-level, intrusive noises (such as vehicle pass-by noise near a roadway). The sound level exceeded for a large percent of the time, L_{90}, closely corresponds to continuous, lower-level background noise (such as continuous noise from a distant industrial facility). L_{50} is the level exceeded 50 percent of the time and is typically referred to the median sound level over a given period.
- L_{max}: The maximum sound level (L_{max}) can be used to quantify the maximum instantaneous sound pressure level over a given measurement period or maximum sound generated by a source.

1.2 Analysis Area

The analysis area for noise impacts is defined in OAR 345-021-0010 as including those NSRs within 1 mile of the site boundary. Section 2.2 below includes the definition of a NSR. The Amended Carty Solar Farm including the entire analysis area and beyond is surrounded by land either owned by PGE or Threemile Canyon Farms, LLC. NSRs were identified in RFA 1. PGE confirms there are no new NSRs located on land owned by PGE and email correspondence between Threemile Canyon Farms and PGE (Greg Harris, Threemile Canyon Farms, LLC, pers. comm., e-mail message to PGE, August 17, 2023) confirmed no new NSRs on land owned by Threemile Canyon Farms. Additionally, the land surrounding the Amended Carty Solar Farm to the east and south, owned by Threemile Canyon Farms, is under a conservation easement managed by The Nature Conservancy which prevents any development on the land. Figure Y-1 shows current site conditions and confirms no NSRs occur within 1 mile from the Amended Site Boundary.

2.0 Regulatory Environment

This section describes the applicable noise-related requirements at the federal, state, county, and local levels. The acoustic assessment described in this exhibit is limited to that of off-site receptors and not potential on-site noise exposure as regulated by the U. S. Occupational Health and Safety Administration.

2.1 Federal Noise Regulations

There are no federal environmental noise requirements specific to the Amended Carty Solar Farm.

2.2 State Noise Regulations

OAR Chapter 340, Division 35 prescribes noise regulations applicable throughout the State of Oregon, with specific requirements in OAR 340-035-0035, "Noise Control Regulations for Industry and Commerce." This standard provides guidance for new noise sources on a previously used site:

> *OAR 340-035-0035(1)(b)(A) New Sources Located on Previously Used Sites. No person owning or controlling a new industrial or commercial noise source located on a previously used industrial or commercial site shall cause or permit the operation of that noise source if the statistical noise levels generated by that new source and measured at an appropriate measurement point, specified in subsection (3)(b) of this rule, exceed the levels specified in Table 8, except as otherwise provided in these rules. For noise levels generated by a wind energy facility including wind turbines of any size and any associated equipment or machinery, subparagraph (1)(b)(B)(iii) applies.*

Table Y-1 gives statistical noise limits as summarized below. All limits are presented in terms of dBA. The L_{50} is the median sound level (50 percent of the measurement interval is above this level, 50 percent is below). The noise limits apply at "appropriate measurement points" on "noise sensitive property."[4] The appropriate measurement point is defined as whichever of the following is farther from the noise source:

- 25 feet toward the noise source from that point on the noise sensitive building nearest the noise source; or
- The point on the noise sensitive property line nearest the noise source.

"Noise sensitive property" is defined by OAR 340-035-0015(38) as "real property normally used for sleeping, or normally used as schools, churches, hospitals, or public libraries. Property used in industrial or agricultural activities is not Noise Sensitive Property unless it meets the above criteria in more than an incidental manner."

Table Y-1. New Industrial and Commercial Noise Standards

Statistical Descriptor	Maximum Permissible Statistical Noise Levels (dBA)	
	Daytime (7:00 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
L_{50}	55	50
L_{10}	60	55
L_1	75	60
Source: OAR 340-035-0035, Table 8		

The standard also provides guidance for new noise sources on a previously unused site, which is defined in OAR 340-035-0015(47) as property which has not been used by any industrial or commercial noise source during the 20 years immediately preceding commencement of

[4] OAR 340-035-0035(3)(b)

construction of a new industrial or commercial source on that property. The standard reads as follows:

OAR 340-035-0035(1)(b)(B)(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).

OAR 340-035-0035(1)(b)(B)(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.

In accordance with the regulatory definitions in OAR Chapter 340 Division 35, the analysis presented in this assessment assumes that the Amended Carty Solar Farm will constitute an industrial or commercial use located on both previously used and unused sites. Although there are no NSRs present within 1 mile, compliance will be evaluated at the closest residence (approximately 2.5 miles away) relative to the most stringent 50 dBA L_{50} nighttime limit described in Table Y-1. Since the closest residence is over 2 miles from any proposed noise source, a baseline sound survey was not conducted for evaluation of compliance with the 10 dBA ambient degradation standard.

2.2.1 Exemptions to State Noise Regulations

OAR 340-035-0035(5) specifically exempts construction activity from the state noise standards and regulations, as indicated below. This section also provides an exemption for maintenance of capital equipment, the operation of aircraft (such as helicopters used in project construction), and sounds created by activities related to timber harvest.

OAR 340-035-0035(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:

[section abridged for brevity]

(b) Warning devices not operating continuously for more than 5 minutes;

(g) Sounds that originate on construction sites.

(h) Sounds created in construction or maintenance of capital equipment;

(j) Sounds generated by the operation of aircraft and subject to pre-emptive federal regulation. This exception does not apply to aircraft engine testing, activity conducted at the

airport that is not directly related to flight operations, and any other activity not pre-emptively regulated by the federal government or controlled under OAR 340-035-0045;

(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);

(m) Sounds created by activities related to the growing or harvesting of forest tree species on forest land as defined in subsection (1) of ORS 526.324.

OAR 340-035-0035(6) allows for some exceptions to the state noise regulations:

OAR 340-035-0035 (6) Exceptions:

Upon written request from the owner or controller of an industrial or commercial noise source, the Department may authorize exceptions to section (1) of this rule, pursuant to rule 340-035-0010, for:

(a) Unusual and/or infrequent events;

(b) Industrial or commercial facilities previously established in areas of new development of noise sensitive property;

(c) Those industrial or commercial noise sources whose statistical noise levels at the appropriate measurement point are exceeded by any noise source external to the industrial or commercial noise source in question;

(d) Noise sensitive property owned or controlled by the person who controls or owns the noise source;

(e) Noise sensitive property located on land zoned exclusively for industrial or commercial use.

2.3 County and Municipal Noise Regulations

There are no quantitative noise limits in Morrow County. Morrow County stipulates that noise shall not be "plainly audible within a dwelling unit one hundred feet (100') or more away from the source of the noise," between 11:00 PM and 7:00 AM, and allows an exception for construction between 6:00 AM and 10:00 PM.

3.0 Existing Conditions

A wide range of noise settings occur within the acoustic analysis area. The background sound level will vary spatially and is related to various physical characteristics such as topography, land use, proximity to transportation corridors and terrain coverage including extent and height of exposed vegetation. The acoustic environment will also vary due in part to surrounding land use and population density. Areas in proximity to major transportation corridors such as interstate highways and areas with higher population densities and are expected to generally have higher existing ambient sound levels as compared to open and rural lands. Table Y-2 shows the relative A-weighted noise levels of common sounds measured in the environment and industry.

Typically, ambient sound measurements would be collected to characterize the pre-construction ambient acoustic environment for a proposed solar energy facility in Oregon; however, considering there are no NSRs within 1 mile of the Facility, it was determined that measurements were not necessary. Due to the separation distance potential noise impacts associated with operation of the Amended Carty Solar Farm are expected to be very low level.

Table Y-2. Sound Pressure Levels (L_P) and Relative Loudness

Noise Source or Activity	Sound Level (dBA)	Subjective Impression	Relative Loudness (Perception of Different Sound Levels)
Jet aircraft takeoff from carrier (50 ft.)	140	Threshold of pain	64 times as loud
50-hp siren (100 ft.)	130		32 times as loud
Loud rock concert near stage Jet takeoff (200 ft.)	120	Uncomfortably loud	16 times as loud
Float plane takeoff (100 ft.)	110		8 times as loud
Jet takeoff (2,000 ft.)	100	Very loud	4 times as loud
Heavy truck or motorcycle (25 ft.)	90		2 times as loud
Garbage disposal Food blender (2 ft.) Pneumatic drill (50 ft.)	80	Loud	Reference loudness
Vacuum cleaner (10 ft.)	70	Moderate	1/2 as loud
Passenger car at 65 mph (25 ft.)	65		
Large store air-conditioning unit (20 ft.)	60		1/4 as loud
Light auto traffic (100 ft.)	50	Quiet	1/8 as loud
Quiet rural residential area with no activity	45		
Bedroom or quiet living room Bird calls	40	Faint	1/16 as loud
Typical wilderness area	35		
Quiet library, soft whisper (15 ft.)	30	Very quiet	1/32 as loud
Wilderness with no wind or animal activity	25	Extremely quiet	
High-quality recording studio	20		1/64 as loud
Acoustic test chamber	10	Just audible	
	0	Threshold of hearing	

Adapted from: Beranek 1988 and EPA 1971a.

4.0 Predicted Noise Levels – OAR 345-021-0010(1)(y)(A)

OAR 345-021-0010(1)(y) Information about noise generated by construction and operation of the proposed facility, providing evidence to support a finding by the Council that the proposed facility complies with the Oregon Department of Environmental Quality's noise control standards in OAR 340-035-0035. The applicant must include:

OAR 345-021-0010(1)(y)(A) Predicted noise levels resulting from construction and operation of the proposed facility.

4.1 Construction Noise Assessment

Potential noise impacts associated with construction of the Amended Carty Solar Farm were reviewed; however, according to OAR 340-035-0035(5)(g), sound originating from construction sites is exempt from state noise regulations.

Construction of the Amended Carty Solar Farm will require the use of construction equipment that may have the potential for localized sound on a temporary basis, as construction activities progress. The list of construction equipment that may be used for the Amended Carty Solar Farm and estimates of construction sound levels are presented in Table Y-4 using a semi-qualitative approach based on equipment sound levels provided in the *Federal Highway Administration Roadway Construction Noise Model* (FHWA 2006). This equipment is also used for solar projects, so the Federal Highway Administration's sound levels are applicable to incorporate into the Amended Carty Solar Farm. Construction activities at the Amended Carty Solar Farm can be generally divided into five phases:

- Preparation of the site and staging areas, including grading and on-site access roads;
- Installation of array foundations, conductors, the operations and maintenance (O&M) building, and the control enclosure;
- Assembly of solar panels and electrical connection components;
- Construction of the inverter pad and battery pads, substation, cabling, terminations, and transmission lines; and
- Commissioning of the array and interconnection, revegetation, and waste removal and recycling facilities.

These activities will occur sequentially for discrete groupings of solar arrays, with the potential for overlap. In addition to the solar panels, construction activities will also occur for supporting infrastructure. The inverters and distribution transformers are likely to be completed while respective solar arrays are being constructed; completion of other components, such as the O&M building, will occur independently.

Overhead transmission and collector line construction is typically completed in the following stages, but various construction activities may overlap, with multiple construction crews operating simultaneously:

- Preparing the site and site access;
- Installing structure foundations, if required;
- Erecting of support structures and poles; and
- Stringing of conductors, shield wire and fiber optic ground wire.

The sound levels resulting from construction activities vary significantly depending on several factors such as the type and age of equipment, the specific equipment manufacturer and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers. Table Y-3 lists the typical sound levels associated with common construction equipment at various distances. Periodically, sound levels may be higher or lower; however, the overall sound levels should generally be lower due to excess attenuation.

Table Y-3. Estimated L_{max} Sound Pressure Levels from Construction Equipment

Construction Equipment	Expected Sound Level by Distance (dBA)			
	50 feet	1,000 feet	2,500 feet	5,000 feet
Bulldozer (250 to 700 horsepower [hp])	88	62	54	43
Front-end loader (6 to 15 cubic yards)	88	62	54	43
Truck (200 to 400 hp)	86	60	52	41
Grader (13- to 16-foot blade)	85	59	51	40
Shovel (2 to 5 cubic yards)	84	58	50	39
Portable generators (50 to 200 kilowatts)	84	58	50	39
Mobile crane (11 to 20 tons)	83	57	49	38
Concrete pumps (30 to 150 cubic yards)	81	55	47	36
Tractor (0.75 to 2 cubic yards)	80	54	46	35
Source: Beranek 1988, FHWA 2006. dBA = A-weighted decibel				

All reasonable efforts will be made to minimize the impact of noise resulting from construction activities. Candidate construction noise mitigation measures include scheduling louder construction activities during daytime hours and equipping internal combustion engines with appropriately sized muffler systems to minimize noise excessive emissions.

4.2 Operational Noise Assessment

The Certificate Holder modeled noise sources from the Amended Carty Solar Farm to demonstrate that operations will not exceed the noise levels outlined in the Oregon Department of Environmental Quality (ODEQ) Noise Rules.

4.2.1 Acoustic Modeling Software and Calculation Methods

DataKustik GmbH's computer-aided noise abatement program (CadnaA; DataKustik 2023) was used for the Amended Carty Solar Farm acoustic analysis. Further details pertaining to this program are given in the following subsection.

4.2.1.1 CadnaA

The acoustic modeling analysis was conducted using the most recent version of CadnaA, a comprehensive three-dimensional acoustic software model that conforms to the International Organization for Standardization (ISO) standard ISO 9613-2 "Attenuation of Sound during Propagation Outdoors" (ISO 1996). The engineering methods specified in this standard consist of full (1/1) octave band algorithms that incorporate geometric spreading due to wave divergence, reflection from surfaces, atmospheric absorption, screening by topography and obstacles, ground effects, source directivity, heights of both sources and receptors, seasonal foliage effects, and meteorological conditions.

Topographical information was imported into the acoustic model using the official U.S. Geological Survey digital elevation dataset to accurately represent terrain in three dimensions (USGS 2023). Terrain conditions, vegetation type, ground cover, and the density and height of foliage can also influence the absorption that takes place when sound waves travel over land. The ISO 9613-2 standard accounts for ground absorption rates by assigning a numerical coefficient of G=0 for acoustically hard, reflective surfaces and G=1 for absorptive surfaces and soft ground. If the ground is hard-packed dirt, typically found in industrial complexes, pavement, bare rock or for sound traveling over water, the absorption coefficient is defined as G=0 to account for reduced sound attenuation and higher reflectivity. In contrast, ground covered in vegetation, including suburban lawns, livestock and agricultural fields (both fallow with bare soil and planted with crops), will be acoustically absorptive and aid in sound attenuation (i.e., G=1). A mixed (semi-reflective) ground factor of G=0.5 was used in the Facility acoustic modeling analysis and is considered standard engineering practice. In addition to geometrical divergence, attenuation factors include topographical features, terrain coverage, and/or other natural or anthropogenic obstacles that can affect sound attenuation and result in acoustical screening. To be conservative, sound attenuation through foliage and diffraction around and over existing anthropogenic structures such as buildings was not included in this modeling analysis.

Sound attenuation by the atmosphere is not strongly dependent on temperature and humidity; however, the temperature of 10 degrees Celsius (50 degrees Fahrenheit) and 70 percent relative humidity parameters were selected for this analysis and is considered standard engineering practice. Over short distances, the effects of atmospheric absorption are minimal. The ISO 9613-2 standard calculates attenuation for meteorological conditions favorable to propagation, i.e., downwind sound propagation or what might occur typically during a moderate atmospheric ground level inversion. Though a physical impracticality, the ISO 9613-2 standard simulates omnidirectional downwind propagation. For receivers located between discrete Amended Carty

Solar Farm sound sources, the acoustic model may result in over-prediction. In addition, the acoustic modeling algorithms essentially assume laminar atmospheric conditions, in which neighboring layers of air do not mix. This conservative assumption does not take into consideration turbulent eddies and micrometeorological inhomogeneities that may form when winds change speed or direction, which can interfere with the sound propagation path and increase effects of attenuation.

4.3 Input to the Noise Prediction Model

4.3.1 Solar and Battery Energy Storage Facilities

The principal sources of noise associated with the solar facilities are the BESS cooling units, the electrical components of the inverters, the step-up transformer associated with each inverter skid, and the main power transformer planned for installation as part of the Amended Carty Solar Farm. The inverter skids and battery storage units are mounted on pads at grade level.

It is expected that all equipment will potentially operate consistently during both daytime and nighttime hours. The projected operational noise levels are based on Certificate Holder-supplied manufacturer sound power level data with representative octave band sound power level information. Table Y-4 summarizes the equipment sound power level data used as inputs to the initial modeling analysis. It is assumed that the Amended Carty Solar Farm equipment will have similar sound power profiles as those used in the acoustic modeling analysis; however, it is possible that the final manufacturer warranty values may vary slightly.

Table Y-4. Modeled Octave Band Sound Power Level of Solar/BESS Equipment

Equipment	Octave Band Sound Power Level (dB) by Frequency (Hz)									Broadband (dBA)
	31.5	63	125	250	500	1000	2000	4000	8000	
PV Inverter	55	61	76	77	79	82	83	93	79	94
BESS Unit	113	99	107	101	93	85	80	73	67	96
BESS Inverter	94	87	92	86	82	82	82	92	80	94
BESS Transformer	93	101	100	96	95	91	87	82	75	97

4.3.2 Substation

The primary ongoing noise sources at substations are the transformers, which generate sound generally described as a low humming. There are three main sound sources associated with a transformer: core noise, load noise, and noise generated by the operation of the cooling equipment. The core vibrational noise is the principal noise source and does not vary significantly with electrical load.

Transformer noise varies with transformer dimensions, voltage rating, and design, and attenuates with distance. The noise produced by substation transformers is primarily caused by the load current in the transformer's conducting coils (or windings) and consequently the main frequency of this sound is twice the supply frequency (60 Hz). The characteristic humming sound consists of tonal components generated at harmonics of 120 Hz. Most of the acoustical energy resides in the fundamental tone (120 Hz) and the first three or four harmonics (240, 360, 480, and 600 Hz).

Circuit-breaker operations may also cause audible noise, particularly the operation of air-blast breakers, which is characterized as an impulsive sound event of very short duration and expected to occur no more than a few times throughout the year. Because of its short duration and infrequent occurrence, circuit breaker noise was not considered in this analysis. The Amended Carty Solar Farm includes a collector substation located inside the solar array fence line. The substation will include one step-up transformer. The transformer rating of 230 megavolt amperes (MVA) corresponds to a National Electrical Manufacturers Association rating of 83 dBA. The L_W for the substation transformer was calculated using the methodology recommended by the Electric Power Plant Environmental Noise Guide (Volume 1, 2nd edition) (Edison Electric Institute 1983). Table Y-5 presents the transformer sound source data by octave band center frequency input to the acoustic modeling analysis. Table Y-5 presents the transformer sound source data by octave band center frequency input to the acoustic modeling analysis.

Table Y-5. Transformer Sound Power Level

Equipment	Octave Band Sound Power Level (dBA) by Frequency (Hz)									Broadband (dBA)
	31.5	63	125	250	500	1000	2000	4000	8000	
230 MVA Transformer	105	111	113	108	108	102	97	92	85	108

5.0 Assessment of Compliance with Applicable Noise Regulations – OAR 345-021-0010(1)(y)(B)

OAR 345-021-0010(1)(y)(B) An analysis of the proposed facility's compliance with the applicable noise regulations in OAR 340-035-0035, including a discussion and justification of the methods and assumptions used in the analysis;

Construction activities are categorically exempted under OAR 340-35-0035(5)(g). Construction noise is short term and not expected to result in any significant long-term impacts.

The acoustic modeling analysis evaluated simultaneous operation of all Amended Carty Solar Farm components including the proposed solar facilities, BESS facilities, and substation. Resultant received sound levels were evaluated at the closest residence (approximately 2.5 miles away) relative to the applicable ODEQ noise regulations.

A sound contour plot displaying modeled operational sound levels in color-coded isopleths is provided in Figure Y-1. The resultant noise contour plots are independent of the existing acoustic

environment (i.e., are project-generated sound levels only). Table Y-6 presents the results of the acoustic modeling analysis for the Amended Carty Solar Farm and includes the feature ID, Universal Transverse Mercator (UTM) coordinates, and the received sound levels at each NSR resulting from operations. Received sound levels are rounded to the nearest whole decimal for consistency with the ODEQ noise regulations.

Modeling results indicate the Amended Carty Solar Farm successfully demonstrates compliance with the applicable ODEQ statistical noise limits (50 dBA L_{50}, 55 dBA L_{10}, 60 dBA L_{10}) at the closest NSRs and all sound levels are well below those limits.

Table Y-6. Acoustic Modeling Results

NSR ID	UTM Coordinates (m)		Project Sound Level (dBA)	Compliance with OAR 340-035-0035
	Easting	Northing		
1	282860	5056927	22	Yes
2	281015	5056932	22	Yes
3	273004	5065969	23	Yes

6.0 Measures to Reduce Noise Levels or Impacts to Address Public Complaints – OAR 345-021-0010(1)(y)(C)

OAR 345-021-0010(1)(y)(C) Any measures the applicant proposes to reduce noise levels or noise impacts or to address public complaints about noise from the facility;

The Certificate Holder has successfully demonstrated compliance with the OAR 340-035-0035 noise regulations; therefore, it is not expected that any further noise mitigation measures will be required during operation of the Amended Carty Solar Farm. During construction, the following mitigation measures will be considered and incorporated into the contract specifications, as necessary and appropriate, to minimize noise levels to the extent practicable:

- Confine the noisiest operation of heavy construction equipment to the daylight hours per Site Certificate Condition 13.1.
- Construction site and access road speed limits will be established and enforced during the construction period.
- Electrically powered equipment will be used instead of pneumatic or internal combustion powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas will be located as far as practicable from NSRs.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, will be for safety warning purposes only.

- All noise-producing construction equipment and vehicles using internal combustion engines will be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification per Site Certificate Condition 13.1. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) will be equipped with shrouds and noise control features that are readily available for that type of equipment.
- Establish a complaint response system at the construction manager's office to address noise complaints per Site Certificate Condition 13.1. Records of noise complaints during construction must be made available to authorized representatives of the Department of Energy upon request.
- All construction noise complaints will be logged within 48 hours of issuance. The construction supervisor will have the responsibility and authority to receive and resolve noise complaints. A clear appeal process to the Certificate Holder will be established prior to the start of construction that will allow for resolution of noise problems that cannot be resolved by the site supervisor in a reasonable period of time.
- During operation, the Certificate Holder will maintain a complaint response system to address noise complaints per Site Certificate Condition 13.2. The Certificate Holder will notify the Department within 15 days of receiving a complaint about noise from the facility. The notification should include the date the complaint was received, the nature of the complaint, the complainant's contact information, the location of the affected property, and any actions taken, or planned to be taken, by the certificate holder to address the complaint.
- Final equipment specifications and noise warranty data will be reviewed by an acoustician to ensure compliance with OAR 340-035-0035.

7.0 Monitoring – OAR 345-021-0010(1)(y)(D)

OAR 345-021-0010(1)(y)(D) Any measures the applicant proposes to monitor noise generated by operation of the facility; and

Noise monitoring is not proposed for the Amended Carty Solar Farm during operation. However, the legislative authority granted to the Council in OAR 345-026-0010(1) states that under Oregon Revised Statute 469.430, "the Council has continuing authority over the site for which a site certificate is issued and may inspect, direct the Department of Energy to inspect, or ask another state agency or local government to inspect, the site at any time to ensure that the certificate holder is operating the facility in compliance with the terms and conditions of the site certificate."

In addition, Site Certificate Condition 13.3 states that upon written notification from the Department of Energy, the Certificate Holder will monitor and record the actual statistical noise levels during operations to verify that the Certificate Holder is operating the facility in compliance with the noise control regulations. The monitoring plan must be reviewed and approved by the

Department of Energy prior to implementation. The cost of such monitoring, if required, will be borne by the Certificate Holder.

8.0 Owners of Noise Sensitive Property– OAR 345-021-0010(1)(y)(E)

OAR 345-021-0010(1)(y)(E) A list of the names and addresses of all owners of noise sensitive property, as defined in OAR 340-035-0015, within one mile of the proposed site boundary.

No noise sensitive properties were identified within 1 mile from the Amended Site Boundary.

9.0 References

Beranek, L. 1988. Noise and Vibration Control, Chapter 7 - Sound Propagation Outdoors. Institute of Noise Control Engineering, Washington, DC.

Council (Oregon Energy Facility Siting Council). 2022. Third Amended Site Certificate for the Carty Generating Station. Energy Facility Siting Council, Salem, Oregon. July 2022. Available at: https://www.oregon.gov/energy/facilities-safety/facilities/Facilities%20library/2022-08-07-CGS-AMD3-Site-Certificate.pdf

DataKustik (DataKustik GmbH). 2023. Computer-Aided Noise Abatement Model CadnaA, Munich, Germany.

Edison Electric Institute. 1983. Electric Power Plant Environmental Noise Guide (Volume 1, 2nd edition, Report 3637. 1983 Update). Prepared by Bolt Beranek and Newman Inc.

EPA. 1971a. Community Noise. NTID300.3 (N-96-01 IIA-231). Prepared by Wylie Laboratories.

FHWA. 2006. Federal Highway Administration Roadway Construction Noise Model User's Guide, FHWA-HEP-05-054, January 2006.

ISO (International Organization for Standardization). 1996. Standard ISO 9613-2 Acoustics – Attenuation of Sound during Propagation Outdoors. Part 2 General Method of Calculation. Geneva, Switzerland.

USGS (U.S. Geological Survey). 2023. National Geospatial Program, USGS National Elevation Dataset 1/3 arc-second. (Publish date unknown.)

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Figures

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Carty Generating Station Request for Amendment 4

Figure Y-1 Operational Received Sound Levels

MORROW COUNTY, OR

- Amended Site Boundary
- Analysis Area (1-mile Buffer)
- Property Line
- Local Roads
- Noise Sensitive Receptor

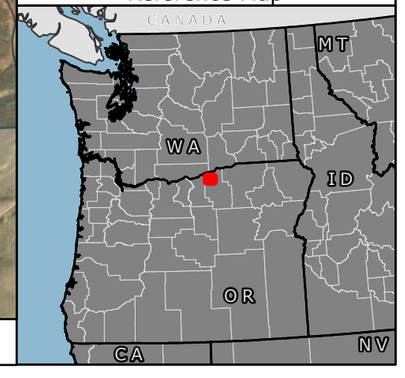
Sound Contours (dBA)

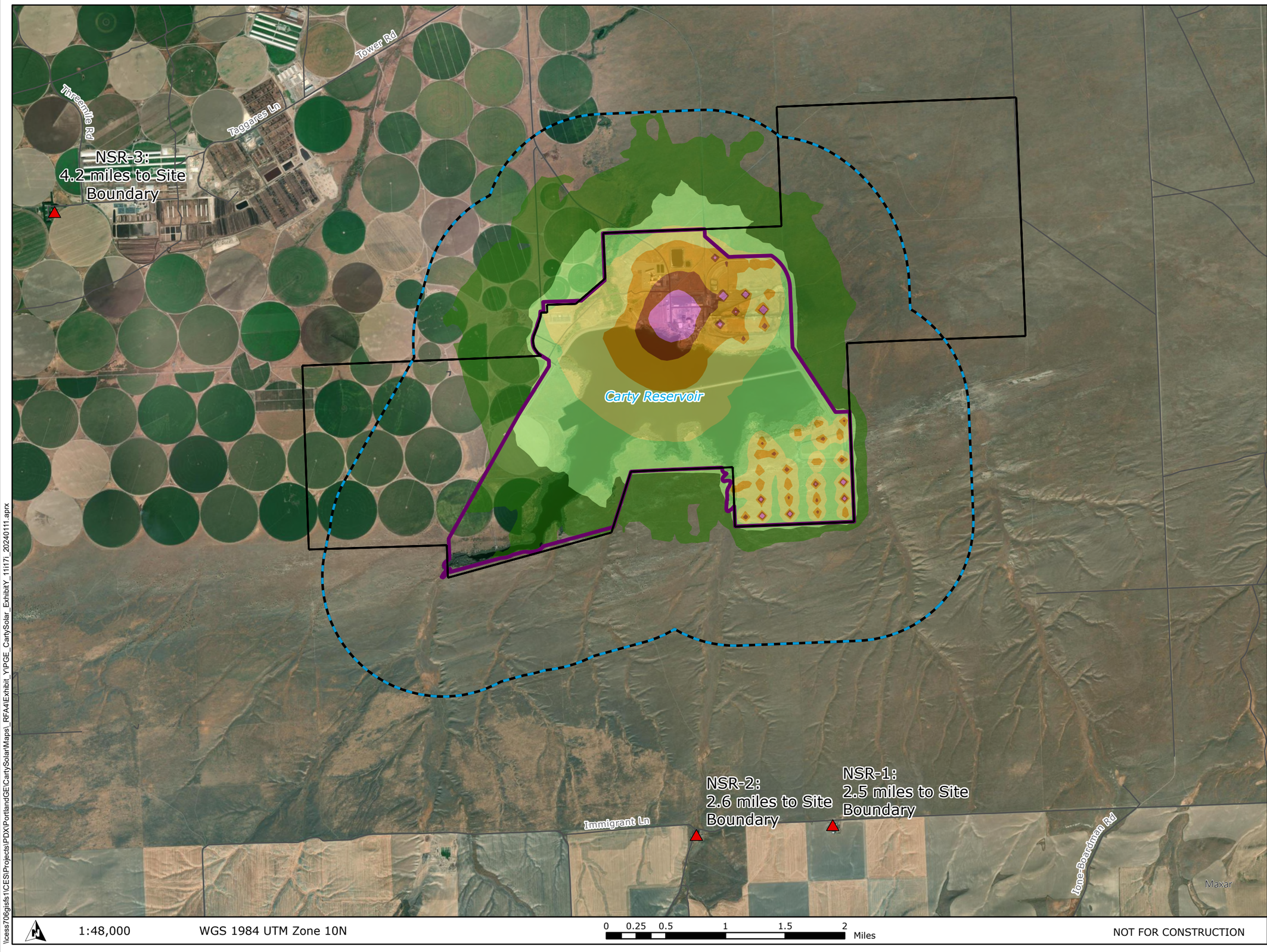
- 36-41
- 41-46
- 46-51
- 51-56
- 56-61
- > 61

TETRA TECH

PGE

Reference Map





1:48,000

WGS 1984 UTM Zone 10N

0 0.25 0.5 1 1.5 2 Miles

NOT FOR CONSTRUCTION

\\cess706gisfs1\CES\Projects\PDX\PortlandGE\CartySolarMaps_RFA4\Exhibit_Y\PGE_CartySolar_ExhibitY_11117i_20240111.aprx

Exhibit AA

Electromagnetic Frequencies from Transmission Lines

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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Table of Contents

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Acronyms and Abbreviations

AC	alternating current
BCP	Boardman Coal Plant
BESS	battery energy storage system
BLM	Bureau of Land Management
BPA	Bonneville Power Administration
CAFE	Corona and Fields Effect Program
Certificate Holder / PGE	Portland General Electric Company
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
dB	decibel
ELF	extremely low frequency
EMF	electromagnetic field
EMR	electromagnetic radiation
FCC	Federal Communications Commission
GHz	gigahertz
GPS	Global Positioning System
Hz	hertz
ICES	International Committee on Electromagnetic Safety
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
kHz	kilohertz
kV	kilovolt
m	meter
MHz	megahertz
mG	milligauss
MW	megawatt
OAR	Oregon Administrative Rules
RFA	Request for Amendment
µV/m	microvolt per meter

1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current (AC) of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant (BCP) and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

This Exhibit AA was prepared to meet the submittal requirements in Oregon Administrative Rules (OAR) 345-021-0010(1)(aa). Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate, previous RFAs, and Oregon Department of Energy Final Orders to demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate conditions and the standard in OAR 345-021-0010(1)(aa). OAR 345 Division 22 does not provide an approval standard specific to Exhibit AA. This exhibit also includes the submittal requirements outlined in the Specific Standards for Transmission Lines under OAR 345-024-0090:

> *(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.*

1.1 EMF Background Information

Electromagnetic fields (EMFs) occur both naturally and as a result of the generation, transmission, and use of electric power. The earth itself generates steady-state magnetic and electric fields.

Electromagnetic fields are present around any conductors or devices that transmit or use electrical energy; as a result, exposure to EMF is common from an array of electrical appliances and equipment, building wiring, and electric distribution and transmission lines. The electrical power system in the United States is an alternating current (AC) system operating at a frequency of 60 hertz (Hz)[1], resulting in "power frequency" or "extremely low frequency (ELF)" EMF.[2] While electric and magnetic fields are often referred to and thought of collectively, each arises through a different mechanism and can have differing effects.

Electric fields around transmission lines are produced by the presence of an electric charge, measured as voltage, on the energized conductor. Electric field strength is directly proportional to the line's voltage; that is, increased voltage produces a stronger electric field. The strength of the electric field is inversely proportional to the square of distance from the conductors; the electric field strength declines as the distance from the conductor increases. The strength of the electric field is measured in units of kilovolts (kV) per meter (m) or kV/m. Electric fields are readily weakened or blocked by conductive objects such as trees or buildings. The direction of force within the electric field alternates at a frequency of 60 Hz, in direct relation to the charge on each conductor. However, the overall transmission line voltage, and therefore the overall strength and reach of the electric field, remains practically steady and is not affected by the common daily and seasonal fluctuations in usage of electricity by customers.

Magnetic fields around transmission lines are produced by the movement of electrical charge, measured in terms of amperage, through the conductors. Like the electric field, the magnetic field alternates at a frequency of 60 Hz. Magnetic field strength is expressed in units of milligauss (mG).[3] The magnetic field strength is directly proportional to the amperage; that is, increased current flow resulting from increased power flow through the line produces a stronger magnetic field. As with electric fields, the magnetic field is inversely proportional to the square of the distance from the conductors, declining in strength as the distance from the conductor increases. Magnetic fields are not blocked or shielded by most materials. Unlike voltage, the amperage and the resulting magnetic field around a transmission line fluctuate daily and seasonally as the usage of electricity varies and the resulting amount of current flow varies.

Each AC three-phase circuit carries power over three conductors. One phase of the circuit is carried by each of the three conductors. The AC voltage and current in each phase conductor is out of sync with the other two phases by 120 degrees, or one-third of the 360-degree cycle. The fields from each of these conductors tend to cancel each other out because of this phase difference. However, since the conductors are separated from each other, when a person stands under a transmission

[1] Hertz is a measure of cycles per second. In a 60-Hz transmission system, the charge and direction of current flow on each conductor will cycle from positive to negative and back to positive 60 times per second. The direction of force in the electric and magnetic fields will also cycle in direct relation to the charge and direction of flow on the conductor.

[2] The electric transmission system in the U.S. operates at 60 Hz, while in Europe and other parts of the world, the systems operate at 50 Hz; both produce fields that are referred to as power frequency or ELF EMF.

[3] Magnetic field strength may also be measured in terms of the Tesla, an International System unit of measurement. 1 Gauss = 0.0001 Tesla, or 1 Tesla = 10,000 Gauss; 1 Gauss = 1,000 mG.

line, one conductor is somewhat closer than the others and will contribute a net uncanceled field at the person's location.

1.2 EMF Standards

No federal regulations or guidelines apply directly to the EMF levels for transmission lines. The National Institute of Environmental Health Sciences performed an extensive review of field-related issues in the 1990s that resulted in the decision that regulatory actions are unwarranted (NIEHS 1999).

Although there are no federal regulations on power-frequency EMF in the United States, international recommendations and guidelines exist. Table AA-1 lists power-frequency EMF guidelines recommended by the European Union, the International Committee on Electromagnetic Safety (ICES), and the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which is an affiliate of the World Health Organization (EU 1999, ICES 2002, ICNIRP 2010).

Table AA-1. International Guidelines for Alternating Current Power-Frequency EMF Levels

Agency	Exposure	Electric Field (kV/m)	Magnetic Field (mG)
European Union	General public	4.2	833
ICES[1]	Occupational	20	27,100
	General public	5	9,040
	General public within right-of-way	10	NA
ICNIRP	Occupational	8.3	10,000
	General public	4.2	2,000

Magnetic fields are measured in gauss (G) and milligauss. 1 G = 1,000 mG

NA = Not Applicable (no requirements)

1. ICES recommendations have been adopted as standards by the Institute of Electrical and Electronics Engineers (IEEE); see Standard C95.6 -2002 (R2007).

Transmission line projects in Oregon must comply with the electric field standard found in OAR 345-024-0090, which requires that the applicant design, construct, and operate the 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.

Six other states have adopted limits for electric field strength either at the edge or within the right-of-way of the transmission line corridor. Only Florida and New York currently limit magnetic fields levels from transmission lines. The magnetic field levels set in those two states only apply at the edge of the right-of-way and were developed to prevent magnetic fields from increasing beyond levels currently experienced by the public. Table AA-2 shows the AC electric field and magnetic field standards that have been adopted by states in the U.S.

Table AA-2. Other State Alternating Current Power-Frequency EMF Standards

State		Location	Electric Field (kV/m)	Magnetic Field (mG)
Florida	230 to 500 kV lines	Within right-of-way	10	NA
		Edge of right-of-way	2	200[1]
	230 kV or less	Within right-of-way	8	NA
		Edge of right-of-way	2	150
Minnesota		Within right-of-way	8	NA
Montana		Within right-of-way: road crossing	7	NA
		Edge of right-of-way	1[2]	NA
New Jersey		Within right-of-way	NA	NA
		Edge of right-of-way	3	NA
New York		Within right-of-way: open	11.8	NA
		Within right-of-way: public road	7	NA
		Within right-of-way: private road	11	NA
		Edge of right-of-way	1.6	200
North Dakota		Within right-of-way	9	NA
		Edge of right-of-way	NA	NA
Oregon		Within right-of-way	9	NA
		Edge of right-of-way	NA	NA

NA = Not Applicable (no requirements)

1. Magnetic field strength is limited to 250 mG for new double-circuit 500-kV lines constructed on a previously existing right-of-way.

2. Can be waived by landowner.

In fall 2009, the Oregon Energy Facility Siting Council (Council) commissioned a review of existing information to prepare for the review of several transmission lines under discussion at that time. That review was conducted by Dr. Kara Warner and presented to the Council on November 20, 2009, during a regular Council meeting. The prevailing conclusions were that there is a need to continue to monitor the science on EMF; that low-cost, prudent avoidance measures of public EMF exposure are appropriate; and that health-based limits are not appropriate given the scientific data available (Council 2009).

2.0 Facility EMF – OAR 345-021-0010(1)(aa)(A)

OAR 345-021-0010(1)(aa) Exhibit AA. If the proposed energy facility is a transmission line or has, as a related or supporting facility, a transmission line of any size:

OAR 345-021-0010(1)(aa)(A) Information about the expected electric and magnetic fields, including:

The Amended Carty Solar Farm includes one segment of proposed 500-kV generation-tie transmission line and one segment of 34.5-kV overhead collector line. The transmission line will connect the proposed collector substation to the existing electrical transmission dead-end structure for a 500-kV transmission line, which used to serve the BCP. The new substation will connect to the existing dead-end structure, which is 100 feet tall, via the new transmission line that will be approximately 300 feet in length. On the existing dead-end structure, old switch components and operators will be replaced with new equipment, but there will be no modifications made to the structure. Once connected to the existing dead-end structure, the energy will be conveyed through the existing BCP 500-kV transmission line to the existing Grassland Switchyard. From the Grassland Switchyard, electrical output from the Amended Carty Solar Farm will be routed to BPA's existing Slatt Substation through the existing 500-kV Grassland to Slatt transmission line (approximately 17 miles long).

Based on the proposed siting of the 300-foot-long transmission line between the proposed collector substation and existing dead-end structure, the new segment of transmission line will be inaccessible to the public. The new segment will be located behind multiple security fences and within the chain-link perimeter fencing for the collector substation, which will be up to 11 feet in height and include an additional 1 foot of razor or barb wire. Other existing fencing around the Facility perimeter will further preclude public access to the transmission line; therefore, it will be unlikely for members of the public to experience any impacts from alternating current electric fields. Based on the proposed siting of the transmission line, and because the 9-kV per meter standard and modeling requirements of OAR 345-024-0090(1) are required for areas accessible to the public, the 9-kV per meter standard and modeling of electric fields are not applicable to the 300-foot-long segment of proposed transmission line and it is not analyzed further in this exhibit.

One segment of 34.5-kV collector line will be installed aboveground. This segment will extend from the perimeter fence on the north side of the Southern Solar Area, along the eastern shore of the Carty Reservoir, to a point just south of the Northern Solar Area where the line will go back underground until entering the proposed collector substation. The aboveground segment will be approximately 1-mile long, in the center of a new 80-foot-wide right-of-way, using the support pole design approved for this same segment of line in RFA 1. See Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station).

2.1 Analysis Area – OAR 345-021-0010(1)(aa)(A)(i)(ii)(iii)

OAR 345-021-0010(1)(aa)(A)(i) The distance in feet from the proposed center line of each proposed transmission line to the edge of the right-of-way;

OAR 345-021-0010(1)(aa)(A)(ii) The type of each occupied structure, including but not limited to residences, commercial establishments, industrial facilities, schools, daycare centers and hospitals, within 200 feet on each side of the proposed center line of each proposed transmission line;

OAR 345-021-0010(1)(aa)(A)(iii) The approximate distance in feet from the proposed center line to each structure identified in (A);

The aboveground segment of proposed 34.5-kV collector line will be approximately 1-mile long, in the center of a new 80-foot-wide right-of-way. There are no occupied buildings, residences, or other sensitive receptors within 200 feet of the center line of the proposed 34.5-kV overhead collector line route. See Figure 2 in the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station). The collector line is oriented north to south and extends from the perimeter fence on the north side of the Southern Solar Area, along the eastern shore of the Carty Reservoir, to a point just south of the Northern Solar Area where the line will go back underground until entering the proposed collector substation. The areas within 200 feet of the north end of the proposed collector line are all associated with the Facility and there are no existing or proposed buildings, residences, or other sensitive receptors. The area within 200 feet to the east is all vacant land owned by Threemile Canyon Farms, LLC, and under a conservation easement. The area within 200 feet to the south will all be part of the Southern Solar Area. The area within 200 feet to the west of the collector line is all the Carty Reservoir or associated shoreline.

2.2 Modeling Results – OAR 345-021-0010(1)(aa)(A)(iv)

OAR 345-021-0010(1)(aa)(A)(iv) At representative locations along each proposed transmission line, a graph of the predicted electric and magnetic fields levels from the proposed center line to 200 feet on each side of the proposed center line;

Table AA-3 shows calculated electric field values for the proposed aboveground 34.5-kV collector line. Table AA-4 shows calculated magnetic field values for the 34.5-kV collector line.

Table AA-3. Calculated Electric Field Values

Line Description	Figure	Electric Field (kV/m)		
		200 feet Left	Peak Value	200 feet Right
34.5-kV Collector Line	AA-1 AA-3	0.004	0.378, 8 feet right of centerline	0.005

Table AA-4. Calculated Magnetic Field Values

Line Description	Figure	Magnetic Field (mG)		
		200 feet Left	Peak Value	200 feet Right
34.5-kV Collector Line	AA-1 AA-3	3.13	193.2, 4 feet right of centerline	3.59

The analysis results of the Bonneville Power Administration (BPA) Corona and Fields Effect Program, Version 3 (CAFE) model presented in Table AA-3 demonstrate that the proposed 34.5-kV collector line can be constructed and operated such that the AC electric field will not exceed 9 kV/m at 1 meter above the ground surface, as required by OAR 345-024-0090(1). See Figure AA-1 for the electric field graph for the 34.5-kV collector line, and Figure AA-2 for the magnetic field graph for the 34.5-kV collector line. The analysis results for the 34.5-kV collector line are provided in

Attachment AA-1. The modeling assumptions related to the collector line are intentionally conservative, producing worst-case EMF results. EMF levels under normal operating conditions will be lower than indicated by this analysis.

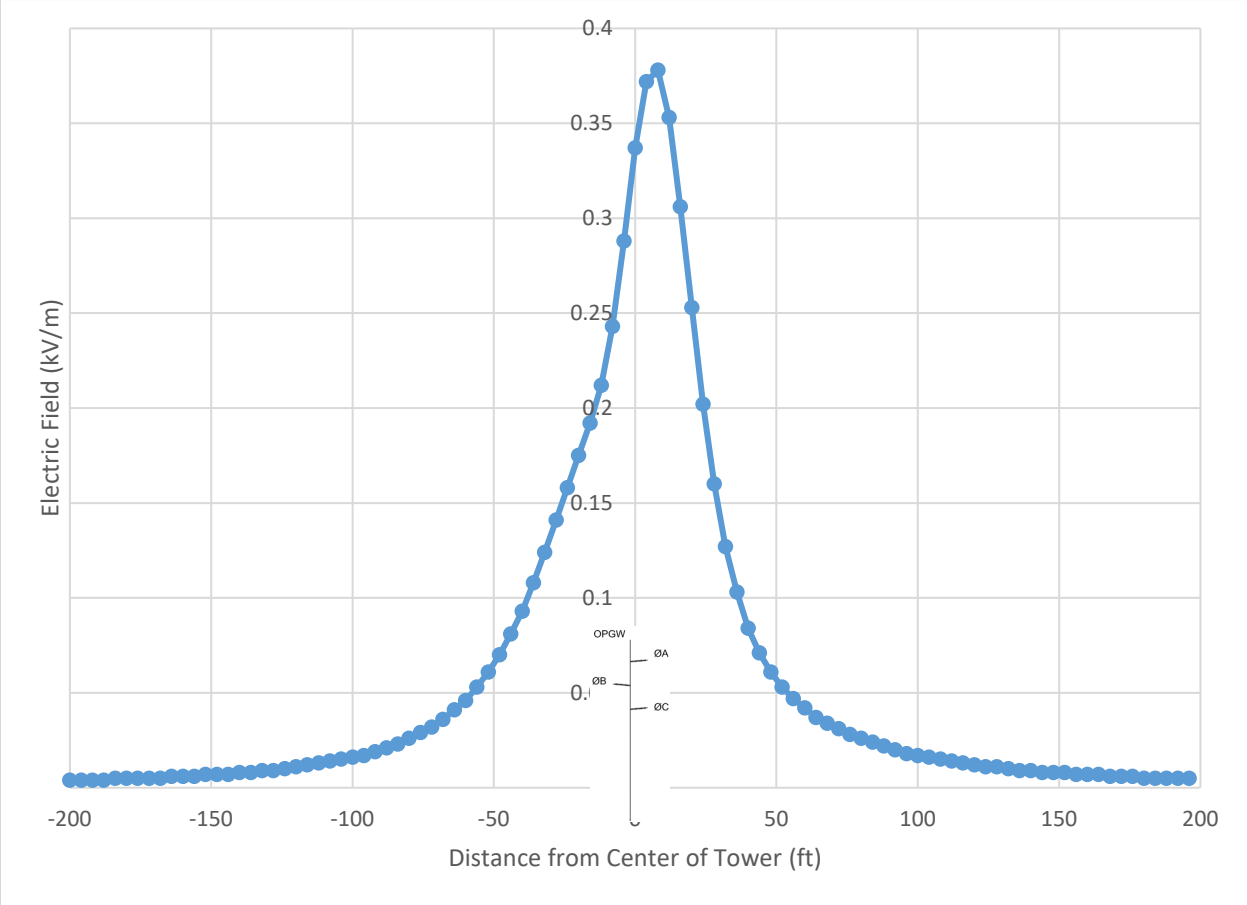


Figure AA-1. Electric Field, 34.5-kV Collector Line

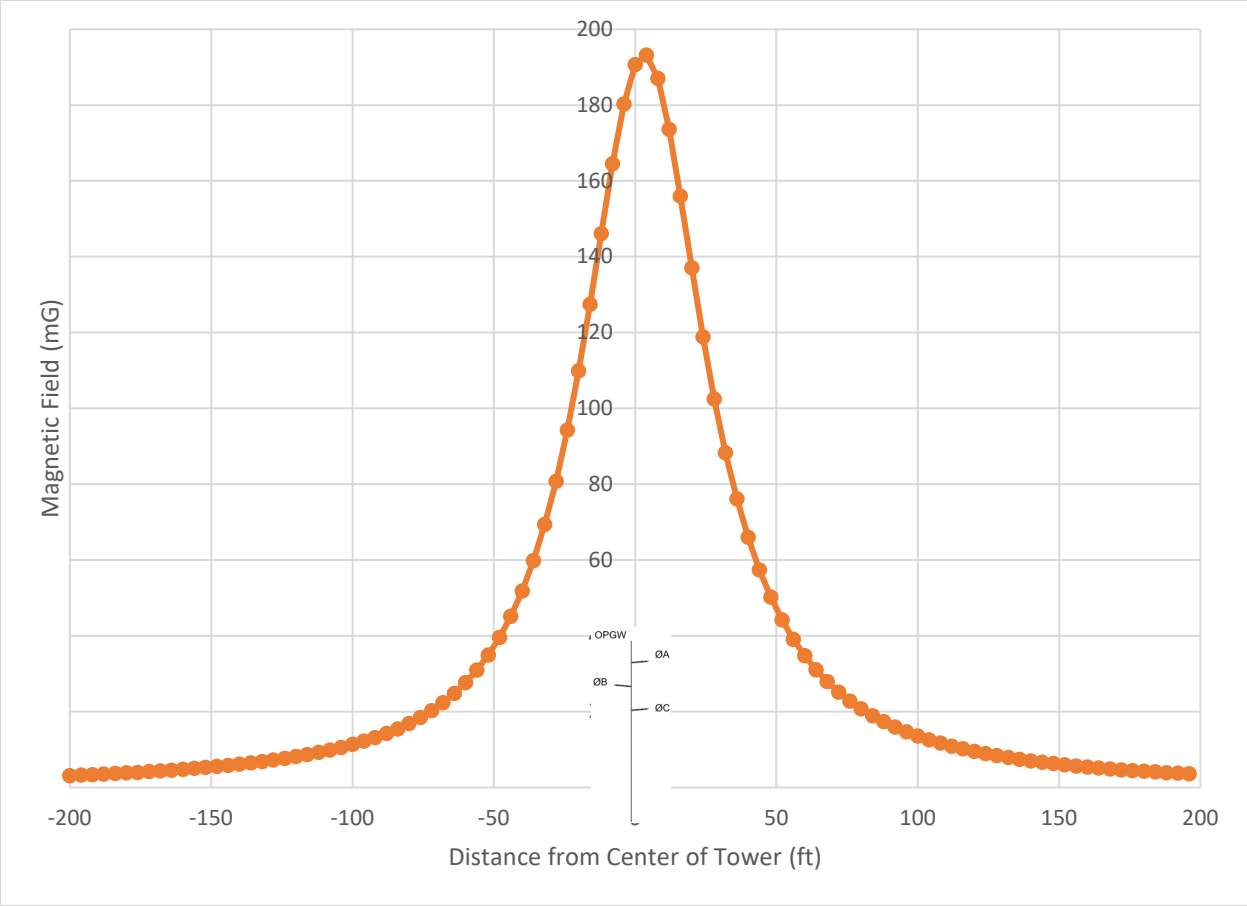


Figure AA-2. Magnetic Field, 34.5-kV Collector Line

2.3 EMF Calculation Methods – OAR 345-021-0010(1)(aa)(A)(vi)

OAR 345-021-0010(1)(aa)(A)(vi) The assumptions and methods used in the electric and magnetic field analysis, including the current in amperes on each proposed transmission line;

The following assumptions are used for the calculation of the electric and magnetic field analysis of the aboveground segment of the 34.5-kV collector line. The planned 34.5-kV collector line configuration is shown in Figure AA-3.

Assumptions for modeling are as follows:

- Environmental parameters – 1 inch of precipitation per hour, 2.0 miles per hour wind speed (for modeling wet-weather conditions)
- Height for both electrical and magnetic field measurements – 1 meter, or 3.28 feet above ground.
- 34.5-kV collector line information:

- Overhead pole height – 70 feet
- Line amperage – 1,687 amps, maximum output value of southern portion of the Facility.
- Line voltage – 34.5-kV phase/phase or 19.92-kV phase/ground
- Conductor type – Single 795- thousand circular mils aluminum-conductor steel-reinforced cable conductors per phase, 1.11" in diameter as shown in Figure AA-3.
- Ground wire – one optical ground wire, 0.5" in diameter, as shown in Figure AA-3. Minimum height from ground is 45 feet.
- Minimum height of conductor from ground – 25 feet.
- A phase is located on the upper arm of the transmission structure at 39 feet minimum height and 5 feet right of centerline.
- B phase is located on the central arm of the transmission structure at 32 feet minimum height and 5 feet left of centerline.
- C phase is located on the lower arm of the transmission structure at 25 feet minimum height and 5 feet right of centerline.

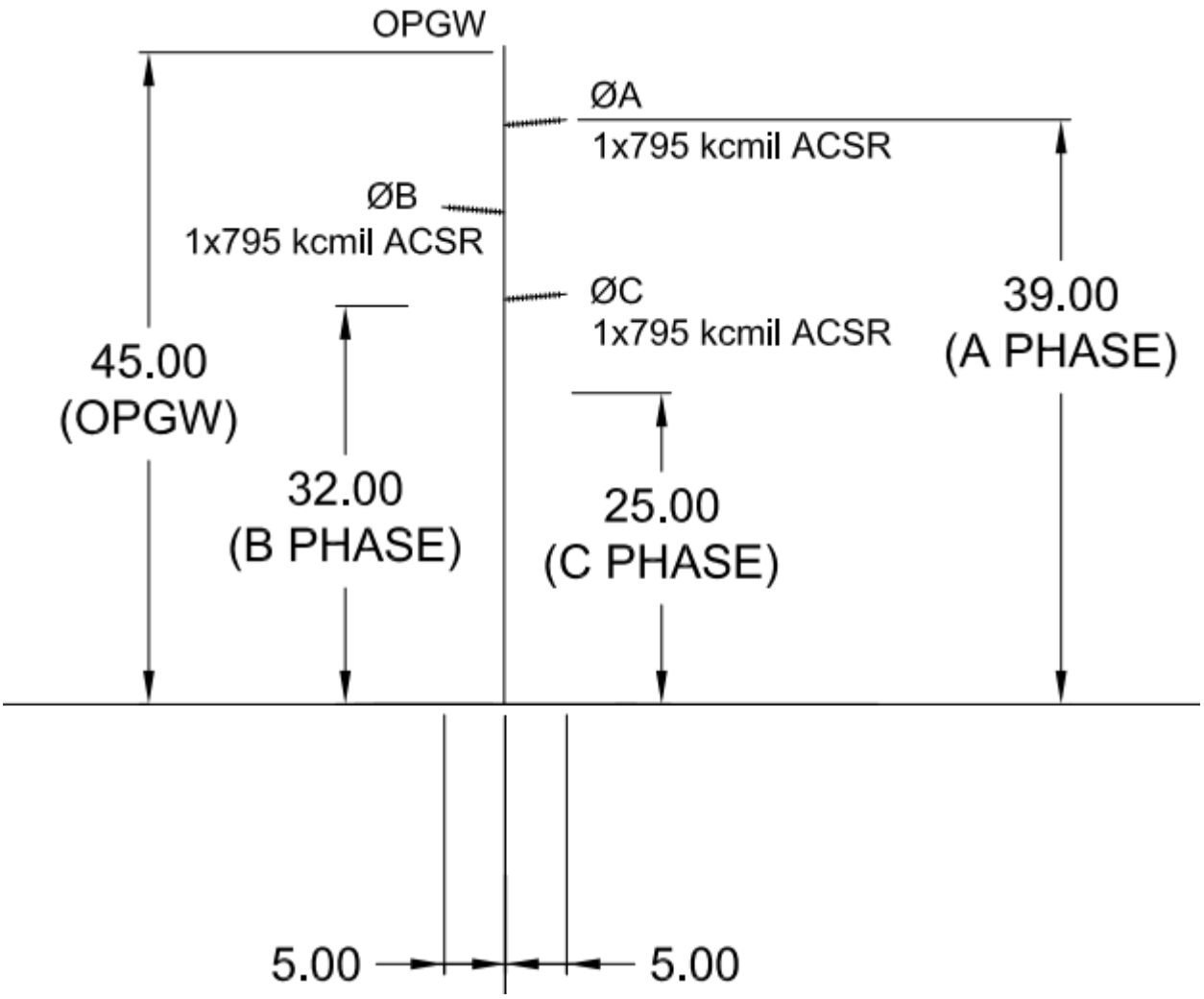


Figure AA-3. Typical Overhead Collector Line for Facility

3.0 EMF Mitigation Measures – OAR 345-021-0010(1)(aa)(A)(v)

OAR 345-021-0010(1)(aa)(A)(v) Any measures the applicant proposes to reduce electric or magnetic field levels;

The Certificate Holder will comply with the existing Site Certificate Conditions 7.1 and 7.9 to limit EMF and induced current impacts in the Third Amended Site Certificate (Council 2022).

4.0 EMF Monitoring Program – OAR 345-021-0010(1)(aa)(A)(vii)

OAR 345-021-0010(1)(aa)(A)(vii) The applicant's proposed monitoring program, if any, for actual electric and magnetic field levels; and

No program for monitoring actual EMF levels before or after construction is proposed at this time.

5.0 Radio and TV Interference – OAR 345-021-0010(1)(aa)(B)

OAR 345-021-0010(1)(aa)(B) An evaluation of alternate methods and costs of reducing radio interference likely to be caused by the transmission line in the primary reception area near interstate, U.S. and state highways.

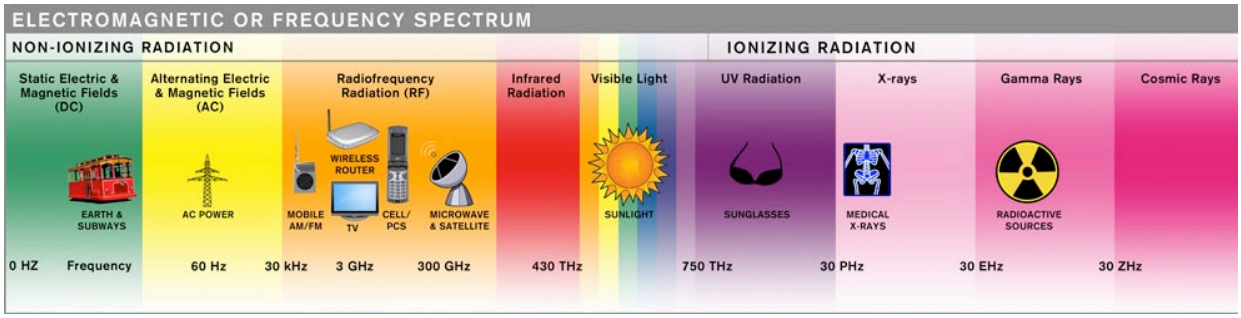
5.1 Background

5.1.1 Electromagnetic Interference

Electromagnetic interference from power transmission systems in the U.S. is governed by the Federal Communications Commission (FCC) Rules and Regulations (FCC 1988). A power transmission line is categorized by the FCC as an "incidental radiation device." It is defined as "a device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy." Such a device "shall be operated so that the radio frequency energy that is emitted does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference." In this case, "harmful interference" is defined as "any emission, radiation or induction which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with this chapter" (FCC 1988). Oregon does not have regulatory standards for either radio or TV interference.

Modern communications systems all rely on electromagnetic radiation (EMR) to transmit information. AM and FM radio, TV, shortwave radio, cellular telephones, radar, Global Positioning System (GPS) devices and satellite communications, cordless telephones, Bluetooth, and wireless computer networks such as Wi-Fi or wireless local area network all utilize a region of the electromagnetic spectrum known as "radio frequency" EMR, which extends from the very low-frequency end at about 30 kilohertz (kHz) up into the high-frequency microwave range at about 300 gigahertz (GHz). Each type of technology uses a specific segment of the electromagnetic frequency spectrum; older technology such as AM radio is at the low-frequency end, while newer

technologies such as GPS and Wi-Fi utilize high-frequency signals. Figure AA-4 provides a visual representation of typical communications frequencies.



Source: EMF & Radio Frequency Solutions. Available at: http://www.emfrf.com/index.php/emf-rf/emf-overview/electromagnetic-spectrum-or-frequency-spectrum.html.

Figure AA-4. Communications Frequency Spectrum

The level of interference can be partially determined by how similar or different the signal frequency is compared to the noise frequency. In general, there is very little interaction between signals of differing frequency; radio signals, TV signals, cellular phone signals, and GPS signals can all coexist in the same space and time without interfering with each other. For interference to occur, frequencies must be similar.

EMR and resulting interference can be an indirect product of electric transmission lines. EMR arises not from the lines themselves, but from the interaction of the strong electric field at the surface of the conductors and other energized components with the surrounding air. Two types of interactions may occur that create electromagnetic interference: corona discharge and gap discharge.

5.1.1.1 Corona Discharge

High-voltage power transmission lines generate a strong electric field at the surface of the conductor, which can be strong enough to split the surrounding air molecules, resulting in the emission of electromagnetic energy in the form of ultraviolet and near-ultraviolet light and broad-band radio frequency EMR (corona discharge also produces audible sound, which is addressed in Exhibit Y; audible sound is not discussed further in this exhibit). The former can sometimes be seen by humans under the right conditions or with specialized equipment, while the latter can sometimes be heard as electronic "noise," or interference with radio signal reception. Broadband corona EMR discharge typically occurs in the frequency spectrum from below 100 kHz to approximately 1,000 megahertz (MHz), which overlaps with the frequencies used for AM and FM radio and some TV signals. With sufficient corona activity, low-frequency radio and TV interference can be noticeable within a few hundred feet of the transmission line. These effects are most pronounced directly underneath the line conductors and decrease with distance from the transmission line.

Corona on a transmission line conductor depends on several factors such as operating voltage, conductor diameter, overall line geometry, weather conditions, and altitude. Conductor size, line voltage and line geometry are taken into consideration when designing a transmission line so that the electric fields at the conductor surface are minimized. However, for a high-voltage line, any incidental irregularities on the conductor surface (for example, water droplets, dust, debris, and nicks or scratches in the conductor) act as points where the electric field may be intensified sufficiently to produce corona. Thus, the level of corona activity is elevated during foul weather when raindrops on the conductor surface act as points producing corona.

5.1.1.2 Gap Discharge

A gap discharge occurs when current arcs across a gap between two conductive objects. Gap discharges can produce radio noise in the lower frequencies (AM radio frequencies) and well into the microwave range (analog TV frequencies). These discharges can be produced by loose connections, a problem that more commonly occurs on low-voltage distribution lines but rarely occurs on high-voltage transmission lines (Trinh 2012). Unlike corona discharge, which may occur anywhere along a high-voltage transmission line conductor, gap discharge occurs at mechanical connectors and components that are used to hold the conductors in place. Gap discharge is controlled through proper construction and maintenance practices to ensure all mechanical connectors and components are properly assembled. Because gap discharge is an intermittent, temporary, and readily resolved problem, and results only in localized electrical interference issues, the potential for interference with TV signals or higher-frequency communications is not considered a significant problem.

5.1.2 Radio Interference Effects

The corona-induced broadband EMR from transmission lines can produce interference to AM signals, such as a commercial AM radio audio signal (i.e., radio noise) or the video portion of an older analog broadcast TV station (i.e., TV noise). Technologies that use frequency modulation, such as FM radio stations and the audio portion of older analog broadcast TV signals, are generally not affected by noise from a transmission line. As digital signal processing has been integrated into these communication systems, the potential interference impact of corona-generated radio noise has decreased.

The level of interference caused by radio noise from a transmission line to the reception of a radio signal depends on the location of the radio transmitter, the radio receiver, and the transmission line. A transmission line that is directly between a radio transmitter and a listener's receiver may be more likely to interfere with that listener's reception, whereas a transmission line behind or beside the listener in relation to the transmitter will not necessarily cause interference, depending on the radio receiver's antennae. The radio noise generated by a transmission line is very low in power and decreases rapidly as distance from the line increases. It is experienced only when in close proximity to the transmission line.

In general, complaints related to corona-generated interference are infrequent. Moreover, the advent of cable and satellite TV service, and the federally mandated conversion to digital TV broadcast in June 2009 have greatly reduced the occurrence of corona-generated interference. Low-frequency corona-induced EMR does not interact with the higher-frequency satellite signals or with wired communication systems, while digital TV receivers are equipped with systems to filter out interference. Many radio stations also broadcast in digital, reducing the likelihood of corona-induced EMR interference. Electric power companies are able to operate very effectively under the present FCC rule because harmful interference can generally be eliminated or effectively mitigated.

Radio noise is measured in units of decibels (dB) based on its field strength referenced to a signal level of 1 microvolt per meter (Institute of Electrical and Electronics Engineers [IEEE] 1986). Corona-induced radio noise during fair weather is calculated to be approximately 40 dB (dB-1 microvolt per meter [1 μV/m]) at the edge of the right-of-way. This is considered an acceptable level (IEEE 1971). When the transmission line is in proximity to roadways (for example, interstate, U.S., and state highways), such as when it passes over these roadways, radio interference may be experienced for short distances while in proximity to the line. Interference may be more noticeable near the line particularly during foul weather, when corona activity is elevated.

5.1.3 Interference with Other Electronic Communications

Wireless computer network systems, cell phones, GPS units, and satellite receivers operate at high frequencies in the tens to hundreds of MHz or even GHz. These systems also often use FM or digital coding of the signals so they are relatively immune to electromagnetic interference from transmission line corona. GPS units are used in a wide range of activities, including several important agricultural activities such as monitoring pivot irrigation, tracking wheeled and tracked equipment movements during farming operation, and checking the orientation of aerial spraying aircraft. GPS units operate in the frequency range of 1.2 to 1.6 GHz. Satellite receivers operate at frequencies of 3.4 GHz to 7 GHz and have shown no effect from transmission lines unless the receiver was trying to view the satellite through the transmission tower or conductor bundle of the transmission line (Chartier et al. 1986). Repositioning the receiver by a few feet was sufficient to eliminate the obstruction and reduced signal. Mobile phones operate in the radiofrequency range of about 800 MHz to 1,900 MHz or higher. As a result of the high frequencies used by these devices, modulation and processing techniques, and the typically lower-frequency corona-induced EMR, effects from interference are unlikely.

The voltages and currents associated with the transmission line have the potential to induce voltage and current in nearby conductors (e.g., ungrounded metal fences and ungrounded metal irrigation systems). This effect is more likely where ungrounded fences or irrigation systems are parallel and long (1 mile or more). These induced voltages could result in a “nuisance” shock to anyone who touches such a fence or irrigation system. These shocks are known as nuisance or “startle” shocks as they will not physically harm someone, but may be noticed by some people and provoke a startle reaction. An example of an ungrounded metal irrigation system would be a center

pivot system on rubber tires. By contrast, the Vermeer-type metal irrigation system is grounded through its metal wheels and therefore presents less of a shock hazard.

A GPS unit in farming equipment should work properly within the vicinity of a transmission line. GPS devices continually pull signals from a number of satellites, not just one and may also utilize a fixed base station. A signal may be blocked temporarily if the transmission structure is between the receiver and a weak signal, but it will return as the farm equipment moves past the structure. It is also common for GPS receivers to drop and pick up signals even in the absence of transmission lines and structures. If the base station signal is weak or blocked, additional or alternate locations may improve the signal and performance.

Signal interference occurs when other signals at the same frequency as the satellite signal are present. Multipath occurs when objects such as buildings, structures, or tractor parts reflect a GPS satellite signal, causing the satellite signal to arrive at the receiver later than it would have if it followed a straight line from the satellite. A study commissioned by the Electric Power Research Institute found that signal interference is "unlikely" based on the design of GPS receivers and their ability to separate the GPS signal from background noise (Silva and Olsen 2002). Another study compared the accuracy of real-time kinematic GPS receivers at different locations to transmission lines and towers (Gibbings et al. 2001). This study concluded that multipath from transmission towers could result in GPS-initialization errors (e.g., the system reports the wrong starting location) 1.1 percent to 2.3 percent of the time. This study also reported that GPS software was able to identify and correct these initialization errors within the normal startup time. This study reported initialization errors caused by electromagnetic interference from energized overhead transmission lines when the GPS receiver was located outside the vehicle, but concluded that "most, if not all of this effect can be eliminated by shielding the receiver and cables." Placing the receiver inside the vehicle significantly reduced initialization errors.

5.2 Evaluation of Alternate Methods and Costs to Reduce Interference

Design options for reducing the radio noise from the collector line include use of larger diameter conductors, or use of more conductors within the conductor bundles. Increasing the distance between phases of the lines (conductor bundles) may also result in a decrease in the radio noise. These line design options have been employed to minimize the generation of radio noise to acceptable levels.

6.0 Conclusion

Exhibit AA demonstrates that the Facility, with the addition of the Amended Carty Solar Farm, will continue to ensure public health and safety with respect to EMFs. Also, this exhibit demonstrates that the Amended Carty Solar Farm's AC electric fields and induced currents will comply with the Specific Standards for Transmission Lines provided under OAR 345-024-0090.

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Attachment AA-1. CAFE EMF Output

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ÛßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßÛ
Û       C O R O N A   A N D   F I E L D       Û
Û E F F E C T S   P R O G R A M   V E R.  3   Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
```

INPUT DATA LIST

```
               12/26/2023         07:50:38
  PGE Carty 34.5 kV Transmission Line
  Run 1 20231226
 1,0, 3, 4,0.0,   2.00,   1.00,    .00

 (ENGLISH UNITS OPTION)

 (GRADIENTS ARE COMPUTED BY PROGRAM)

 PHYSICAL SYSTEM CONSISTS OF  4 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

 OPTIONS: EF MF AN
   4.921,  6.562,  9.842,  1.000,  1.000, 75.000,  3.280,  6.700,  3.280
 'A        ','A',    5.00,   39.00, 1,   1.110,    .000,  19.920,    .000,
1.687,    .000
 'B        ','A',   -5.00,   32.00, 1,   1.110,    .000,  19.920, 120.000,
1.687,    .000
 'C        ','A',    5.00,   25.00, 1,   1.110,    .000,  19.920, 240.000,
1.687,    .000
 'G        ','A',     .00,   45.00, 1,    .500,    .000,    .000,    .000,
.000,    .000
 100 -200.0    4.0
```

1ELECTRIC FIELD CALCULATIONS

PGE Carty 34.5 kV Transmission Line
Run 1 20231226

	DIST. FROM REFERENCE FEET	HEIGHT FEET	MAXIMUM GRADIENT (KV/CM)	SUBCON. DIAM. (IN)	NO. OF SUBCON.	PHASE ANGLE (DEGREES)
A	5.00	39.00	2.55	1.11	1	.0
B	-5.00	32.00	2.54	1.11	1	120.0
C	5.00	25.00	2.54	1.11	1	240.0
G	.00	45.00	.68	.50	1	.0

SENSOR HT. = 3.3 FEET

```
 DIST FROM
 REFERENCE       E-FIELD         THETA       EY-FIELD        THETAY
EX-FIELD       THETAX   SPACE POTENTIAL
     FEET      (KV/METER)      (DEGREES)    (KV/METER)      (DEGREES)
```

(KV/METER)	(DEGREES)	(VOLTS)		
-200.0	.004	88.1	.004	-121.5
.000	-107.2	3.8		
-196.0	.004	88.1	.004	-120.9
.000	-106.4	4.0		
-192.0	.004	88.0	.004	-120.3
.000	-105.5	4.1		
-188.0	.004	88.0	.004	-119.6
.000	-104.7	4.3		
-184.0	.005	87.9	.005	-119.0
.000	-103.8	4.5		
-180.0	.005	87.9	.005	-118.3
.000	-102.8	4.7		
-176.0	.005	87.8	.005	-117.6
.000	-101.9	4.9		
-172.0	.005	87.8	.005	-116.8
.000	-100.9	5.2		
-168.0	.005	87.7	.005	-116.0
.000	-99.9	5.4		
-164.0	.006	87.7	.006	-115.2
.000	-98.8	5.7		
-160.0	.006	87.6	.006	-114.3
.000	-97.7	6.0		
-156.0	.006	87.5	.006	-113.5
.000	-96.6	6.3		
-152.0	.007	87.5	.007	-112.5
.000	-95.4	6.7		
-148.0	.007	87.4	.007	-111.6
.000	-94.2	7.0		
-144.0	.007	87.3	.007	-110.6
.000	-93.0	7.4		
-140.0	.008	87.2	.008	-109.5
.000	-91.7	7.9		
-136.0	.008	87.1	.008	-108.4
.000	-90.4	8.4		
-132.0	.009	87.0	.009	-107.2
.000	-89.0	8.9		
-128.0	.009	86.9	.009	-106.0
.001	-87.6	9.5		
-124.0	.010	86.8	.010	-104.8
.001	-86.2	10.1		
-120.0	.011	86.7	.011	-103.4
.001	-84.7	10.9		
-116.0	.012	86.6	.012	-102.1
.001	-83.1	11.7		
-112.0	.013	86.5	.013	-100.6
.001	-81.5	12.6		
-108.0	.014	86.3	.014	-99.1
.001	-79.9	13.6		
-104.0	.015	86.2	.015	-97.5
.001	-78.2	14.7		
-100.0	.016	86.0	.016	-95.8

.001	-76.5	16.0			
-96.0	.017	85.8	.017	-94.1	
.001	-74.7	17.4			
-92.0	.019	85.6	.019	-92.3	
.002	-72.8	19.1			
-88.0	.021	85.4	.021	-90.4	
.002	-70.9	21.0			
-84.0	.023	85.2	.023	-88.4	
.002	-68.9	23.2			
-80.0	.026	85.0	.026	-86.3	
.002	-66.9	25.7			
-76.0	.029	84.8	.029	-84.2	
.003	-64.8	28.6			
-72.0	.032	84.6	.032	-81.9	
.003	-62.5	32.1			
-68.0	.036	84.3	.036	-79.6	
.004	-60.2	36.1			
-64.0	.041	84.1	.041	-77.1	
.004	-57.7	40.8			
-60.0	.046	83.9	.046	-74.6	
.005	-55.0	46.4			
-56.0	.053	83.7	.053	-71.9	
.006	-52.1	52.9			
-52.0	.061	83.5	.060	-69.1	
.007	-48.8	60.7			
-48.0	.070	83.3	.070	-66.1	
.009	-45.1	69.9			
-44.0	.081	83.3	.080	-63.0	
.010	-40.7	80.6			
-40.0	.093	83.3	.093	-59.5	
.012	-35.2	93.0			
-36.0	.108	83.4	.107	-55.7	
.014	-28.2	107.2			
-32.0	.124	83.8	.123	-51.4	
.016	-18.8	122.9			
-28.0	.141	84.3	.140	-46.3	
.018	-5.9	139.6			
-24.0	.158	85.0	.157	-39.9	
.021	11.0	156.6			
-20.0	.175	85.7	.174	-31.7	
.027	30.0	173.1			
-16.0	.192	85.8	.191	-20.8	
.037	47.5	189.7			
-12.0	.212	84.7	.211	-6.9	
.050	61.1	209.9			
-8.0	.243	82.7	.241	9.3	
.062	71.3	239.9			
-4.0	.288	82.0	.285	24.9	
.068	80.2	282.7			
.0	.337	83.7	.335	37.4	
.061	91.3	329.8			
4.0	.372	87.2	.372	46.6	
.044	112.6	363.9			

8.0	.378	91.2	.378	53.4	.033	157.1	369.9		
12.0	.353	94.9	.351	59.2	.041	-163.3	345.8		
16.0	.306	97.8	.303	64.7	.048	-145.7	301.1		
20.0	.253	99.7	.249	70.5	.048	-136.8	249.2		
24.0	.202	100.7	.199	77.0	.042	-130.8	200.0		
28.0	.160	100.9	.157	84.3	.035	-125.7	158.8		
32.0	.127	100.5	.125	92.1	.027	-120.6	126.5		
36.0	.103	99.6	.101	100.1	.021	-115.3	102.2		
40.0	.084	98.6	.084	108.1	.016	-109.6	84.2		
44.0	.071	97.7	.070	115.8	.012	-103.4	70.8		
48.0	.061	96.8	.060	122.8	.009	-96.9	60.8		
52.0	.053	96.1	.053	129.1	.007	-90.2	53.0		
56.0	.047	95.6	.047	134.6	.006	-83.5	46.8		
60.0	.042	95.2	.042	139.5	.005	-76.9	41.7		
64.0	.037	94.9	.037	143.8	.004	-70.7	37.4		
68.0	.034	94.6	.034	147.5	.003	-64.8	33.8		
72.0	.031	94.4	.031	150.8	.003	-59.5	30.7		
76.0	.028	94.3	.028	153.8	.002	-54.6	28.0		
80.0	.026	94.1	.026	156.4	.002	-50.2	25.6		
84.0	.024	94.0	.023	158.7	.002	-46.2	23.5		
88.0	.022	93.8	.022	160.8	.002	-42.7	21.6		
92.0	.020	93.7	.020	162.7	.001	-39.4	19.9		
96.0	.018	93.6	.018	164.5	.001	-36.5	18.4		
100.0	.017	93.5	.017	166.1	.001	-33.9	17.1		
104.0	.016	93.4	.016	167.6	.001	-31.5	15.9		
108.0	.015	93.3	.015	168.9	.001	-29.3	14.8		
112.0	.014	93.2	.014	170.2					

```
.001          -27.3          13.8
    116.0          .013           93.1          .013          171.4
.001          -25.4          12.9
    120.0          .012           93.0          .012          172.5
.001          -23.7          12.1
    124.0          .011           93.0          .011          173.5
.001          -22.1          11.3
    128.0          .011           92.9          .011          174.5
.001          -20.7          10.7
    132.0          .010           92.8          .010          175.4
.001          -19.3          10.0
    136.0          .009           92.7          .009          176.3
.000          -18.0           9.5
    140.0          .009           92.7          .009          177.1
.000          -16.8           8.9
    144.0          .008           92.6          .008          177.9
.000          -15.6           8.4
    148.0          .008           92.5          .008          178.6
.000          -14.6           8.0
    152.0          .008           92.5          .008          179.3
.000          -13.5           7.6
    156.0          .007           92.4          .007          180.0
.000          -12.6           7.2
    160.0          .007           92.4          .007         -179.4
.000          -11.7           6.8
    164.0          .007           92.3          .006         -178.8
.000          -10.8           6.5
    168.0          .006           92.3          .006         -178.2
.000           -9.9           6.2
    172.0          .006           92.2          .006         -177.6
.000           -9.2           5.9
    176.0          .006           92.2          .006         -177.1
.000           -8.4           5.6
    180.0          .005           92.1          .005         -176.6
.000           -7.7           5.4
    184.0          .005           92.1          .005         -176.1
.000           -7.0           5.2
    188.0          .005           92.0          .005         -175.6
.000           -6.3           4.9
    192.0          .005           92.0          .005         -175.2
.000           -5.7           4.7
    196.0          .005           92.0          .005         -174.7
.000           -5.0           4.5
1MAGNETIC FIELD CALCULATIONS


 SENSOR HT. =  3.3 FEET

 DIST FROM
 REFERENCE   B-FIELD      THETA    BY-FIELD     THETAY    BX-FIELD     THETAX
     FEET    (GAUSS)               (GAUSS)               (GAUSS)
```

-200.0	.00312929	13.8	.00279439	-42.1	.00311016	44.7
-196.0	.00325249	14.0	.00290868	-41.8	.00323224	45.0
-192.0	.00338305	14.2	.00303005	-41.4	.00336162	45.3
-188.0	.00352159	14.4	.00315907	-41.1	.00349890	45.7
-184.0	.00366874	14.6	.00329640	-40.7	.00364472	46.1
-180.0	.00382525	14.8	.00344274	-40.3	.00379981	46.4
-176.0	.00399190	15.0	.00359891	-40.0	.00396497	46.8
-172.0	.00416960	15.2	.00376578	-39.5	.00414109	47.3
-168.0	.00435934	15.4	.00394432	-39.1	.00432916	47.7
-164.0	.00456221	15.6	.00413564	-38.7	.00453028	48.2
-160.0	.00477944	15.8	.00434095	-38.2	.00474570	48.6
-156.0	.00501243	16.0	.00456161	-37.7	.00497679	49.1
-152.0	.00526271	16.2	.00479917	-37.2	.00522511	49.7
-148.0	.00553203	16.4	.00505534	-36.7	.00549242	50.3
-144.0	.00582235	16.6	.00533207	-36.1	.00578071	50.8
-140.0	.00613590	16.7	.00563154	-35.5	.00609222	51.5
-136.0	.00647521	16.8	.00595624	-34.9	.00642953	52.2
-132.0	.00684316	16.9	.00630898	-34.3	.00679558	52.9
-128.0	.00724305	17.0	.00669296	-33.6	.00719372	53.6
-124.0	.00767868	16.9	.00711184	-32.9	.00762782	54.4
-120.0	.00815441	16.9	.00756979	-32.1	.00810237	55.3
-116.0	.00867533	16.7	.00807160	-31.3	.00862255	56.2
-112.0	.00924736	16.5	.00862276	-30.4	.00919445	57.2
-108.0	.00987744	16.1	.00922960	-29.5	.00982515	58.2
-104.0	.01057381	15.6	.00989945	-28.5	.01052304	59.4
-100.0	.01134621	-165.1	.01064075	-27.5	.01129803	60.6
-96.0	.01220638	-166.1	.01146335	-26.3	.01216193	61.9
-92.0	.01316844	-167.2	.01237863	-25.1	.01312886	63.3
-88.0	.01424958	-168.6	.01339992	-23.8	.01421583	64.8
-84.0	.01547076	-170.1	.01454275	-22.3	.01544346	66.4
-80.0	.01685759	-171.8	.01582534	-20.7	.01683677	68.2
-76.0	.01844136	-173.4	.01726903	-19.0	.01842638	70.1
-72.0	.02026024	-174.9	.01889897	-17.1	.02024983	72.2
-68.0	.02236075	-176.0	.02074502	-14.9	.02235321	74.5
-64.0	.02479971	-176.6	.02284278	-12.5	.02479308	76.9
-60.0	.02764691	-176.5	.02523548	-9.8	.02763843	79.6
-56.0	.03098843	-175.7	.02797676	-6.7	.03097243	82.5
-52.0	.03493078	-174.1	.03113586	-3.0	.03489282	85.6
-48.0	.03960565	-171.7	.03480664	1.2	.03950935	89.0
-44.0	.04517493	-168.4	.03912450	6.1	.04493453	92.6
-40.0	.05183477	-164.1	.04429651	11.8	.05126129	96.6
-36.0	.05981662	-158.7	.05065045	18.6	.05851760	101.0
-32.0	.06938050	-152.2	.05870113	26.4	.06658490	105.8
-28.0	.08079238	-144.4	.06920142	35.1	.07507384	111.3
-24.0	.09427235	-135.1	.08307515	44.4	.08318862	117.8
-20.0	.10989640	-124.3	.10104210	53.8	.08973894	126.2
-16.0	.12743730	-111.6	.12274880	62.7	.09376035	137.8
-12.0	.14614880	-97.2	.14549230	70.8	.09657374	154.6
-8.0	.16454920	-80.9	.16329470	78.5	.10472820	177.1
-4.0	.18033980	-63.0	.16799320	86.6	.12622570	200.1
.0	.19070070	-43.9	.15411860	97.2	.15719580	217.3
4.0	.19319130	-24.1	.12666930	114.2	.18181430	228.7
8.0	.18701530	-4.6	.10428800	141.0	.18659670	236.8

12.0	.17363630	13.9	.10189450	170.1	.17013590	243.8
16.0	.15599380	30.7	.10900860	190.0	.14123870	251.3
20.0	.13704500	45.6	.11178520	201.6	.11053830	260.2
24.0	.11884950	58.7	.10747320	208.8	.08477704	-88.8
28.0	.10246690	69.9	.09840176	214.0	.06613825	-76.1
32.0	.08824831	-100.3	.08733004	218.1	.05387428	-62.8
36.0	.07615256	-91.8	.07612749	221.6	.04607277	-50.3
40.0	.06596371	-84.5	.06577550	224.8	.04089242	-39.7
44.0	.05741246	-78.1	.05666495	227.8	.03708790	-31.1
48.0	.05023427	-72.5	.04885945	230.7	.03398522	-24.2
52.0	.04419360	-67.5	.04226668	233.4	.03127038	-18.8
56.0	.03909032	-63.2	.03673469	236.0	.02881171	-14.5
60.0	.03475866	-59.3	.03210091	238.6	.02655751	-10.9
64.0	.03106314	-55.8	.02821443	241.0	.02448689	-8.0
68.0	.02789365	-52.7	.02494412	243.3	.02258871	-5.5
72.0	.02516093	-49.8	.02218003	245.5	.02085371	-3.3
76.0	.02279253	-47.3	.01983173	247.6	.01927197	-1.5
80.0	.02072951	-45.0	.01782561	249.6	.01783270	.2
84.0	.01892379	-42.9	.01610204	251.4	.01652455	1.6
88.0	.01733592	-40.9	.01461282	253.2	.01533614	2.9
92.0	.01593345	-39.1	.01331890	254.9	.01425640	4.1
96.0	.01468951	-37.5	.01218860	256.5	.01327485	5.1
100.0	.01358179	-36.0	.01119612	258.0	.01238177	6.1
104.0	.01259164	-34.6	.01032033	259.5	.01156826	7.0
108.0	.01170339	-33.3	.00954389	260.8	.01082622	7.8
112.0	.01090385	-32.1	.00885246	262.1	.01014838	8.5
116.0	.01018186	-30.9	.00823417	263.3	.00952821	9.2
120.0	.00952789	-29.9	.00767909	264.5	.00895988	9.9
124.0	.00893382	-28.9	.00717888	265.5	.00843818	10.5
128.0	.00839269	-28.0	.00672655	266.6	.00795851	11.0
132.0	.00789849	-27.1	.00631615	267.6	.00751672	11.6
136.0	.00744602	-26.3	.00594265	268.5	.00710914	12.1
140.0	.00703079	-25.5	.00560173	269.4	.00673253	12.6
144.0	.00664889	-24.8	.00528968	-89.8	.00638395	13.0
148.0	.00629687	-24.1	.00500330	-89.0	.00606082	13.4
152.0	.00597175	-23.4	.00473984	-88.2	.00576082	13.8
156.0	.00567089	-22.8	.00449690	-87.5	.00548187	14.2
160.0	.00539195	-22.2	.00427238	-86.8	.00522212	14.6
164.0	.00513287	-21.6	.00406445	-86.2	.00497989	14.9
168.0	.00489185	-21.1	.00387150	-85.5	.00475371	15.3
172.0	.00466725	-20.6	.00369212	-84.9	.00454221	15.6
176.0	.00445762	-20.1	.00352505	-84.4	.00434420	15.9
180.0	.00426169	-19.6	.00336917	-83.8	.00415858	16.2
184.0	.00407828	-19.2	.00322352	-83.3	.00398436	16.5
188.0	.00390638	-18.8	.00308719	-82.8	.00382064	16.7
192.0	.00374503	-18.4	.00295941	-82.3	.00366663	17.0
196.0	.00359340	-18.0	.00283946	-81.8	.00352157	17.2

Exhibit CC

Applicable Statutes, Rules, and Local Government Ordinances

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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List of Tables

Acronyms and Abbreviations

BESS	battery energy storage system
Certificate Holder / PGE	Portland General Electric Company
CFR	Code of Federal Regulations
CGS / Facility	Carty Generating Station
Council	Oregon Energy Facility Siting Council
MW	megawatt
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statutes
RFA	Request for Amendment

1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) is submitting a Request for Amendment (RFA) 4 to the Site Certificate for the Carty Generating Station (CGS or Facility). The Facility is located approximately 13 miles southwest of Boardman, in Morrow County, Oregon. As currently approved, the Facility is capable of generating up to 500 megawatts (MW) of electrical power. CGS consists of the operating 450-MW natural gas-fueled combined-cycle unit (Unit 1) and includes the not-yet-constructed 50-MW Carty Solar Farm (Carty Solar Farm) on 315 acres (0.49 sq. miles) located south of the Carty Reservoir.

In RFA 4, the Certificate Holder is proposing to increase the output from solar energy generation at CGS from 50 MW to approximately 185 MW alternating current of nominal and average generating capacity by expanding into areas formerly used for PGE's Boardman Coal Plant and maximizing the buildable area southeast of Carty Reservoir, and adding a battery energy storage system (BESS) to the Facility. The Certificate Holder proposes the 185 MW of solar generation as a complete reconfiguration to the previously approved 50-MW Carty Solar Farm. Thus, the overall changes proposed with RFA 4 (including the BESS) are referred to throughout this request as the Amended Carty Solar Farm. The solar generation is proposed in two separate solar areas referred to as the Northern Solar Area, located north of the Carty Reservoir, and the Southern Solar Area, located south of the reservoir [see Figure 2 in RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station)].

Per Oregon Administrative Rules (OAR) 345-021-0010(1)(cc), Exhibit CC identifies state statutes and administrative rules and local government ordinances containing approval criteria that the Facility must meet for the Oregon Energy Facility Siting Council (Council) to amend a site certificate for the Facility, other than those statutes, rules, or ordinances identified in Section 5.4 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station), which addresses OAR 345-021-0010(1)(e).

2.0 Additional Statutes and Administrative Rules – OAR 345-021-0010(1)(cc)

OAR 345-021-0010(1)(cc) Identification, by legal citation, of all state statutes and administrative rules and local government ordinances containing standards or criteria that the proposed facility must meet for the Council to issue a site certificate, other than statutes, rules and ordinances identified in Exhibit E, and identification of the agencies administering those statutes, administrative rules and ordinances. The applicant must identify all statutes, administrative rules and ordinances that the applicant knows to be applicable to the proposed facility, whether or not identified in the project order. To the extent not addressed by other materials in the application,

the applicant must include a discussion of how the proposed facility meets the requirements of the applicable statutes, administrative rules and ordinances.

Table CC-1 identifies by legal citation and relevant administering agency the state statutes and administrative rules and local government ordinances referenced in other exhibits, with the exception of those presented in Section 5.4 of the RFA 4's Division 27 document (Request for Amendment 4 for the Carty Generating Station), which addresses OAR 345-021-0010(1)(e). The identified statutes, rules, and ordinances contain standards or criteria that the Facility, as proposed in RFA 4, must meet for the Council to amend the Facility's Site Certificate.

Table CC-1. Statutes, Rules, and Local Ordinances Referenced in Other Exhibits

Administering Agency	Agency Address	Legal Citation	Relevant Exhibit
Oregon Department of Agriculture	Oregon Department of Agriculture 635 Capitol Street, NE Salem, OR 97301 (503) 986-4550	Plant Conservation Biology Program—Oregon Revised Statutes (ORS) Chapter 564	Exhibit Q
Oregon Department of State Lands	Oregon Department of State Lands 775 Summer Street NE. Suite 100 Salem, OR 97301 (503) 986-5200	33 Code of Federal Regulations (CFR) § 328; ORS Chapters 196 and 390; OAR Chapter 141	Exhibit J
Oregon Water Resources Department – Water Rights Division	Oregon Water Resources Department 725 Summer Street NE, Suite A Salem, OR 97301 (503) 986-0900	OAR Chapter 690	Exhibit O
Oregon Department of Environmental Quality – Noise	Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701 (541) 388-6146	ORS Chapters 467 and 526; OAR Chapter 340	Exhibit Y
Oregon Department of Environmental Quality – Noise	Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701 (541) 388-6146	OAR Chapter 340	Exhibits K, L and T

Administering Agency	Agency Address	Legal Citation	Relevant Exhibit
Oregon Department of Environmental Quality – Hazardous Waste Management	Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701 (541) 388-6146	40 CFR §112; ORS Chapter 465; OAR Chapter 340	Exhibit G
Oregon Department of Environmental Quality – Hazardous Waste Management	Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701 (541) 388-6146	40 CFR §112	Division 27
Oregon Department of Environmental Quality – Solid Waste	Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701 (541) 388-6146	ORS Chapter 466; OAR Chapter 340	Exhibit W
Oregon Department of Fish and Wildlife – Habitat Conservation Division	Oregon Department of Fish and Wildlife 2042 SE Paulina Highway Prineville, OR 97754 (541) 447-5111	ORS Chapter 496	Exhibit Q
Oregon Department of Fish and Wildlife – Habitat Conservation Division	Oregon Department of Fish and Wildlife 2042 SE Paulina Highway Prineville, OR 97754 (541) 447-5111	OAR Chapter 635	Exhibit P
Oregon Department of Land Conservation and Development	Oregon Department of Land Conservation and Development 635 Capital Street NE, Suite 150 Salem, OR 97301 (503) 373-0050	ORS Chapters 195, 197, 215, 469, and 540; OAR Chapter 660	Exhibit K
Oregon Department of Land Conservation and Development	Oregon Department of Land Conservation and Development 635 Capital Street NE, Suite 150 Salem, OR 97301 (503) 373-0050	ORS Chapter 469; OAR Chapter 660	Division 27
Oregon Office of State Fire Marshal	Oregon Office of State Fire Marshal 3565 Trelstad Avenue SE Salem, OR 97317 (503) 378-3473	2019 Oregon Fire Code	Division 27

Administering Agency	Agency Address	Legal Citation	Relevant Exhibit
Oregon Department of Transportation Commerce and Compliance Division	Oregon Department of Transportation Commerce and Compliance Division 455 Airport Road SE, Building A Salem, OR 97301 (541) 207-5294	49 CFR 173	Division 27 and Exhibit U
Oregon Parks and Recreation Department, State Historic Preservation Office – Archaeological	Oregon State Historic Preservation Office 725 Summer St NE, Suite C Salem, OR 97301 (503) 986-0690	ORS Chapters 192 and 358; OAR Chapter 736	Exhibit S
Oregon Public Utility Commission	Oregon Public Utility Commission 201 High Street SE, Suite 100 Salem, OR 97301 (503) 378-6600	OAR Chapter 860	Division 27 and Exhibit V
Morrow County Planning Department – Land Use	Morrow County Planning Department Irrigon Annex PO Box 40 205 Third Street NE Irrigon, OR 97844 (541) 922-4624	Morrow County Zoning Ordinance	Exhibit K

3.0 Spill Response Statutes

In regard to reporting and responding to spills or the release of hazardous materials, the following rules and statutes contain state and federal spill reporting requirements:

- ORS 466.635;
- OAR Chapter 340, Divisions 45, 100, 101, 102, 103, 122, 135, 142, 150, 160;
- 33 Code of Federal Regulations part 153; and
- 40 Code of Federal Regulations parts 110, 122, 262, 265, 280, 302, 355, 761.

Oregon agencies that may be required to be notified in the event of spill or the release of hazardous materials of reportable quantities include:

- Oregon Office of Emergency Management;
- Oregon Department of Environmental Quality; and
- Oregon State Police.

Exhibit DD

Specific Standards

Carty Generating Station
February 2024

Prepared for

Portland General Electric Company

Prepared by

TETRA TECH

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CGS / Facility	Carty Generating Station
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2.0 Specific Standards Applicable to the Project – OAR 345-021-0010(1)(dd)

OAR 345-021-0010(1)(dd) If the proposed facility is a facility for which the Council has adopted specific standards, information about the facility providing evidence to support findings by the Council as required by the following rules:

(A) For wind energy facilities, OAR 345-024-0010 and 345-024-0015;

(B) For surface facilities related to underground gas storage reservoirs, OAR 345-024-0030, including information required by OAR 345-021-0020; and

(C) For any transmission line under Council jurisdiction, OAR 345-024-0090.

The Carty Generating Station is not a wind energy facility, underground gas storage facility, or transmission line under the Oregon Energy Facility Siting Council's jurisdiction; therefore, these provisions do not apply.

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