Amendment for
Proponent's Environmental Assessment
Klamath River Rural Broadband Initiative

Prepared for
The California Public Utilities Commission, lead state agency,
and
The Bureau of Indian Affairs, lead federal agency

Prepared by
The Karuk Tribe

May 2020

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Acronyms and Abbreviations

APE	Area of Potential Effect (Cultural)
ATV	all-terrain vehicle
BAA	Biological Assessment Area
BIA	U.S. Department of the Interior, Bureau of Indian Affairs
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	Best Management Practices
CalTrans	California Department of Transportation
CASF	California Advanced Services Fund
CDF	California Department of Forestry and Fire Protection
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Parks and Recreation
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CLEC	Competitive Local Exchange Carrier
CNDDB	California Natural Diversity Database
CPCN	Certificate of Public Convenience and Necessity
CPUC	California Public Utilities Commission
CRPR	California Rare Plant Ranks
CSLC	California State Lands Commission
CSSC	California Species of Special Concern
DIA	Direct Impact Area (Biological)
DNR	Department of Natural Resources
EA	Environmental Assessment (NEPA)
EPM	environmental protection measure
ESA	Endangered Species Act of 1973 (federal)
FONSI	Finding of No Significant Impact (NEPA)
GDR	Green Diamond Resource Company
GIS	geographic information system
HUC	Hydrologic Unit Code
IIA	Indirect Impact Area (Biological)
IS	Initial Study (CEQA)
JARPA	Joint Aquatic Resources Permit Application
kbps	kilobits per second

KRRBI	Klamath River Rural Broadband Initiative
KRRBI Project	Klamath River Rural Broadband Initiative Project
kV	kilovolt
last mile	High-speed Internet access provided to business or residence
Mbps	megabits per second
meet-me	Point of connection between middle mile and larger network
middle mile	Fiber optic cable connection between the larger national fiber optic network and last mile services
MND	Mitigated Negative Declaration (CEQA)
MOA	Memorandum of Agreement
MP	milepost
NAGPRA	Native American Graves Protection and Repatriation Act
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NFS	National Forest System (Lands managed by USFS)
NHPA	National Historic Preservation Act
NPS	U.S. Department of the Interior, National Park Service
NRHP	National Register of Historic Places
NSO	northern spotted owl
NWIC	Northwest Information Center
OCSC	Orleans Community Service Club
PEA	Proponent's Environmental Assessment
PG&E	Pacific Gas and Electric Company, a public utility
PM_{10}	particulate matter of 10 micrometers or less
Project	Klamath River Rural Broadband Initiative Project
RNP	Redwood National Park, federal portion of the Redwood National and State Parks
RNSP	Redwood National and State Parks
ROW	right-of-way
SCADA	Supervisory Control and Data Acquisition
SF-299	Application for Transportation and Utility Systems and Facilities on Federal Lands (BLM and USFS)
SWPPP	Stormwater Pollution Prevention Plan
TPZ	Timber Protection or Production Zone
Tribe	The Karuk Tribe
Tribes	The Sovereign Nations of the Karuk and Yurok Tribes

UPS	uninterruptable power supply
USDI	U.S. Department of the Interior
USACE	U.S. Department of Defense, Army Corps of Engineers
USFS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Department of the Interior, Fish and Wildlife Service

1 Proponent's Environmental Assessment Summary

1.1 Overview

The original Proponent's Environmental Assessment (PEA)[1] for Karuk Tribe's Klamath River Rural Broadband Initiative Project (KRRBI Project, or Project), which provided a detailed Project description, the environmental setting for the Project, and an evaluation of the potential impacts of the Project as part of the joint National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) process, was published in December 2017. This amendment document provides a revision to that original PEA for the purposes of reflecting changes that have occurred in the Project description and the resultant revisions in the environmental setting and potential impacts of the Project. It includes the information originally provided and supplements it throughout the document as appropriate. The most significant change in the Project description is the revision of the final connection between the town of Orick and the larger Internet "grid" or network.

The Karuk Tribe (Tribe), a California utility (Competitive Local Exchange Carrier or CLEC[2]), is the lead applicant, proponent, and fiscal agent for the KRRBI Project. The KRRBI Project has been granted California Advanced Services Fund (CASF) funding from the California Public Utilities Commission (CPUC) pending an environmental review. The Project will supply middle and last mile fiber optic and non-fiber Project components in Humboldt County, California.

The KRRBI Project will install about 104 miles of "middle mile" fiber optic cable from Orleans to Weitchpec, from Weitchpec to Wautec and Tulley Creek, from Weitchpec to Orick, and from Orick to the "meet-me" with existing fiber in McKinleyville. The "middle mile" is so called because it connects areas without broadband fiber optic cable connections to the larger long-distance fiber optic network, and the "meet-me" is the point of connection between the middle mile and the larger network.

For convenience of permitting and consideration of alternatives, the middle mile portion of the Project is divided into five segments, as shown on Figure 1.1-1. Segment 1 runs from the existing fiber optic connection with Siskiyou Telephone in Orleans to Weitchpec. Segment 2 connects Weitchpec and Wautec along Highway 169, while Segment 3 connects Segment 2 to Segment 4 along Bald Hills Road. Segment 4 runs from Elk Camp Fire Station and the intersection of Johnsons Road, where Segment 3 terminates, to the town of Orick, and terminates at the new Orick Tower. Segment R5 connects the first four segments to the existing fiber optic network, running from the Orick Tower to the "meet-me" point. There will be "last mile" connections along all five segments. It is called "last mile" because it connects individual

[1] Karuk Tribe. 2017. Klamath River Rural Broadband Initiative Proponent's Environmental Assessment.
[2] A service provider that competes with the incumbent company to provide local service.

customers (commercial, institutional, and domestic) directly to the broadband fiber optic network.

The Project will supply last mile high-speed broadband access to anchor institutions, businesses, and residences in the communities of Orleans, Weitchpec, Wautec, Johnsons, and Orick, and possibly other customers. The last mile will largely be supplied wirelessly, utilizing existing towers to broadcast the signal in Orleans and along the Klamath River in the Yurok Reservation. It will also utilize a new tower to be built in Orick as part of this Project. Some anchor institutions will receive a direct fiber connection.

Klamath River Rural Broadband Project

Figure 1.1-1
Project Area

Crescent City
Klamath
Wautec
Orick
Orleans
Weitchpec
Hoopa
Willow Creek
Trinidad
McKinleyville
Arcata
Eureka
Pacific Ocean
101
96
169
299

Legend

- Yurok Ancestral Territory
- Karuk Ancestral Territory

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- R5

0 5 10 20 Miles

N W E S

Yurok Tribe GIS Program
December 12, 2019

1.2 Scope of the PEA

The PEA, prepared for the Karuk Tribe by its contractor, EnerTribe, provides a detailed Project description in Section 2, then describes the affected environment and Project-related environmental effects of the construction, operation, and maintenance of the KRRBI Project for the following resource areas in Section 3:

- Aesthetics
- Agriculture and Forestry
- Air Quality and Greenhouse Gasses
- Biological Resources
- Cultural Resources and Tribal Cultural Resources
- Geology, Soils, and Minerals
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use, Recreation, and Planning
- Noise
- Population and Housing
- Public Services/Utilities
- Transportation and Traffic

Alternatives considered are presented in Section 4, while Section 5 presents initial environmental protection measures (EPMs) proposed as an integral part of the Project.

The PEA presents the regulatory setting, the environmental setting for the Project, and the residual environmental impacts of the Project after all reasonable design and construction elements have been incorporated into the Project description to avoid, minimize, or mitigate for adverse effects of the Project. The Project description includes a strong commitment from the Karuk and Yurok Tribes to reduce the Project impacts as much as feasible given the Project purpose and need and the timeline for being in service to these remote rural communities. This commitment to reducing Project impacts is further discussed in Section 5, Applicant Proposed Measures.

The PEA is intended to provide the Bureau of Indian Affairs (BIA), the lead federal agency for NEPA, and the CPUC, the lead state agency for CEQA, with the information needed to complete a NEPA/CEQA joint analysis and document. The Karuk Tribe anticipates that the resultant NEPA environmental Assessment (EA) and CEQA Initial Study (IS) will be sufficient for the NEPA Finding of No Significant Impact (FONSI) and the CEQA issuance of a Mitigated Negative Declaration (MND).

1.3 Coordination with Permitting Agencies

The Karuk Tribe has held three multi-agency meetings to present this Project and solicit input regarding the Project design. The first was held October 14, 2014, in Eureka, California, and the second was held on August 25-26, 2015. The latter meeting started in Orick at the U.S. Department of the Interior, National Park Service (NPS) Southern Operations Center and went on to be a 2-day field review. During and after these meetings, the Karuk Tribe received

important information that helped refine the Project. The NPS staff have been particularly responsive and helpful, providing geographic information system (GIS) files to help with the analysis and providing a formal letter with concerns (dated November 24, 2015) regarding possible impacts on Redwood National Park (RNP) lands[3].

The third meeting was held on August 6, 2019, at the NPS offices in Orick, California. Its purpose was to introduce a revision to Segment 5 (renamed Segment R5), changing it from being a predominantly underground installation along existing roads to predominantly utilizing existing Pacific Gas and Electric Company (PG&E) 60-kilovolt (kV) transmission poles, dramatically reducing the amount of underground installation needed and thus reducing overall environmental impact for this segment.

In addition to initial filings with NPS and U.S. Department of Agriculture, Forest Service (USFS), the Karuk Tribe has filed several new or amended permit applications, including:

- Revised SF-299, Application for Transportation and Utility Systems and Facilities on Federal Lands, requesting a Special Use Authorization, to the USFS to include the Yurok Signal connection, submitted June 2, 2016, to occupy a portion of National Forest System (NFS) lands in the Six Rivers National Forest. On June 22, 2016, USFS staff contacted EnerTribe staff for additional information and stated that a meeting in Orleans would be scheduled in the next few weeks to discuss the Project. As of the date of this publication, no meeting has occurred.
- New SF-299 application requesting a Right-of-Way (ROW) grant across Public Lands managed by the U.S. Department of the Interior, Bureau of Land Management (BLM)'s Arcata Field Office, submitted June 13, 2016. EnerTribe staff met with BLM staff in the field and reviewed the Project on the ground in Segment 1 just northeast of the Reservation boundary on June 10, 2016. BLM staff stated they did not see any problems with the application and would respond positively to the BIA's letter requesting cooperating agency status.
- New Encroachment Permit application to the State of California Department of Transportation (CalTrans) for use of the road shoulders of Highways 96, 169, and 101 for the Project, submitted June 7, 2016. On June 24, 2016, CalTrans staff responded by phone message. EnerTribe staff has followed up with CalTrans staff.
- Application to California Department of Forestry and Fire Protection (CDF) for permission to cross their parcel at Elk Camp Fire Station on Bald Hills Road, submitted July 20, 2017.

[3] Redwood National and State Parks (RNSP) include Redwood National Park (established 1968) and California's Del Norte Coast, Jedediah Smith, and Prairie Creek Redwoods State Parks (dating from the 1920s). The combined parks contain 133,000 acres. KRRBI crosses only the National Park portion, and reference will be made to Redwood National Park, or RNP, in this document.

- New Encroachment Permit application to the California Department of Parks and Recreation to cross lands they manage that underlie the existing PG&E ROW for the transmission line poles where Segment R5 will be attached, to be submitted if needed.
- New Encroachment Permit application to Humboldt County Public Works for the use of road shoulders of several county roads, submitted June 10, 2016. On the same day, Humboldt County Public Works staff informed the Tribe they were working on the encroachment permit and the memorandum of understanding that serves in place of a franchise to allow occupancy of Humboldt County infrastructure in parallel. Humboldt County approved the Memorandum of Understanding on October 26, 2016.

The Tribe plans to continue to work closely with these and other regulatory agencies to develop a Project description that reflects the issues, concerns, and policies of each agency and, to the extent possible, incorporates needed measures to make the Project permissible under each agency's policies.

Section 2.3, below, further elaborates on the roles and responsibilities of participating agencies.

1.4 Public Outreach

Public outreach efforts, including outreach to federal, state, and local agencies, are summarized in Table 1.4-1, below:

Table 1.4-1. Public Outreach Record

Date	Location	Outreach Event
11/20/19	Blue Lake, CA	FCC Broadband Workshop – Presentation on KRRBI to public
9/24/19	Washington, DC	Presentation on KRRBI to the National Tribal Broadband Summit
6/26/19	San Francisco, CA	Public Hearing on tribal broadband in CA (EnerTribe presented on behalf of KRRBI)
6/26/19	San Francisco, CA	CASF, CPUC, Contractor & Tribal KRRBI working sessions
2/1/19	Weitchpec/Klamath, CA	Intertribal & Interagency KRRBI working session and Commissioner tour
11/1/2018	Weitchpec/Klamath, CA	Intertribal & Interagency KRRBI working session and Commissioner tour
5/22/17	Washington, DC	Presentation of KRRBI at America's Rural Opportunity: Infrastructure Fueling Economic Development, Fourth Event,
2/1/17	Tuolumne, CA	Presentation of KRRBI during the FCC Tribal Broadband, Telecom, and Broadcast Training and Consultation Workshop
9/25/16	KRRBI Project	CPUC commissioner Sandoval and telecommunications advisor William Johnston toured the KRRBI Project in Yurok territory
8/26/16	Orick, CA	Agency and public meeting for KRRBI Project
11/2/15	Austin, TX	Annual TribalNet conference (11/2-5/2015) – EnerTribe staff, Earthprint Staff and Karuk/Yurok tribal staff attended the conference. EnerTribe did a presentation on the KRRBI Project to help raise awareness with neighboring tribes
10/30/15	Cal OES offices, Mather, CA	Presentation of Orleans Community Perspective on Broadband, Water/Energy Nexus meeting

Table 1.4-1. Public Outreach Record

Date	Location	Outreach Event
10/19/15	News article	Article run in multiple news sources: http://anewscafe.com/2015/10/19/indian-country-gets-wired-karuk-tribe-brings-broadband-to-the-boondocks/.
10/16/15	Orleans Karuk Council Chambers	Ribbon Cutting Ceremony for Áan Chúuphan. This event was publicly broadcasted and attended by members of the public, tribal members, agencies, and tribal leadership.
8/25/15	Orick, CA	Environmental project walk for CPUC and permitting agencies for KRRBI, on site and at National Park offices (8/25–8/26, 2015).
7/8/15	Yurok Tribal Offices, Weitchpec, CA	Public Hearing with CPUC, Verizon, community leaders, agencies, tribal leaders etc. to address broadband concerns and how KRRBI will solve some of them.
4/9/15	Orleans Karuk Council Chambers	Broadband Meeting with tribal leadership, communications consultants, contractors, and concerned community members.
3/13/15	News article	Article in the Eureka Times-Standard "Broadband coming to Orleans": http://www.timesstandard.com/article/NJ/20150313/NEWS/150319905.
3/4/15	News article	Article in Indian Country Today to raise awareness: http://indiancountrytodaymedianetwork.com/2015/03/04/karuk-yurok-tribes-bringing-broadband-remote-homes-california-159467.
11/12/14	Las Vegas, NV	TribalNet Conference, panel discussion on Broadband in Indian Country and the KRRBI Project success. This helped raise awareness with neighboring tribes and Indian Country as a whole.
10/14/14	Tribal Offices, Smith River, CA	Tribal meetings with Commissioner Catherine Sandoval and her Telecommunications Adviser William Johnston. Tolowa tribal representatives and the team discussed the Broadband projects in Indian Country and the "Water/Energy Nexus".
8/27/14	Klamath, CA	Presentation of KRRBI during the FCC Tribal Broadband, Telecom, and Broadcast Training and Consultation Workshop.
7/23/14	Coeur d'Alene, ID	Presentation of KRRBI during the FCC Tribal Broadband, Telecom, and Broadcast Training and Consultation Workshop.
5/6/14	Tribal Council Chambers, Hoopa and Orleans, CA	Meetings with Karuk, Yurok, and Hoopa tribes and CPUC to raise awareness and discuss challenges facing the KRRBI Project.
5/4/14	Willow Creek, CA	CPUC meeting with the City of Willow Creek and local agencies and municipalities to discuss Broadband Plans and how KRRBI will affect the town.
3/11/14	Hoopa Valley Community Center	Meeting with River communities (Hoopa) to discuss economic impacts of Broadband along the river including the KRRBI Project. This meeting was well attended by roughly 50 community and tribal members.
2/26/14	Yurok Tribal Offices, Weitchpec, CA	EnerTribe team hosts community meetings with Karuk Tribe for further field engineering of KRRBI Project.
2/6/14	Trinidad, CA	EnerTribe presents – Tribally chartered Broadband efforts at the Northern California Tribal Chairmen's Association.
1/27/14	News article	"Strike Up The Broadband" article posted in the Eureka Times-Standard: http://www.times-standard.com/article/zz/20140127/NEWS/140128981.
1/22/14	News article	Karuk Tribe presents Broadband article, http://www.times-standard.com/…/karuk-tribe-presents-broadb…
1/21/14	Eureka, CA	Presentation to the Humboldt County Board of Supervisors on KRRBI.
12/12/13	Arcata, CA	Live radio interview on KHSU show Thursday Night Talk regarding KRRBI.

Table 1.4-1. Public Outreach Record

Date	Location	Outreach Event
11/15/13	Yurok Tribal Offices, Weitchpec, CA	Kickoff for the KRRBI Project with Yurok Tribe and members of the community.
11/3/13	News article	Sacramento Bee column Northern Exposure article "Remote area will get broadband": https://www.yumpu.com/en/document/view/52466401/northern-exposure-jane-braxton-little-dyerpress.
10/30/13	News article	Live radio interview discussing the KRRBI Project on Jefferson Public Radio, "Broadband Access Comes to Karuk & Yurok County": http://ijpr.org/post/broadband-access-comes-karuk-yurok-country.
10/19/13	News article	Article in the Record Searchlight "$6.6M given to provide Internet service" (no link available).
10/18/13	News article	Article in the Eureka Times-Standard "Tribes get $6.6M for broadband service": http://www.times-standard.com/general-news/20131018/community-connection-tribes-get-66m-for-broadband-service/1.
10/18/13	News article	Recorded radio interview "Broadband Internet Headed to Rural Humboldt County" on KMUD.org online radio (no link available).

1.5 Summary of Findings

The KRRBI Project has minimal impacts on the environment, none of which is significant when Proponent-proposed measures and permit terms and conditions are applied. The small possible impacts to special status species or cultural resources will be mitigated through avoidance and minimization measures.

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2 Project Description

2.1 Introduction

The Project purpose and need is presented in Section 2.2 and the roles and responsibilities of the Proponent's team and the many involved agencies are provided in Section 2.3. Section 2.4 provides a detailed Project description, including fiber optic and non-fiber Project components, construction details, and operations and maintenance plans.

2.2 Purpose and Need

2.2.1 Purpose and Goals of Project

The purpose of the KRRBI Project is to provide high-speed broadband Internet service to people living in the ancestral territories of the Karuk and Yurok Tribes (Tribes), including tribal and non-tribal community members, who are presently unserved or underserved by current service providers[4].

The Project will provide broadband access to 7 first responder agencies, 19 other anchor institutions, and 616 households in Orick, Orleans, Johnsons, Wautec, Weitchpec, and other neighbors and businesses along Segments 1 through 4 where 295 households are unserved and 321 households are underserved. To achieve this shared goal, the Tribes have agreed to partner under the Karuk Tribe's CLEC.

2.2.2 Current Internet Access

The KRRBI service area is very large, and identifying current internet access is best discussed at the community level. The KRRBI will serve five unserved and underserved communities: Orleans, Weitchpec, Ka'Pel, Wautec, and Orick. The communities are listed below with a description of the broadband service that is available as of November 2019.

Orleans: In October 2015, the Karuk Tribe launched Áan Chúuphan, a wireless Internet provider in Orleans. Áan Chúuphan has over 100 subscribers and provides Internet access to most of the Orleans area. Áan Chúuphan offers residential plans up to 3.2 megabits per second (Mbps) download and 1.4 Mbps upload. Most of Orleans is now considered underserved, but some of the surrounding area is still unserved.

Weitchpec, Ka'Pel, and Wautec: These three communities are served by Yurok Connect, the Yurok Tribe's wireless Internet provider. The maximum speed available to Yurok Connect subscribers is 6 Mbps download and 1.5 Mbps upload. The 6 Mbps service requires a premium account, the cost of which prevents many residents from purchasing it. A few households in these communities may have limited access to US Cellular or Verizon Wireless 3G service, but

[4] The terms "unserved", "underserved", and "partially served" are used as defined in the California Broadband Map (https://www.broadbandmap.ca.gov/, last accessed 4/9/20).

due to the cell towers' location more than 20 miles away and the dense forest in between, this is not available to the communities as a whole.

Orick: In May of 2015, Tsunami Wireless expanded services into Orick. They offer speeds of 6.5 Mbps download and 1.6 Mbps upload. While Tsunami Wireless's website indicates that Orick is in their service area, it does not show Orick on their service area map. With this data, it is not possible to ascertain how much of the community of Orick receives Tsunami's service. A few households in this community may have Verizon Wireless 3G or 4G services, but these services are not available to the community as a whole. The partial cellular service is due to the location of cell towers, which are placed to provide service to Highway 101 rather than the community of Orick.

The Karuk Tribe estimates that around 75 percent of the populations of Orleans, Weitchpec, Ka'Pel, and Wautec have underserved access. Orick is listed on the California broadband map as partially served, where an unknown percentage of households have access to full broadband service according to the California standard. According to CPUC Decision D.12-02-015, a served area is defined as an area with at least one broadband provider offering combined download speeds of at least 6 Mbps and upload speeds of at least 1.5 Mbps. An underserved area is where broadband is available, but no wireline or wireless facilities-based provider offers service at advertised speeds of at least 6 Mbps download and 1.5 Mbps upload. An unserved area has no service, or service slower than 768 kilobits per second (kbps) download and 200 kbps upload.

The current carriers in the region are as follows:

- Yurok Connect
- Áan Chúuphan
- Tsunami Wireless
- Frontier Communications
- Verizon Wireless
- US Cellular

Áan Chúuphan, Yurok Connect, and Tsunami wireless all use unlicensed radio frequencies for last mile service, with a mix of unlicensed and licensed radio frequencies for middle mile service. Áan Chúuphan also has a short fiber optic run as part of its middle mile infrastructure. Verizon Wireless and US Cellular use their own cellular networks for middle mile service. Frontier Communications acquired the telephone facilities of Verizon California in April of 2016. As far as we know, Frontier has not offered any broadband access in KRRBI's service area.

2.2.3 Integration with Existing Broadband Carriers

The Project area covered by KRRBI is extremely rural, and the Karuk Tribe believes the best way to serve the population of the region is to provide interconnections with existing providers. Although limited competition for the same households may occur, the benefits to providers for backhaul and transport cost savings make a solid business case for fiber optic interconnections between broadband carriers.

The Yurok Connect and Áan Chúuphan wireless Internet service providers are owned and operated by the Yurok Tribe and the Karuk Tribe, respectively. As partners to implement KRRBI, the Yurok and Karuk Tribes will incorporate the existing Yurok Connect and Áan Chúuphan subscribers into the KRRBI network. The Karuk and Yurok Tribes intend to form a single new combined Internet Service Provider that will maintain operations after KRRBI completes construction.

Frontier Communications is the Incumbent Local Exchange Carrier for most of KRRBI's Project area. The Karuk Tribe contacted Frontier and arranged to provide fiber optic interconnections between KRRBI's and Frontier's networks at three locations: Frontier's central office in Orick, Frontier's central office in Orleans, and a fiber splice box in Weitchpec.

Tsunami Wireless has radio equipment attached to an existing tower near the town of Orick. The Karuk Tribe contacted Tsunami and offered to provide a fiber optic connection to the existing tower, which Tsunami accepted. Tsunami is now considered an anchor institution in the KRRBI Project.

The fiber optic network built by KRRBI will be able to support cellular networks. Any cellular carriers, including Verizon Wireless and US Cellular, will be welcome to lease space on KRRBI towers or have KRRBI provide fiber to a private tower. However, such connections are outside the scope of KRRBI and are not part of the KRRBI Project.

2.2.4 Project Need

This Project is needed because the area to be served is so remote with a scattered population that commercial carriers have been reluctant to extend adequate broadband service. The communities to be served by this Project have low median household incomes, high unemployment rates, and few economic opportunities in the local area. In order to curb the departure of tribal and non-tribal community members to larger urban areas, the KRRBI Project will contribute to better education, health care, public safety, and business opportunities available through access to broadband Internet facilities, thereby developing economic opportunities in the communities themselves.

Providing broadband to this previously unserved or underserved area will bridge the digital divide that currently separates remote rural communities from the rest of the digitally connected world. The benefits expected from this Project include:

- **Improved online learning opportunities.** Reliable broadband will allow students to avoid missing classes at remote high schools and colleges due to inclement weather (the narrow one- and two-lane roads in this area are often closed in winter for hours or days at a time), allowing them to attend from their homes or from community facilities like the Orleans Panamnik Library. Additionally, job training, including for emergency first responders, will be available to all community members.
- **Improved emergency response.** Broadband will enable fire departments and local rescue organizations to assist in communicating with first responders in the event of an emergency. The area to be served is a high-risk fire area, and improved broadband speeds will facilitate the transmission of data and communications among first responders and the public.
- **Improved health care.** The significant distance to reach health care facilities is a problematic in remote communities. Access to remote doctors, Internet-based medical services for individuals, and the ability of small rural clinics to access sophisticated medical diagnostic tools are all important benefits of high-speed broadband Internet access.
- **Improved business opportunities.** Multiple business opportunities are available to develop and expand local businesses with high-speed Internet access, including online sales for businesses such as nurseries, organic farms, and orchards.
- **Improved government interactions.** Many government services are now available exclusively on the Internet or provide preferential access online. Paying taxes, registering an automobile, registering to vote, applying for jobs, and filing for unemployment all can be completed with broadband more quickly than driving to the local government office. Transportation costs are also saved, with less wear and tear on vehicles and roads.
- **Cultural preservation.** Access to broadband services will help facilitate cultural preservation by enabling the Yurok and Karuk Tribes to have regular communication with tribal members not living within the tribal boundaries. Online classes in Native languages, beading, and cultural awareness, among others, will enable tribal members to contribute to the maintenance of cultural traditions and to make them a part of everyday life for tribal members regardless of where they live.
- **Improved quality of life.** Broadband provides a wide range of opportunities for residents in these remote areas to be connected to real-time and current events that

provide cultural, civic, health, and recreational information, as well as improved opportunities to interact with distant family and friends.

2.3 Roles and Responsibilities

This section explains the relationships among the Tribes and their contractors and subsidiaries, and the team's relationship with the various agencies responsible for funding or permitting the KRRBI Project. It also specifies the decision each agency is responsible for in approving the Project. Table 2.3-1 summarizes the major permits, approvals, and consultations that the KRRBI Project will need to proceed with construction and operation.

Table 2.3-1. Major Permits, Approvals, and Consultations Required for the KRRBI Project

Regulatory Agency	Permit, Approval, or Consultation	Agency Action
Federal		
U.S. Department of the Interior (USDI), Bureau of Indian Affairs (BIA)	Approval for use of tribal trust lands	In consultation and coordination with the Yurok and Karuk Tribal Councils, consider permitting construction, operation, and maintenance of fiber optic cables, conduits, and related facilities on lands held in trust for either tribe.
USDI National Park Service (NPS)	Right-of-Way Permit	Consider issuance of a Right-of-Way Permit.
USDI Bureau of Land Management (BLM)	Right-of-Way Permit	Consider issuance of a Right-of-Way Permit.
U.S. Department of Agriculture, Forest Service (USFS)	Temporary Use Permit	Consider issuance of a Temporary Use Permit for temporary activities in a construction right-of-way (ROW) on National Forest System (NFS) Lands.
	Special Use Authorization	Consider issuance of a Special Use Authorization for use of NFS lands for construction and operation of a fiber optic line.
U.S. Department of Defense, Army Corps of Engineers, San Francisco District (USACE)	Section 404, Clean Water Act Permit	Consider issuance of a Section 404 permit for the placement of dredge or fill material in waters of the United States, including jurisdictional wetlands.
Advisory Council on Historic Preservation (ACHP)	Section 106, Consultation, National Historic Preservation Act (NHPA)	Has the opportunity to comment if the Project may affect cultural resources that are either listed on or eligible for listing on the National Register of Historic Places (NRHP).
USDI, Fish and Wildlife Service (USFWS)	Section 7 Consultation, Endangered Species Act	Consult on lead agency finding of impact on federally listed species.
California		
California Public Utilities Commission (CPUC)	California Advanced Services Fund (CASF) Grant approval	After consideration of the environmental effects of the proposed Project, determine whether to issue grant funding under the CASF program.
	Revised Certificate of Public Convenience and Necessity (CPCN) for a Facilities-Based Competitive Local Exchange Carrier (CLEC)	Consider issuance of a revised CPCN to the Karuk Tribe as a Facilities-Based CLEC to allow the construction, operation, and maintenance of the fiber optic cable, wireless towers, and associated facilities.

Table 2.3-1. Major Permits, Approvals, and Consultations Required for KRRBI (continued)

Regulatory Agency	Permit, Approval, or Consultation	Agency Action
California Department of Transportation (CalTrans)	Encroachment Permit	Consider issuance of an encroachment permit for underground and overhead installations within the easements or properties on California-managed highways (96, 169, and 101).
California Department of Parks and Recreation (CDPR)	Easement	Consider issuance of an easement within the existing PG&E ROW and on existing PG&E poles, for the KRRBI Project across parcels of land that are part of Humboldt Lagoons State Park and Henry Merlo State Recreation Area.
California State Lands Commission (CSLC)	Easement, upland	Consider issuance of an easement for the KRRBI Project across an upland parcel along Bald Hills Road.
	Easement, waters of the State	Consider issuance of an easement for the KRRBI Project across the Klamath River at Martins Ferry and at Orleans.
California Department of Fish and Wildlife (CDFW)	California Endangered Species Act concurrence (2080.1)	Determine whether the federal ESA declaration meets California ESA standards
	Stream and Lake Alteration Permit (1602)	Consider issuance of a 1602 permit to allow installation of fiber optic cable in roadside ditches that also carry waters of the State, and to allow installation of fiber optic cable beneath waters of the State.
California State Water Resources Control Board (Board), Region 1, North Coast	Clean Water Act Section 401 certification of USACE 402 permit	Determine whether the terms and conditions of the USACE 402 permit meet California clean water standards.
	Clean Water Act Section 402 Construction General Stormwater Permit	Decide whether to issue a General Stormwater Permit for construction based on application and best management practices.
Humboldt County		
Board of Supervisors	Memorandum of Agreement (MOA)	Decide whether to sign a revised MOA with the Karuk Tribe allowing occupancy of county roads and bridges with fiber optic cable for the KRRBI Project.
Public Works	Encroachment Permit	Consider issuance of an encroachment permit for underground and overhead installations within the easements of Humboldt County roads and bridges.
Planning and Building	Building Permit	Issue a building permit to allow construction of the broadband tower, its appurtenant buildings, generator, and electrical connection, in Orick.

2.3.1 Karuk and Yurok Tribes

The Tribes, each a sovereign nation, are teamed for the purposes of the KRRBI Project and are the lead decision-makers for activities that occur within reservation boundaries and on tribal trust land outside of reservation boundaries. Where activities take place outside of reservation boundaries or trust lands, the Tribes recognize the authority of federal, state, and local agencies to conduct environmental review and issue permits for those activities. However, the Tribes anticipate that each government agency will recognize their unique government-to-government relationship with the Tribes and afford the permitting process every priority and attention so

that the Tribes may provide this important service to tribal members and other members of communities in the service area in a timely manner. As the holder of the CLEC, the Karuk Tribe is the formal proponent of the Project.

2.3.1.1 Tribal Contractors

The Karuk Tribe has retained the services of two Native-owned contractors to provide program management, Project management, permitting, and construction services. EnerTribe has been retained to provide overall program management, Project management, permitting, and easement acquisition for the KRRBI Project. Earthprint Technologies has been retained to provide last-mile wireless engineering, equipment, installation, and service.

The Karuk Tribe selected Owner's Engineer, a firm that will provide design advice, drawings, and specifications during permitting; develop the final drawings and specifications for the construction contract; and oversee the technical aspects of construction. Trinity Valley Consulting Engineers, a Native-owned firm, and their partner N-Com, were awarded the Owner's Engineer contract and have been providing additional details for the Project description and technical options for avoiding environmental impacts.

2.3.2 Federal Agencies

The KRRBI Project will cross lands managed by three federal agencies: RNP, managed by the NPS; two parcels of Public Lands near Weitchpec on Highway 96 managed by the BLM; and Six Rivers National Forest, managed by the USFS. There may be a need for one or more permits under the Clean Water Act for temporary impacts to wetlands from the U.S. Army Corps of Engineers (USACE). The BIA, the surface management agency for tribal lands held in trust and for allotments, will serve as the lead federal agency in the NEPA analysis. Detailed discussion of federal agencies follows.

2.3.2.1 Federal Communications Commission

While the Federal Communications Commission does not have a decision to make with regards to the KRBBI Project, this agency has a long-term commitment to ensure the availability of high-speed broadband Internet service to Native Americans both on and off reservations throughout their ancestral territories. The service provided by the system installed under this grant has compliance and reporting requirements under Federal Communications Commission rules.

2.3.2.2 Bureau of Indian Affairs

The BIA, Pacific Regional Office, is the surface management agency for lands held in trust and for allotments for the Yurok and Karuk Tribes and for the Hoopa Tribe to the south. Their decision is whether to approve the use of trust and allotment lands as requested by the Tribes for the KRRBI Project, subject to the approval of the Tribal Councils and allotment landowners, respectively. The BIA has accepted the role of lead agency for federal permitting purposes as formally requested by the Karuk and Yurok Tribes through Tribal Resolutions . The BIA is the

lead agency for the NEPA environmental analysis and documentation. The BIA signed an agreement on January 21, 2016, with the CPUC for the production and review of a joint NEPA/CEQA environmental document. On October 28, 2015, the BIA issued letters offering cooperating agency status for the purposes of the NEPA review to the NPS, the USFS, and the USACE. On April 29, 2016, the BIA issued a similar letter to the BLM.

2.3.2.3 National Park Service

The Karuk Tribe submitted an application to the NPS on August 21, 2014 (Segments 3 through 5) and is preparing a revision to the application to remove any reference to lands south of Orick, since Segment R5 (an amended route for Segment 5 presented publicly for the first time in 2019) does not cross RNP lands. The easement request is subject to the regulations in the federal Code of Regulations, Chapter 36, Part 14, and requests a ROW through the RNP unit of the NPS that follows and is located within the existing disturbed road ROW for Bald Hills Road. NPS will consider whether to issue the ROW, dependent on finding that such issuance will have only minimal adverse effects on the natural or cultural resources of the park and will not be inconsistent with the purposes of the park. RNP responded to the initial application with a letter dated October 8, 2014, stating that the application had been received but was considered incomplete because of lack of information to write a legal description of the ROW. The Karuk Tribe proposes to wait until the NEPA/CEQA process is complete and an agency-preferred set of alternatives identified before conducting the survey and writing a legal description in order to complete this application.

The NPS received the cooperating agency request letter from the BIA in November 2015 and also sent a comment letter to the Karuk Tribe regarding the proposed use of roads within the RNP on November 24, 2015. The Karuk Tribe provided a formal response to the NPS on April 22, 2016. Karuk and Yurok staff and councilmembers, including Reneé Stauffer, a Karuk Tribal Councilmember, and Joseph James, a Yurok Tribal Councilmember, met with the NPS on June 15, 2017, to discuss NPS cultural resources concerns.

2.3.2.4 Bureau of Land Management

The BLM manages two parcels of Public Land along Segment 1 between the Six Rivers National Forest and the Yurok and Hoopa Reservations (530-007-008 and 530-007-112, T 9 N, R 4 E, Section 1, Humboldt Base and Meridian). The Karuk Tribe submitted an SF-299 application to apply for a ROW grant from the BLM to cross these two parcels in the easement for Highway 96 on June 13, 2016. The BLM must determine, under the Federal Land Policy and Management Act of 1976, as amended, whether to issue a ROW grant to allow the KRRBI Project fiber optic cable and conduit components to occupy the easement already granted to CalTrans for State Highway 96 where that easement crosses Public Lands.

2.3.2.5 U.S. Forest Service

The USFS manages the NFS lands that will be crossed by the KRRBI Project from Orleans to the Yurok Reservation boundary near Weitchpec (Segment 1). It also manages the land where the Orleans Mountain and Antenna Ridge repeaters will be placed (Yurok Signal Connection). The USFS must determine, under the Federal Land Policy and Management Act of 1976, as amended, whether to issue a Special Use Authorization to allow the KRRBI Project fiber optic cable and conduit components to occupy the easement already granted to CalTrans for State Highway 96 where that easement crosses NFS lands. The Karuk Tribe submitted an application to amend its existing Special Use Permit (OR-181) on August 21, 2014. While the USFS never responded to that application, they did respond to the amended application for a Special Use Authorization to include the Yurok Signal connection, submitted June 2, 2016, to occupy a portion of NFS lands in the Six Rivers National Forest. On June 22, 2016, USFS staff contacted EnerTribe staff for additional information and stated that a meeting in Orleans would be scheduled in the next few weeks to go over the Project. As of November 30, 2017, no meeting has been scheduled.

The USFS received the cooperating agency request letter from the BIA in November 2015, but has not responded to the BIA as of November 30, 2017.

2.3.2.6 U.S. Army Corps of Engineers

The USACE is charged with the responsibility for overseeing the enforcement of Section 404 of the Clean Water Act, regarding activities within Waters of the United States, and for overseeing the enforcement of the Rivers and Harbors Act. While the KRRBI Project will not affect any large bodies of water or wetlands, the Project will cross streams now located in culverts or under bridges. The Project will cross the Klamath River with new overhead lines twice, once in Orleans and once at Martin's Ferry, and may install the fiber optic cable within floodplains, coastal zones, or wetlands, which may require consultation with the USACE and possible application for an issuance of a Nationwide 12 permit for utility installation.

The USACE received the cooperating agency request letter from the BIA in November 2015 and responded with a standard list of permit application requirements on December 21, 2015.

2.3.2.7 Advisory Council on Historic Preservation

The Advisory Council on Historic Preservation, under Section 106 of the National Historic Preservation Act (NHPA), has the opportunity to comment if the Project may affect cultural resources that are either listed on or eligible for listing on the National Register of Historic Places (NRHP). The Karuk Tribe does not anticipate that the Project will have an adverse effect on such properties, but until the cultural resources site review and field surveys are complete, this is unknown.

2.3.2.8 U.S. Fish and Wildlife Service (USFWS)

The USFWS, under Section 7 of the ESA, has the opportunity to consult with the lead federal agency finding of impact on federally listed species, if the BIA identifies adverse impact. The Biology Report for this Project indicates there would be no adverse impact to any federally listed species identified at this time.

2.3.3 State Agencies

Several agencies will or may be involved in this Project. Detailed discussion of state agencies follows.

2.3.3.1 California Public Utilities Commission

The CPUC, as the issuer of the CASF Grant to the Tribes, is the State of California Lead Agency under CEQA. The Commission issued two Resolutions funding KRRBI (T-17418, October 17, 2013[5] and T-17690, May 7, 2020[6]) subject to environmental review and approval. This resolution requires, among other things, for the Tribes to provide a PEA. The CPUC will, employing the services of a third-party contractor (Environmental Science Associates), review the PEA, produce an IS, and likely issue a mitigated negative declaration MND decision document, since the impacts of this Project on the environment will be shown to be minimal. The CPUC will determine if the Project should be funded and what environmental protection measures may be needed to avoid, minimize, or compensate for any adverse effects of the Project.

The CPUC will also use this CEQA process to inform its decision to revise the Karuk Tribe's CLEC to a full facilities-based CLEC, accompanied by a revised CPCN that will permit the construction, operation, and maintenance of the KRRBI Project on and off tribal trust lands.

2.3.3.2 California Department of Transportation (CalTrans)

The Karuk Tribe will submit an encroachment permit application to CalTrans for use of an easement along Highways 96 (Segment 1), 169 (Segment 2), and 101 (Segments 4 and R5 in and near Orick) for the construction, operation, and maintenance of the fiber optic cable. Based on the response of CalTrans for the Orleans Community Connect Project, it is expected that CalTrans will issue the permit without charge as a government-to-government courtesy. Table 2.4-2 (provided in Section 2.4.5) details proposed installations within state highway easements or fee ownerships, by installation method.

The Karuk Tribe also considered the possible use of the CalTrans storage yard in Orick as an alternative location for the Orick broadband tower (Section 4.2).

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[5] Available online http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M079/K379/79379916.pdf, last accessed May 7, 2020.

[6] Available online at http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M337/K051/337051399.pdf, last accessed May 11, 2020

2.3.3.3 California State Lands Commission (CSLC)

The KRRBI Project will use the previously disturbed road area of the Bald Hills Road for underground installation of its middle mile fiber optic cable and conduits. Bald Hills Road crosses a small portion of lands managed by the CSLC (Humboldt County Assessor's Parcel # 531-023-008). In addition, the CSLC asserts jurisdiction over any crossing of the Klamath River, and an easement for that crossing would be required—even for a bridge hang or an aerial crossing. The Karuk Tribe will submit an application for the upland crossing on Bald Hills Road and for an overhead crossing of the Klamath River at Orleans (Segment 1) and at Martin's Ferry (Segment 2).

2.3.3.4 California Department of Forestry and Fire Protection

The Elk Camp Fire Station occupies land owned and operated by CDF (Humboldt County Assessor's Parcel # 532-073-008). The Karuk Tribe applied on July 20, 2017, for permission to occupy the Bald Hills Road easement across this parcel.

2.3.3.5 California Department of Fish and Wildlife (CDFW)

CDFW, formerly Fish and Game, does not manage any land to be crossed by the KRRBI Project, but must be consulted regarding possible impacts to waters of the State and to species on the California Endangered Species Act (CESA) lists. Because the Project will have minimal impact on waters of the State and no impact on CESA-listed species, it is anticipated that these consultations will be *de minimis*.

2.3.3.6 California Department of Parks and Recreation (CDPR)

California State Parks manages the Humboldt Lagoons State Park and the Harry A. Merlo State Recreation Area and co-manages the Redwood National and State Parks (RNSP) with the NPS. The proposed route for Segment R5 crosses two units of the state parks—the Humboldt Lagoons Park and the Merlo State Recreation Area. The Karuk Tribe will submit an encroachment permit application, if needed, to the CDPR in 2020 to cross parcels of land in Segment R5. The existing PG&E transmission line, to which the KRRBI fiber is proposed to be attached, crosses those parcels utilizing an easement granted prior to the lands becoming State Park holdings.

CDPR has requested broadband service from the KRRBI Project to serve the following State Park facilities:

- Prairie Creek Redwoods State Park
- Proposed new Visitor's Center (old mill grounds at intersection of Bald Hills Road and Highway 101, co-located with NPS)
- Southern Operations Center (co-located with NPS)
- Humboldt Lagoons State Park (Stone Lagoon Visitor Center)

- Patrick's Point State Park

The revised KRRBI plans include a short spur to the proposed Visitor's Center and another to the existing Southern Operations Center. The 5-mile extension to serve Prairie Creek Redwoods State Park is not included in the KRRBI Project at this time because of very high costs. Stone Lagoon Visitor's Center can likely be served by a direct fiber connection, but Patrick's Point State Park may receive wireless service due to its distance from the Segment R5 centerline.

2.3.3.7 California State Water Resources Control Board

The Board, Region 1, North Coast, has two delegated duties under the federal Clean Water Act. Under Section 401 of the Act, the Board must determine whether a permit proposed for issuance by the USACE meets state water quality standards. Under Section 402 of the Act, the Board must determine whether to issue a General Stormwater Permit for construction based on an application from the Tribe's construction contractor and the best management practices (BMPs) proposed in that contractor's Stormwater Pollution Prevention Plan (SWPPP).

2.3.4 Humboldt County

The Karuk Tribe will request a building permit from Humboldt County for construction of the wireless broadband tower in Orick. The Tribe will also request an encroachment permit and long-term agreement to occupy the road prism of several county roads and bridges managed by Humboldt County Public Works. The Karuk Tribe and Humboldt County have signed a Memorandum of Agreement to accommodate these installations[7]. Table 2.4-2 (provided in Section 2.4.5) details proposed installations within Humboldt County road easements or fee ownerships, by installation method. Humboldt County will be a responsible agency in the CEQA proceedings led by the CPUC.

2.3.4.1 Planning

The construction of the Orick Tower, presently planned for a non-exclusive occupancy easement on private lands outside the special Highway 101 commercial zone, does not require special permitting from Humboldt County Planning. The Project must comply with the requirements of a building permit, which requires additional soils studies, detailed drawings, periodic County inspections during construction, and final County approval before operations.

2.3.4.2 Public Works (Encroachment Permit)

The KRRBI Project has applied to Humboldt County Public Works for an Encroachment Permit to install fiber optic cable above (on existing poles) or within the road prisms of Humboldt County roads (in the shoulder or uphill (inboard) ditch of the road wherever possible). Issuance of this permit is subject to the terms and conditions of the updated and approved

[7] Karuk Tribe Resolution 16-R-142 (8/25/16); Humboldt County Board of Supervisors Resolution 16-A-20 (9/26/16)

Memorandum of Agreement (MOA) between the Karuk Tribe and Humboldt County that provides County permission for long-term occupancy.

2.4 Project Description

This section describes and illustrates the fiber optic routes and installation methods. It also presents details on additional system components including the proposed wireless tower, a wireless signal transmission facility, and the last mile components that deliver high-speed broadband to individual anchor institutions, businesses, and residences.

2.4.1 Proposed Fiber Optic Cable Route

Figure 1.1-1 in Section 1 shows the Project area in northern California and the proposed Project routes. The fiber optic cable is planned in five segments totaling about 104 miles as shown on Figures 2.4-1 through 2.4-5. Each segment is anchored by critical points in the path where service must be supplied. Alternatives for two of the segments have been considered and are discussed in Section 4, including an illustration in Figure 4.1-1. A description of the five segments are provided below:

- **Segment 1:** (15.2 miles) Orleans to Weitchpec, following Highway 96. No feasible alternatives (Figure 2.4-1). This segment includes a 0.5-mile spur that will serve CalTrans and the Karuk offices just north of the Orleans bridge along Highway 96 (Figure 2.4-1a). It also includes two short 0.1-mile spurs to:
  - the existing Orleans broadband tower
  - the existing Frontier landline central office in Orleans
- **Segment 2:** (24.2 miles) Weitchpec to Wautec, entirely within the Yurok Indian Reservation. Includes a 2-mile spur to serve the Yurok Tribe's Tulley Creek facility for a total distance of 24.2 miles and a 0.1-mile spur to serve the Yurok Tribal Community Center and to provide an interconnect option for Frontier. No feasible alternatives (Figure 2.4-2).
- **Segment 3:** (21.9 miles) Weitchpec to Elk Camp. This segment has a proposed route and an alternative route (see Section 4.1.1 for a description of the alternative route). The proposed route travels from the Tulley Creek facility side route of Segment 2 along Bald Hills Road to Elk Camp and includes a short 0.1-mile spur to the existing Elk Camp Fire Station (Figure 2.4-3).
- **Segment 4:** (11.8 miles) Elk Camp to Orick Tower. No feasible alternatives (Figure 2.4-4). This segment follows Bald Hills Road from Elk Camp to Highway 101 just north of Orick, then through the town of Orick to the proposed tower location for a total distance of 11.8 miles. It includes four additional short spurs, all 0.1 mile or less, to:
  - the proposed Orick Tower for this Project,

  - the existing State Parks office at the Southern Operations Center facility shared with the NPS,
  - the proposed Visitor Center at the intersection of Bald Hills Road and Highway 101 just east of Orick, and
  - the existing Frontier office in Orick.

- **Segment R5:** (33.1 miles) Orick Tower to Fiber Network Meet-Me. This segment has a proposed route and an alternative route (see Section 4.1.2 for a description of the alternative route). The proposed route follows Highway 101 from the Orick Tower, through the town of Orick to the intersection of Highway 101 and Hiltons Road. It then continues overhead, south on the existing PG&E 60-kV transmission line poles, staying northeast of Freshwater Lagoon and following the old highway around Stone Lagoon, then paralleling Highway 101 to Big Lagoon. At Big Lagoon, the PG&E transmission line follows the old A-line railroad grade across Green Diamond land, closely paralleling and mostly adjacent to the Hammond Truck Road. The route, continuing overhead on the PG&E line, then turns southeast, away from the truck road, and crosses Humboldt County's Murray Road near Fieldbrook. The route then leaves the transmission line, following Murray Road overhead and underground west and south into McKinleyville, turning south overhead on Central Avenue, and ending at 1555 Railroad Drive in a short underground portion to the AT&T Central Office in McKinleyville. (Figure 2.4-5). There is a short (< 0.1 mile) fiber spur to serve the Tsunami Tower above Orick, another short (<0.1 mile) spur to serve Stone Lagoon Visitor Center, and a pole established in the PG&E ROW to serve Patrick's Point State Park Visitor Center wirelessly.

Further details on the location of each segment and its proposed installation methods are provided in Section 2.4.4.2.

Klamath River Rural Broadband Initiative

Figure 2.4-1
Segment 1
Orleans to Weitchpec

SIX RIVERS NATIONAL FOREST

Orleans

96

Segment 1

Segment 2

169

96

96

Weitchpec

Legend

Yurok Reservation Boundary

Fiber Install Route

Segment

1

2

3

4

5

N

W E

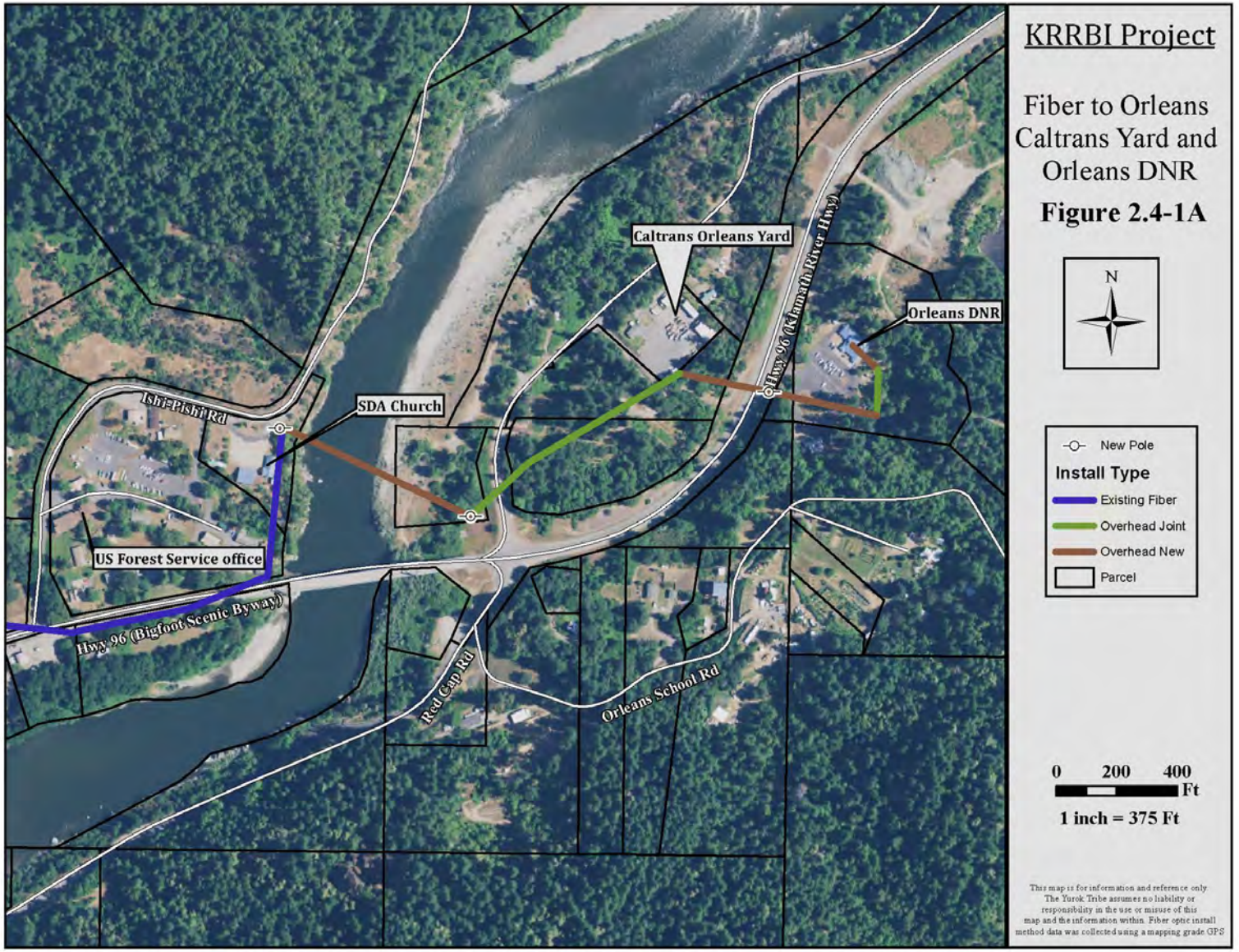
S

0 0.75 1.5 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
March 5, 2016

Figure 2.4-1a. Segment 1 – Fiber to Orleans Caltrans Yard and Orleans DNR



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Klamath River Rural Broadband Initiative

Figure 2.4-2
Segment 2
Weitchpec to Wautec

Legend

- Yurok Reservation Boundary

Fiber Install Route Segment

- 1
- 2
- 3
- 4
- 5

N
W E
S

0 1.25 2.5 Miles

Wautec

SIX RIVERS NATIONAL FOREST

169

Segment 4

Segment 2

Segment 1

Segment 3

Elk Camp

Bald Hills Rd

Bald Hills Rd

REDWOOD NATIONAL STATE PARK

Weitchpec

96

96

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Yurok Tribe GIS Program
March 15, 2016

Klamath River Rural Broadband Initiative

Figure 2.4-3
Segment 3
Segment 2 to Elk Camp

Wautec

SIX RIVERS NATIONAL FOREST

Segment 4

Orick

169

Segment 2

Elk Camp

REDWOOD NATIONAL STATE PARK

Bald Hills Rd

Segment 3

Bald Hills Rd

Weitchpec

96

Legend

- Yurok Reservation Boundary

Fiber Install Route Segment

- 1
- 2
- 3
- 4
- 5

N

W E

S

0 1.25 2.5 Miles

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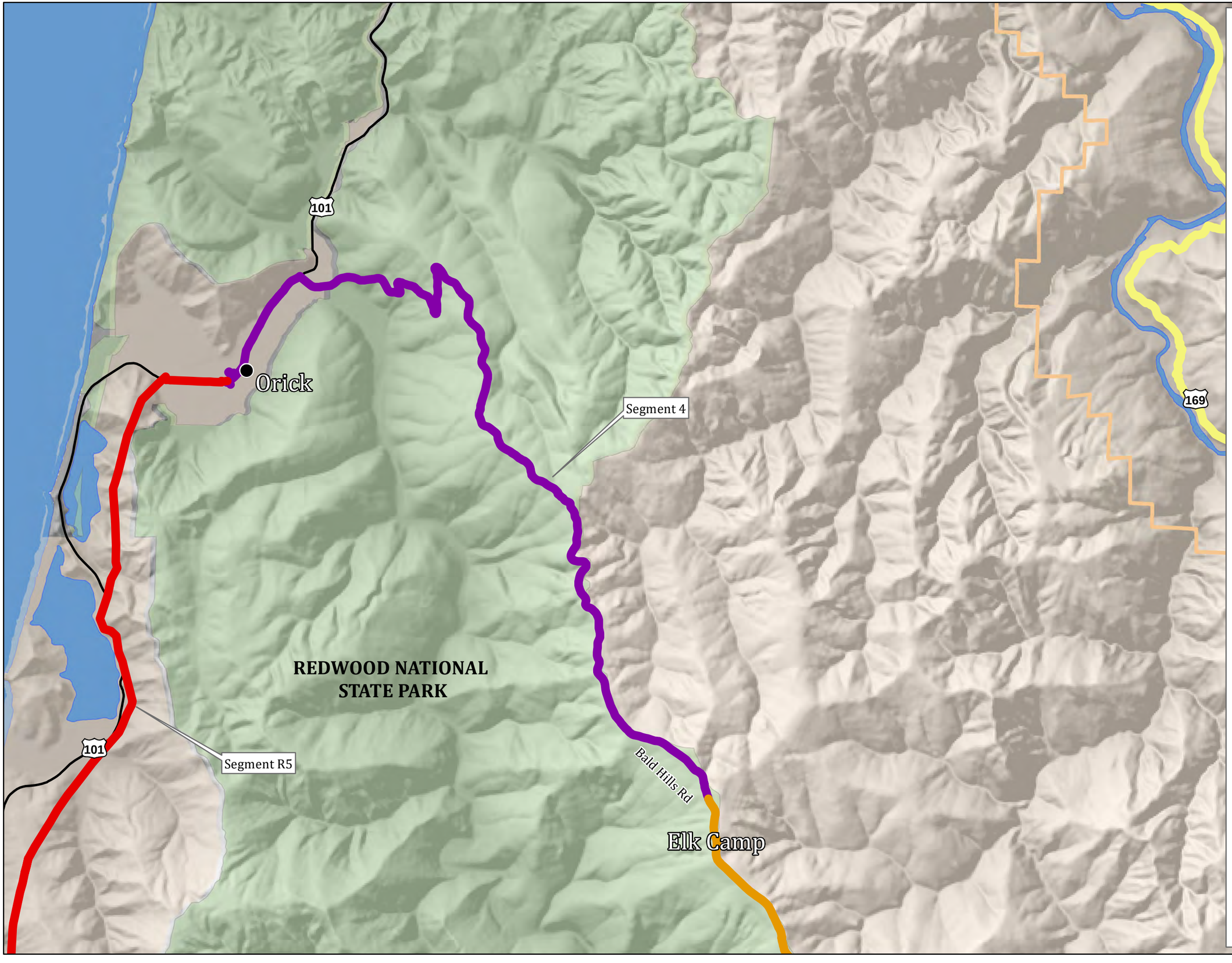
Yurok Tribe GIS Program
March 15, 2016

Klamath River Rural Broadband Initiative

Figure 2.4-4
Segment 4
Elk Camp to Orick



Legend

- Yurok Reservation Boundary

Fiber Install Route
Segment

- 2
- 3
- 4
- R5

N
W E
S

0 1 2 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
May 13, 2020

Klamath River Rural Broadband Initiative

Figure 2.4-5

Proposed Segment R5

Legend

Fiber Install Route

Segment

- 3
- 4
- R5

N E S W

0 2 4 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
December 18, 2019

2.4.2 Anchor Institutions

An anchor institution is a basic community facility providing important public safety, education, or governmental services. The KRRBI Project was designed to offer services to these institutions and is required to do so under the terms of the CASF grant. Anchor institutions are so called because they anchor and largely dictate the location of the fiber optic routes serving them, limiting practical route alternatives. The KRRBI Project plans service for the following 26 anchor institutions, which are shown on Figures 2.4-6 through 2.4-13.

Fire and Police (Public Safety):

- Orleans Volunteer Fire Department (Segment 1)
- Public safety office – Yurok Tribal police and fire – near Weitchpec (Segment 2)
- Yurok Tribal Wildland Fire Department – Tulley Creek – near Weitchpec (Segment 2)
- Wautec Fire House (Segment 2)
- Bald Hills Rd – Cal Fire Elk Camp Forest Fire Station (Segment 3)
- Orick – Volunteer Fire Department (Segment 4)

Schools:

- Orleans Head Start (Segment 1)
- Orleans Elementary (Segment 1)
- Weitchpec – Magnet School (Segment 2)
- Head Start – Ka'Pel (Segment 2)
- Jack Norton Elementary – Wautec (Segment 2)
- Orick School District – Elementary (Segment 4)

Health Care:

- Orleans Medical Clinic – Orleans (Segment 1)
- United Indian Health Service – Weitchpec (Segment 2)

Tribal Offices:

- Karuk Tribe Department of Natural Resources – Orleans (Segment 1)
- Karuk Tribe Housing Office and Council Chambers – Orleans (Segment 1)
- Karuk Tribe Computer/Senior Center and Library – Orleans (Segment 1)
- Yurok Tribal Government – Weitchpec (Segment 2)
- Yurok Tribal Facility at Tulley Creek (Segment 2)

California State Parks:

- New Visitor Center, Bald Hills Rd, Orick (Segment 4)

- Redwoods National and State Parks South Operations Center, Orick (Segment 4)

CalTrans:

- CalTrans Maintenance Station – Orleans (Segment 1)

USDA Forest Service:

- Orleans Ranger Station, Six Rivers National Forest – Orleans (Segment 1)

Existing Broadband Providers:

- Tsunami Wireless Broadband Tower near Orick (Segment R5)
- Frontier Communications Orick Central Office (Segment 4)
- Frontier Communications Orleans Central Office (Segment 1)
- Frontier Communications Weitchpec Network (Yurok Community Center) (Segment 2)

KRRBI: Figure 2.4-6 Anchor Institutions Overview

Pacific Ocean

Figure 2.4 - 10

Figure 2.4 - 9

Figure 2.4 - 14

Figure 2.4 - 13

Figure 2.4 - 12

Figure 2.4 - 11

Figure 2.4 - 8

Figure 2.4 - 7

Antenna Ridge

Orleans Mountain

Legend

- Existing Broadband Towers
- Proposed Broadband Tower
- Anchor Point

Proposed Broadband Antenna

- Antenna Ridge
- Orleans Mountain

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- R5

0 1 2 4 6 Miles

N W E S

Yurok Tribe GIS Program
May 2, 2020

KRRBI:
Figure 2.4-7
Orleans
Anchor Institutions

Cal-Trans Maintenance Station

Karuk Tribe DNR

Six Rivers Ranger Station

Orleans Head Start

Orleans Elementary

Karuk Tribe Computer/Senior Center

Hwy 96

Orleans Volunteer Fire Dept.

Orleans Broadband Tower

Orleans

KTHA/Council Chambers

Karuk Tribe Medical Clinic

Legend

Broadband Towers

Anchor Point

Fiber Install Route

Segment

1

2

3

4

5

0 5 10 20 Miles

N

W E

S

Yurok Tribe GIS Program
August 5, 2015

KRRBI:
Figure 2.4-8
Weitchpec Anchor Institutions

Yurok Tribe Police & Transfer Station

Segment 2

Hwy 169

Segment 1

Weitchpec Yurok Magnet School

UIHS Medical Clinic

Hwy 96

Yurok Tribal Office and Community Center

Hwy 96

Po'to'yo

Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

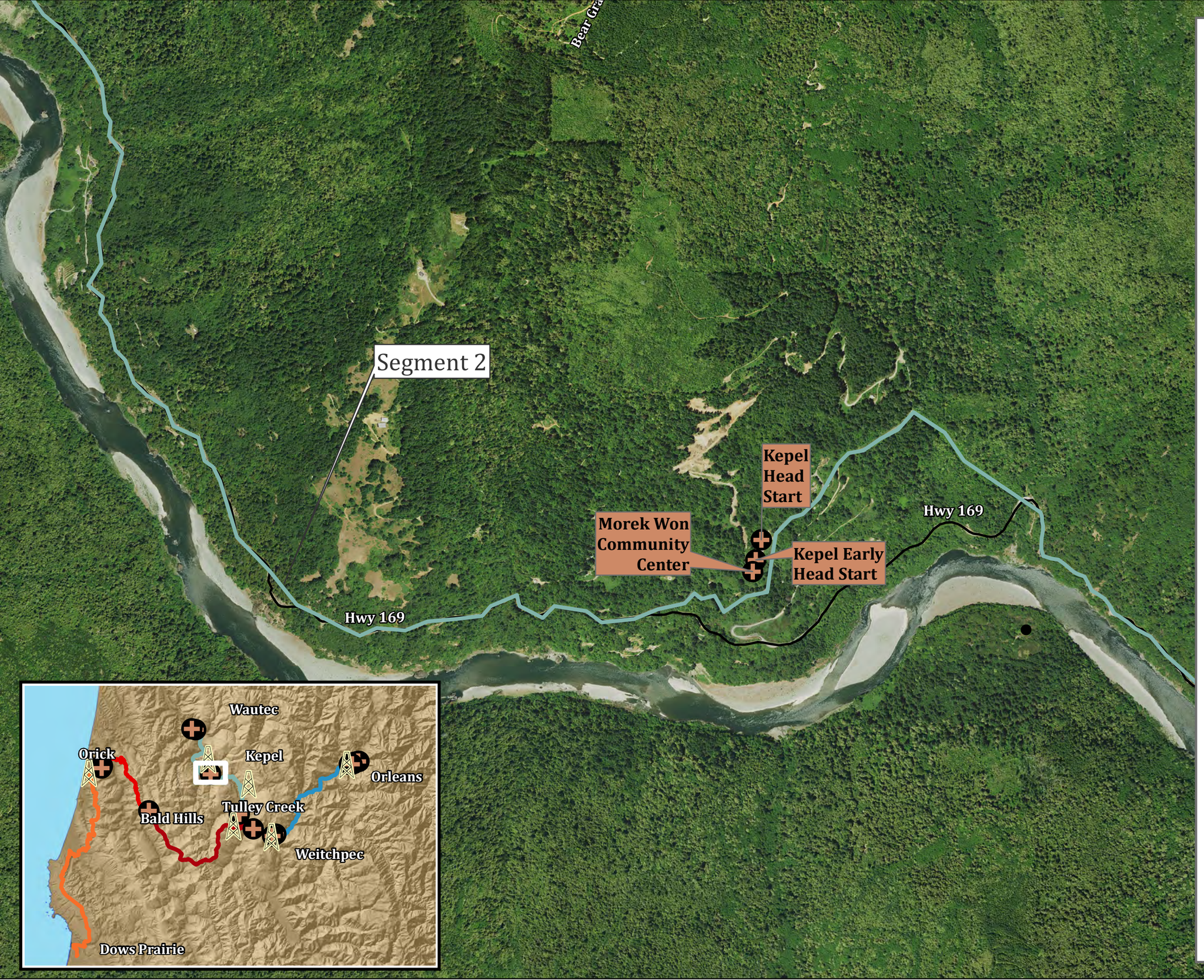
0 750 1,500 3,000 Feet

N
W E
S

Yurok Tribe GIS Program
August 5, 2015

KRRBI:
Figure 2.4-9
Kepel

Anchor Institutions



Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 500 1,000 2,000 Feet

N
W E
S

Yurok Tribe GIS Program
August 5, 2015

KRRBI:
Figure 2.4-10
Wautec
Anchor Institutions

Segment 2

Wautec Fire House

Wautec Village

Wautec

Jack Norton Elem.

Hwy 169

Johnsons Road

Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

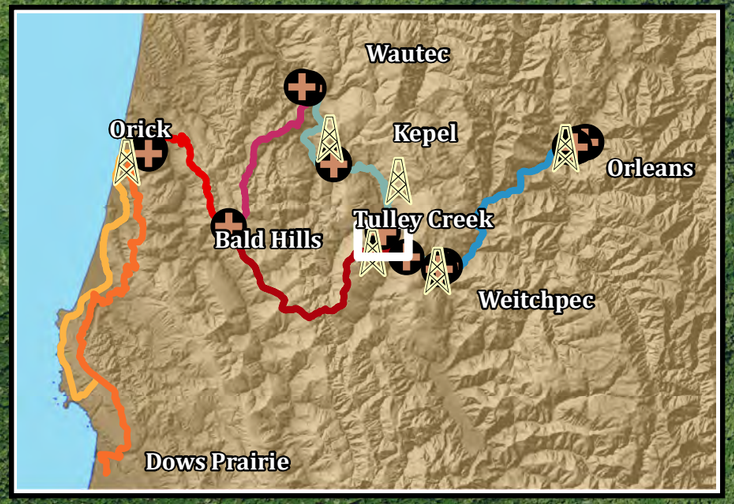
Segment

- 1
- 2
- 3
- 4
- 5

0 500 1,000 2,000 Feet

N
W E
S

Yurok Tribe GIS Program
August 5, 2015



KRRBI:
Figure 2.4-11
Tulley Creek
Anchor Institutions

Tulley Creek Fire & Fitness Center

Tulley Creek

Hwy 169

Segment 2

Segment 3

Martins Ferry Bridge

Bald Hills

Wiregrass

Legend

- Anchor Point
- Broadband Towers

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 500 1,000 2,000 Feet

N
W E
S

Yurok Tribe GIS Program
August 5, 2015

KRRBI:
Figure 2.4-12
Bald Hills
Anchor Institutions

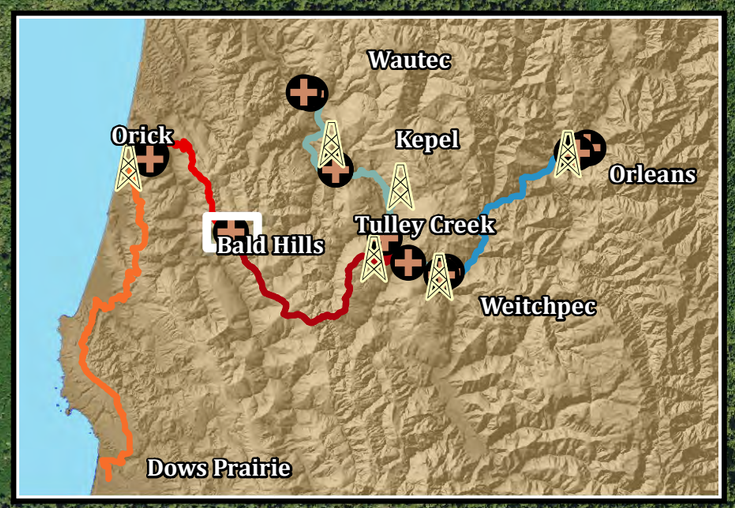
Segment 4

Bald Hills Road

Cal Fire
Elk Camp
Station

Johnsons Road

Segment 3



Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 500 1,000 2,000 Feet

N
W E
S

Yurok Tribe GIS Program
October 6, 2016

Klamath River Rural Broadband Initiative

Figure 2.4-13

Orick/Big Lagoon Anchor Institutions

Segment 4

Proposed Visitor Center

RNSP South Operations Center

Orick Volunteer Fire Dept.

Frontier Office

Orick School District-Elem.

Orick

101

Tsunami Tower

Orick Broadband Tower

Segment R5

Legend

- Broadband Towers
- Anchor Point
- Fiber Install Route Segment
  - 4
  - R5

0 0.15 0.3 0.6 Miles

N W E S

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within.

Yurok Tribe GIS Program
May 2, 2020

2.4.3 Yurok Wireless Towers

Figure 2.4-14 shows the three towers (Wiregrass, Miners, and McKinnon) already installed and functional on the Yurok Reservation that communicate through wireless links to a tower in Requa (on the coast near Klamath), and thence, to fiber optic service from Crescent City. Section 2.4.6.2 describes the replacement of generators for Wiregrass, Miners, and Wautec, and the addition of power backup equipment for the McKinnon tower.

2.4.4 Fiber Optic Cable Installation

2.4.4.1 Fiber Optic Cable

The KRRBI Project will likely use a 144-strand Single-Mode Fiber optic cable for its middle mile installations in all segments, a total distance of 103.4 miles. Where the fiber is placed underground, the Project will install two 31-mm (1.25-inch) diameter conduits, of which one will contain the fiber optic cable and the other will serve as a spare for future use or restoration. Alternatively, the Project may utilize one or two microducts, which are 20-mm (0.79-inch) ducts with 3 to 4 microducts inside. For the purposes of this analysis, we have assumed the larger conduits will be installed. Where the fiber is placed overhead, the fiber may be lashed to a ¼-inch steel cable support strand and the cable secured to existing or new utility poles, or self-supporting cable may be used. The overhead fiber may be enclosed in a UV aerial-rated duct if the area is subject to high rates of firearm vandalism or rodent issues.

2.4.4.2 Installation Methods for Fiber

Figure 2.4-15 shows a map of the proposed installation techniques for the entire KRRBI Project.

Klamath River Rural Broadband Initiative

Figure 2.4-14

Yurok Tower Locations

Mckinnon Hill

Bear Grass 40 Rd

Kep'-el

169

Miners

Telecom Site Rd

Lewis Rd

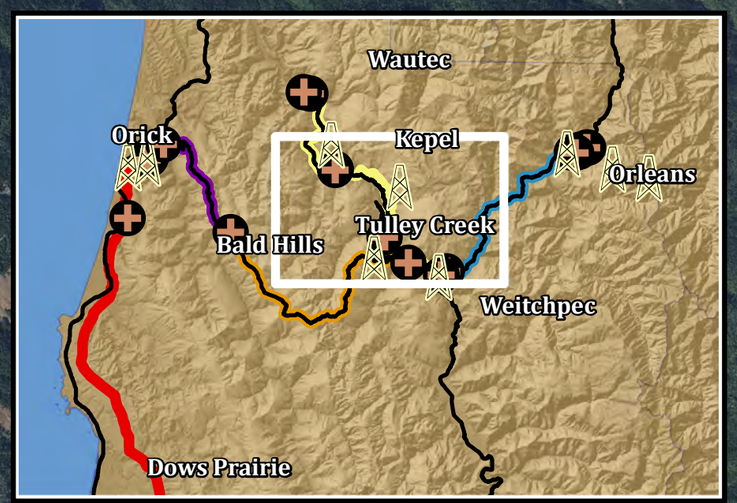
Wiregrass

Bald Hills

Weitchpec

96

Weitchpec



Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

Segment

- 1
- 2
- 3

0 0.5 1 2 Miles

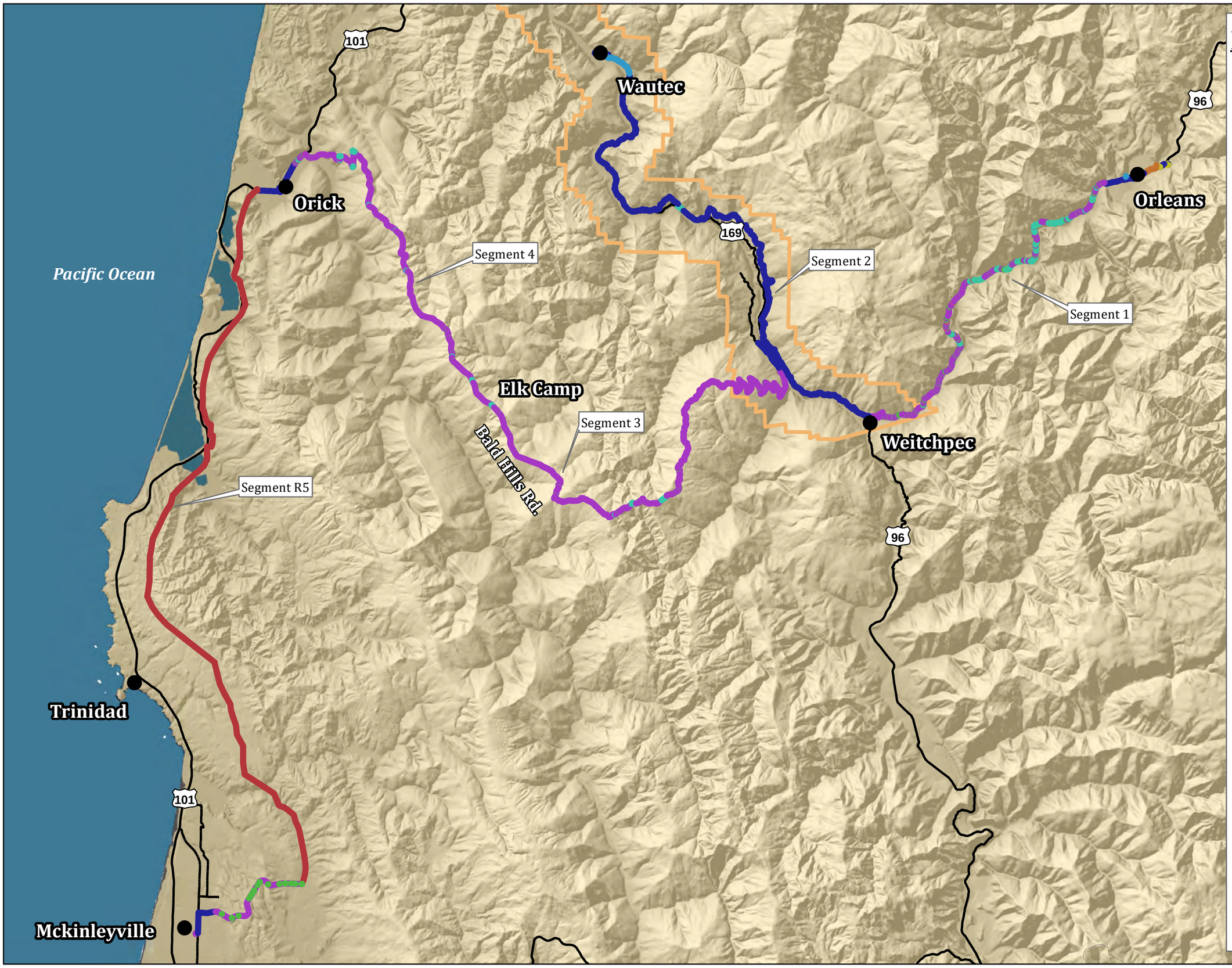
N W E S

Yurok Tribe GIS Program
December 18, 2019

Klamath River Rural Broadband Project

Figure 2.4-15

Installation Methods



Legend

- Community
- Road
- Yurok Reservation

Install Type

- Bridge Hang
- Directional Drilling
- Existing Conduit
- Existing Fiber
- Overhead Distribution
- Overhead New
- Overhead Transmission
- SawCut
- Trench

N
W E
S

0 50 100 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
January 3, 2020

The Karuk Tribe will use existing poles where they are available for overhead installation, and will use underground methods only where existing poles are not available and installing new poles is not feasible or would have adverse visual or cultural resource impacts. The Tribe proposes to use overhead installation on existing poles because the environmental impact is minimal, limited to a small ground disturbance if an additional guy wire anchor is needed, and would not contribute to adverse visual impacts because the poles and wires are already in place. It is also typically the more cost-efficient method for installation, though more costly to maintain due to damage from winter storms, vehicle collisions, and falling trees. Special consideration is needed for water crossings. At this time, no need for mature tree removal is anticipated. See Section 2.4.4.4, Trenching, for the discussion on removal of seedlings and saplings that may have established in the roadside drainage ditch.

- **Installation overhead on existing poles where feasible.** This includes the following types of poles:
  - "joint use" poles, where electric power poles (sub-transmission or distribution voltages) are already shared with one or more communications providers;
  - "power" poles, typically wooden poles with an electric power component at transmission (60 kV), sub-transmission, or distribution voltages but no existing communications provider use; and
  - "communication" poles, where one or more communications providers are installed, typically on a shorter pole, without an electric power component.

  Where there is an existing communications provider, the Karuk Tribe will enter into an agreement with that provider to share the communications space on that pole. For power poles without other communications providers, the Karuk Tribe has entered into an agreement with the electrical service provider (PG&E) to establish and use the communication space on those poles. Alternatives may be necessary when cable placements of existing carriers prohibit the addition of another carrier, or costs to adjust existing carriers' cables (make-ready costs) may exceed other placement methods.
- **Installation overhead on new poles.** New pole installation may be needed in some instances where existing poles are overburdened. These locations are not known at this time, as the requirement to replace poles is frequently made by the pole owner after formal permission to attach to specific poles is being negotiated. There will be three known locations where two poles each will be needed for overhead water crossings, as specified in Section 2.4.8.1.
- **Underground installation techniques include**:
  - Plowing in the unpaved road shoulder with a specialized plow designed to open a very small trench, install the two conduits, and close the trench immediately thereafter in one pass;

- Trenching, typically in existing rights-of-way or roadside drainage ditch, by temporarily digging a trench or deepening the ditch, installing the two conduits and cable, then restoring the ditch profile and functionality;
- Pavement saw cutting, a technique used for opening a narrow trench in the paved portion of a road, installing the two conduits, backfilling the trench, and restoring the pavement cover. This technique is used only where there is no practical alternative for fiber optic cable installation in a road shoulder or ditch.
- Rock saw cutting, a needed technique when competent bedrock is present at or near the road shoulder surface, requiring a specialized rock saw, a narrow trench, and subsequent cement backfill.
- Directional drilling will be used to cross under a paved road where necessary and to cross under culverts. This method requires specialized equipment that directs a drill head at an angle down, below, and then back up on the other side of the roadway. This method is also useful for avoiding impacts to tree roots or to limited areas of environmental sensitivity.

In all cases for underground installation, two conduits will be installed to permit the future addition of another fiber optic cable without new ground disturbance.

- **Specialized water crossing methods** depend on the watercourse to be crossed.
  - Whenever possible, the Karuk Tribe will use existing poles where cables or power lines already cross the watercourse. Where these are not available, the following methods may be considered:
  - Installing new poles to cross the watercourse with an overhead cable, avoiding impacts to the watercourse and to the banks if the poles can be set back far enough;
  - Hanging the cable from an existing bridge to avoid impacts to wetlands and watercourses; and
  - Directional drilling to install two conduits and cable below important structures that should not be disturbed or that may be replaced within the lifetime of the KRRBI Project (e.g., culverts). This method requires specialized equipment that directs a drill head at an angle down, below, and then back up on the other side of the identified obstacle. This method will routinely be used to avoid impacts to culverts and wetlands present in the road shoulder. In general, it will not be used to cross under perennial streams that are not contained in a culvert.

Each of these techniques is described in detail in Sections 2.4.4.3 through 2.4.4.5.

2.4.4.3 Fiber Optic Cable Overhead

Existing Poles

Where feasible and where existing poles are available that are immediately adjacent to an existing road, the Karuk Tribe proposes to expand its existing agreement with Frontier Communications (automatically transferred from Verizon), or to develop an agreement with the incumbent senior communications provider to utilize such poles. Where there are existing poles but no other communications provider, the Karuk Tribe will develop an agreement with PG&E to use those poles that do not already have a communications attachment. Joint authority poles typically have a 13-kV distribution line at the top and one or more existing communications fiber or copper cable(s) at a lower anchor point. Existing communications providers have recently wanted to retain the lowest point on the pole and may require the Karuk Tribe to move the incumbent down 12 inches and install the Tribe's fiber optic cable between the incumbent's line and the distribution lines, at least 3 feet below existing power conductors (see Figure 2.4-16). Where the pole supports only existing telecommunications facilities, the KRRBI Project cable will typically be installed 12 inches above the existing communications cable(s) on those poles. Where there are multiple carriers utilizing the same pole, the Karuk Tribe will enter into an agreement with the carrier that owns the pole and locate where that carrier indicates. Where the pole is a "power" pole without existing communications providers, the Karuk Tribe will enter into an agreement with PG&E to occupy the communications portion of the pole.

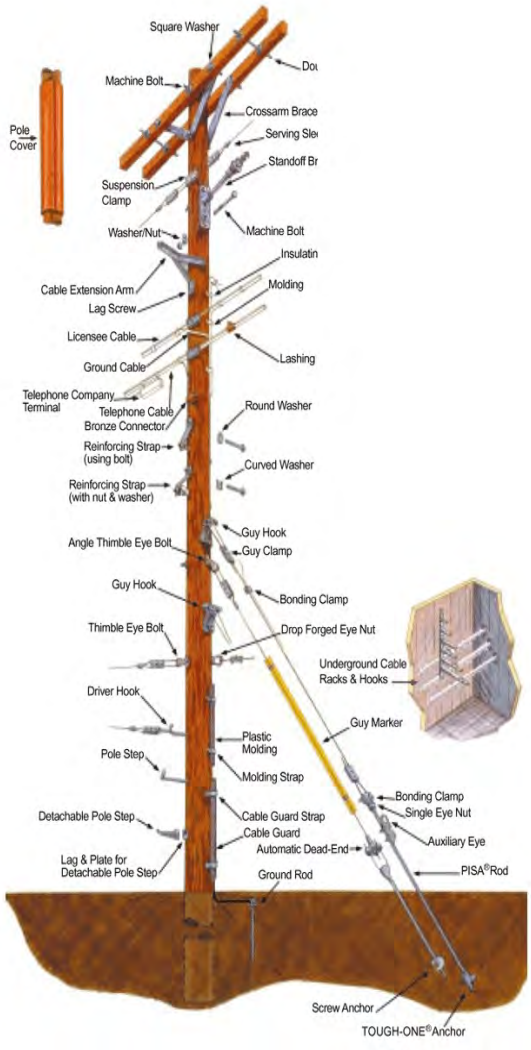


Figure 2.4-16. Typical Fiber Overhead Installation

In Segment R5, the KRRBI Project will occupy transmission poles. This transmission pole route is more direct than distribution lines that typically follow roads, traveling cross-country and supporting longer spans between poles. This may require the use of special equipment, such as all-terrain vehicles and bucket trucks that can traverse cross-country over steep terrain. In some

instances, installers may climb the poles and install pulleys to allow the cable to be pulled into place from accessible locations, then anchor the cables directly to the poles once tensioned.

Traffic control is often needed during installation of the overhead fiber optic cable if the poles are close to the travel way. Traffic control is typically dictated by the Manual of Uniform Traffic Control Devices and will in addition conform to permit requirements from the relevant road agency (see EPM TRANS-1).

Before the Project cable can be attached to the pole, other cable attachments may need to be moved to accommodate the new fiber. Specialized contractors, approved by the other communications providers, must be used for this step. The next step is to either utilize the J-hook attachments left in place when the other carrier cables were moved or to install a similar attachment. A hole is drilled through the pole followed by a machine bolt that goes through the whole pole; nuts and washers would be placed on one side followed by another attachment on the face of the pole that would serve to hold the aerial strand cable in place. In some cases, the aerial strand cable would be attached with an extension arm, which would be used where needed to reduce the radius or tightness of the turns in the cable or where the existing cable is already at minimum clearance over the road.

There are many types of fiber optic cable that could be used—some are self-sustaining (have a built-in steel cable wrap within the cable covering), and some need an aerial steel cable strand. If the steel strand support is used, it is installed first and attached using the J-hooks. Another type of cable is all-dielectric self-supporting cable, which is specifically designed to be self-supporting, lightweight, and non-conductive. This allows for attachment to steel poles without providing any danger of inadvertent grounding.

As the aerial strand cable is being strung, it is tensioned and secured to the pole. When the cable has been secured to all the poles, the fiber optic cable itself is brought to the work area and attached to the strand cable. This is attached using a lasher that takes a form of tie wire and spins it around the cable strand and the fiber, thus attaching the two together as one (Figure 2.4-17). Where vandalism is likely, the cable may instead be installed within a UV-rated aerial duct to further protect it.

Figure 2.4-17. Cable Lasher

At each pole, engineers determine the need for additional guy wires to anchor the pole to the ground based on the new weight and stress on the pole, and in consultation with the pole owner and other carriers. Anchors installed by other carriers generally have triple eye nuts for attachment, but often only one of the eyes is in use. If agreement can be reached with the other carriers, the KRRBI Project can use one of the remaining eyes, and no ground disturbance for additional guy anchors is needed.

If existing anchors are not available, an additional anchor is installed immediately adjacent to the existing anchor by drilling the guy anchor directly into the ground an average of 6 feet.

Figure 2.4-18. Bucket Truck (right) and Splicing Truck

Work on the poles is conducted from a bucket truck (Figure 2.4-18). This truck allows safe access for workers to each pole.

After the fiber optic cable is installed, it must be tensioned and spliced. Splicing is typically needed at least once per mile, and often more frequently depending on the difficulty of installing a full mile of fiber optic cable through existing trees. These splicing locations also include a coil of extra fiber optic cable (typically about 100 feet), which facilitates repair if needed in the future. Splicing can be conducted, and the splice anchored, in-line for overhead installations.

Fiber optic cable requires a specialized splicing truck, where the glass strands in the cable can be individually fused together to allow the light signal to pass through the fused area without distortion. This truck is also shown in Figure 2.4-18, at left.

In strategic locations along the middle mile installation, loops of additional cable are attached to "snowshoes", which are reels suspended in-line that allow for storage of extra fiber optic cable to make future maintenance and repairs feasible without having to decommission large portions of the system during repairs (see Figure 2.4-19).

After the fiber has been installed, tensioned, secured, and spliced, the area is ready for cleanup. Most of the work will be conducted from the pavement or shoulder of the road, eliminating the need for any cleanup. However, where the equipment is located on a dirt shoulder, the shoulder will be returned to preconstruction conditions or as dictated by the permit terms and conditions from the road management agency.

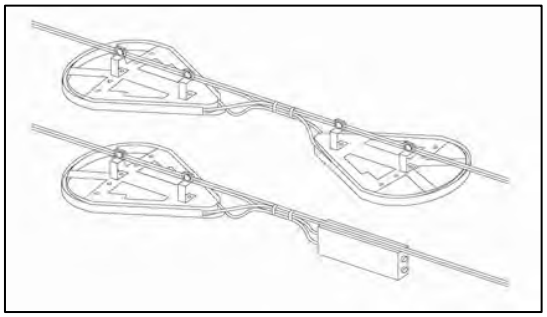


Figure 2.4-19. Snowshoe Reels

Installing New Poles

Figure 2.4-20. Installing New Pole

The installation of new poles will follow general industry practice (Figure 2.4-20). Note that the KRRBI Project anticipates using only direct-bury wooden poles with guy wires if needed. No specialized poles requiring foundations or towers are proposed. A specialized truck will use an auger to drill a hole far enough back from the side of the watercourse to avoid impacting the water or riparian vegetation. An industry-standard pressure-treated wooden pole, 20 to 30 feet total length (depending on the span and obstructions) will be brought to the site, and the attachments for the fiber optic cable and for guy wires, if needed, will be installed on the pole while it is horizontal. A boom truck will then lift the pole and install it in the hole. The hole will be backfilled and compacted while the boom truck steadies the pole and holds it vertical. Backfill will depend on the existing soil conditions and may include a portion of concrete if necessary.

Installation of guy wires, if needed, is begun by attaching the wires to the pole while it is horizontal. Anchors are usually 3 to 4 feet long and equipped with a corkscrew-like anchoring device. They are installed by twisting into the ground, either by hand or using a specialized attachment on a boom truck. Where the ground is rocky or consists of competent bedrock, rock anchors may be used. Guy wires are strung through the eye of the anchor and tensioned and secured. A guy wire plastic cover is placed over the guy wire to make it more visible and to reduce injuries.

Where a new pole is needed because existing poles are fully committed to existing uses, the fiber optic cable will be strung from existing poles where KRRBI Project fiber can be attached to the new poles and installed as specified above for existing poles.

Where new poles are used to cross a sensitive feature such as a stream in an otherwise underground installation, the fiber from the underground portion will be terminated near the pole installation location on each side of the crossing. After poles are installed, the fiber optic cable will be strung and tensioned on the poles. The specialized fiber optic cable splicing team will then complete the connection between the overhead and underground cable. This

connection is sometimes direct and sometimes secured in a vault located near the bottom of the pole on each side of the crossing.

2.4.4.4 Fiber Optic Cable Underground

In general, the fiber optic cable will be installed underground where there are no existing overhead joint authority or distribution power poles adjacent to roads that can be utilized. Underground installation will include plowing, trenching, pavement saw-cutting, rock cutting, and directional drilling where needed to cross under a road. Two conduits will be installed in all underground or bridge hang elements to permit the future addition of a second fiber optic cable without new ground disturbance.

Choice of Underground Installation Methods

The selection of a particular underground method is dependent on ground conditions and on the requirements of the permitting agencies, including land managing agencies and the road managers.

Trenching is the preferred method of underground installation. It can be conducted with a trencher in favorable terrain without heavy rock content and with a backhoe or excavator where terrain is difficult or rock content is higher. It will be the most common underground installation method. Trenching creates a 1- to 2-foot wide disturbance area at the bottom of the ditch and requires careful backfill and compaction after fiber install. Where there is a substantial amount of rock, trenching is slower and may need to use specialized digging equipment.

Pavement saw cutting is used where there is no ditch, or where other localized conditions require the fiber to be in the pavement area. Road managers typically prefer that pavement not be cut at all, so this method is restricted to areas where it is unavoidable. Saw cutting will only be used for parallel encroachments and will not be used for crossing roads unless specifically permitted by the road manager.

Rock cutting will be used in the event that competent bedrock underlies a road and its shoulder or ditch. It will create a minimal trench in the rock, typically 6 inches or narrower and 24 to 36 inches deep, into which the two conduits will be installed.

Directional drilling is used to cross underneath a road, typically perpendicular to the road or at a shallow angle, to avoid cutting the pavement across the road. It is also used to avoid impacts to infrastructure like culverts and waterlines by drilling well below the infrastructure. It can be used to avoid specific sensitive resources such as old-growth tree roots and archaeological sites where the approximate depth of cultural materials is known. Section 2.4.4.5 specifies how directional drilling is used for water crossings.

Trenching

Trenching opens a trench the width of the trenching device. Trenching can be conducted with a specialized trenching machine, often an oval or circular blade with a chain of cutting teeth on small buckets. This can be lowered into a ditch or directly into the dirt to cut a trench 6 to 12 inches in width and 36 inches deep. Where side slopes are steep or the working area is too limited, trenching can be conducted with a backhoe or excavator using a narrow bucket (Figure 2.4-21).

Figure 2.4-21. Roadside Trenching

For much of the KRRBI Project, trenching is proposed to install conduits at the bottom of existing road drainage ditches. These ditches may be full of vegetation and rocks and must first be cleaned out. The extent to which this is necessary depends on the frequency of routine ditch maintenance performed by the road manager. This is the only vegetation removal needed for underground installation. No mature trees will be removed, though seedlings established in and blocking the drainage ditch may be removed if present. The spoil from the cleaning effort will be disposed of as specified by the road manager (CalTrans, Humboldt County, NPS, or Green Diamond Resource Company [GDR]). Typically, road managers will specify a previously disturbed spoils dumpsite, and the material will be loaded into a dump truck and taken to the specified site. Those same road managers use this common practice during routine ditch maintenance.

After the ditch is clean, then the trench is dug into the bottom of the ditch. As shown in Figure 2.4-21, the material removed from the ditch is typically stored temporarily adjacent to the ditch. Typically, road managers want underground utilities to be 36 to 42 inches below the finish grade of the bottom of the ditch, so that when road maintenance crews conduct periodic ditch cleaning, they do not inadvertently damage the fiber optic cable. Trenching 1 foot wide by 3 feet deep will produce about 590 cubic yards of material per mile of ditch. In most cases, most if not all of that material will be returned to the trench as backfill. Actual amount of material hauled will not be known until the quality of the native material for backfill is tested with compaction. A rough estimate can be made by assuming that each mile of trenching or saw cutting would produce about 30 cubic yards of material not suitable for backfill. At a maximum, there would be about 1,440 cubic yards of material to be disposed of as required by the road manager.

If dewatering is needed, a vacuum truck will remove the water from the trench, store the water in its tank, then dump the water at an approved dumpsite. Trench dewatering will be

completed per the CalTrans BMP NS-2 specifications and Field Guide to Construction Site Dewatering[8] (EPM WET-3).

After the trench is complete, the two conduits and the warning tape are installed. Depending on the requirements of the road manager and sometimes also of the property owner or manager, the trench is backfilled with the material removed from it or with a specified aggregate base and compacted to road manager compaction requirements. Aggregate base, if needed, will be purchased commercially in the local area. Typically, compaction rates are specified and must be met in order to avoid shoulder or base failure in the future. Where material removed from the ditch cannot be used as backfill, it is hauled to the specified spoils dumpsite. Roadside ditches are intended to function as drainage, and vegetation is routinely removed to facilitate drainage. Therefore, no vegetation will be re-introduced after trenching is complete.

Pavement Saw Cutting

Wherever possible, the KRRBI Project will be installed in road shoulders or roadside ditches. However, there are places where this is not feasible, such as where the road is paved to the guardrail, to the top edge of a steep fill slope, or to the edge of a full-bench cut in rock and cliffs and where there is no inside ditch or the inside ditch is in an active slide zone. Where the conduits must be installed in pavement, the intent is to cut the pavement as close to the edge as permitted by the road manager. This is conducted with a concrete saw attached to a backhoe that opens a trench about 12 inches wide. Using a trencher or a backhoe with a 12-inch-wide bucket, the trench is opened below the saw cut to 36 inches or as specified by the road manager. The conduits and warning tape are then installed (see Figure 2.4-22). The trench is backfilled as specified by the road manager. Compaction standards shall meet CAL216 Standard or as directed by the local road owner. The wheeled tractor that powers and directs this saw operates on the road surface. Specialized paving equipment will restore the pavement by patching the pavement with asphalt and sealing it to the existing asphalt, or by pouring concrete to match the existing road where indicated.

Figure 2.4-22. Saw Cut and Conduit Install

[8] California Department of Transportation. 2017. Construction Site BMP Manual. California Department of Transportation. 2014. Field Guide to Construction Site Dewatering. Both available online at http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm. Last accessed 4/27/2020.

Rock Sawing

Where bedrock is present at or near the road shoulder surface, the KRRBI Project may require the use of rock saws. These are specialized saws similar to those used for cutting pavement, but specialized for harder rock types; they are also attached to a backhoe. Like the pavement saw, rock saws cut a narrow trench in the rock, about 6 inches wide. The trench would be cut to the shallowest depth permitted by the road manager, typically 18 inches deep. The conduits and warning tape are installed, then the trench is backfilled as specified by the road manager.

Directional Drilling

Where the KRRBI Project is installed in road ditches, the intent is to utilize the ditch on the "high" or uphill side of the road. Roads in steep country frequently switch back and forth through tight curves as they make their way up and down the hills. The uphill side of the road also switches sides. To avoid multiple saw cuts across the road, the KRRBI Project proposes to use directional drilling to shift from one side of the road to another. Directional drilling can be used to avoid specific infrastructure like culverts and waterlines by drilling beneath them, and can be used to avoid sensitive resources like old-growth tree roots. Section 2.4.4.5 describes how directional drilling is used for water crossings.

Figure 2.4-23. Directional Drilling Rig

Directional drilling requires the use of a specialized drill rig, which sits tens to hundreds of feet back from the infrastructure to be drilled under (see Figure 2.4-23). The distance from the infrastructure is roughly estimated at 5 feet horizontal for every foot of vertical depth needed. For example, if the drill needed to be at 5 feet of depth at the edge of the road, the drill rig would need to set back 25 feet to have the drill bit at 5 feet deep at the edge of the road. At each end of the bore, there is a boring pit about 4 feet wide by 5 feet long and 5 feet deep to allow for the entrance and exit of the bore.

Using a drill bit selected based on the soil and subsoil, the drilling rig drills at an angle in the shoulder of the road, under the road, and back out the other side. Guiding the horizontal directional drill is a very important part of the drilling operation, as the drilling head is under the ground and is not visible from the ground surface. In most cases, a transmitter (called a sonde) that registers angle, rotation, direction, and temperature data will be located on the bore head. This information is encoded into an electro-magnetic signal and transmitted through the ground to the surface, where it is picked up by a hand-held receiver.

In order to lubricate the drill bit, drilling "mud" is circulated into and out of the drilling hole. This "mud" is made of naturally occurring bentonite clay and water with non-petroleum emulsifiers and other lubricant compounds. It lubricates, seals the hole, and provides a medium for removal of cuttings. Directional drilling requires an excavated hole at the beginning and end-point of each drilling location and relatively level surface on which to place the drilling machine. At the end-point of the drill, cable and conduit reels are placed. When the drilling machine has reamed out the drill hole to the desired diameter (3 inches), the two conduits, one with fiber optic cable pre-installed, are pulled back through the drill hole to the drilling machine.

When the conduit installation is complete, the directional drilling machine is moved and a splicing vault is typically installed. In the vault at each side of the directional drill, the fiber cable can be spliced to the cable already installed on either side of the drill area. Underground splice boxes or "vaults" require a hole about 3 feet by 4 feet by 2 feet deep and carry a traffic-proof cover that is 2 feet by 3 feet. They are typically located out of the travel way in the road shoulder.

Barriers such as straw bales, sediment fences, and silt socks will be used around bore sites and equipment to contain mud and lubricants during drilling. A vacuum truck will be available during all directional drilling operations to pick up routine drilling fluid and for any spillage or frac-out of drilling fluid. The most direct method of avoiding fracturing out is constant monitoring of the pressure gauges on the drilling equipment and ensuring these are working properly during operation. An additional measure for detecting a "frac-out" is to monitor the drilling corridor during drilling to observe any signs of mud, water, or ground sinkage along the corridor. Directional drilling will not be used to cross under perennial or intermittent streambeds unless they are contained in a culvert, thus minimizing the chance that drilling mud could enter the streambed. Because this effort is conducted in road shoulders routinely graded to remove vegetation, restoration will be limited to re-grading the road shoulder to pre-construction contours and conditions.

The entrance and exit pits are backfilled with the native material originally removed to form them, and compacted around the vaults. Excavated soils will not contain lubricants because excavation occurs prior to the directional drill. Excavated soils in excess of material used to backfill the pits after use will be hauled to an approved disposal site. CalTrans and Humboldt County Public Works maintain a list of approved disposal sites, though it varies over time depending on availability. Wet soils containing bentonite lubricant will be hauled in vacuum trucks from drill pits to a CalTrans or Humboldt County Public Works site capable of managing the mud disposal. The disposal site will likely utilize a mud pit to drain the mud and allow evaporation of the water. Resultant nontoxic clay residue will be added to other soil materials at the disposal site. All sites are previously disturbed areas commonly used for this purpose. Exact locations cannot be known until construction.

An estimated 67 pairs of exit and entrance pits (134 pits total) will be needed for the multiple directional drills planned for the KRRBI Project. At 3.7 cubic yards per pit, the total excavation will be 496 cubic yards. About 1.77 cubic yards in each case will be displaced by a handhole box, requiring off-site disposal of about 237 cubic yards, with 259 cubic yards to be used as backfill.

Installing Cable Markers

When the underground fiber optic cable installation is complete by any of the above methods, cable markers are placed along the route for two main purposes: 1) to identify underground fiber access locations (or vaults), and 2) to notify road maintenance workers, other utilities, and anyone who might need to dig in that location that the cables are present underground. These markers are typically white plastic cylindrical markers, 3-1/2 inches in diameter and 42 inches tall, with orange tops that are commonly used to indicate underground communications. In visually sensitive areas, other types of markers can be used, such as wooden 4-inch by 4-inch posts, typically 24 to 36 inches above ground, that are less visually intrusive.

In one area of the RNP, the KRRBI Project has agreed with the NPS to forego installation of above-ground markers and to rely instead on a specialized detection system installed in the vaults in this area. The detection systems in vaults allow for precise location of the vaults in the event they are buried below the surface or get covered up. Proper location and accessing of these locations is necessary for the proper location of the cable itself, using cable location equipment, so as to minimize the risk of inadvertent damage from anyone digging in the area. The disadvantage of the detection system, other than its cost, is the need for specialized equipment to accurately identify the location and depth of the cable, often not available to landowners or routine maintenance crews.

2.4.4.5 Water Crossings

Water crossings include crossings of streams that may be considered waters of the State or waters of the United States, and the crossing of road culverts, which usually convey road runoff water. Whenever possible, the KRRBI Project will cross flowing streams by installation on existing poles where there is an existing overhead crossing. Installation will follow the general guidelines of overhead installation as specified in Section 2.4.4.3. Where existing poles are not available for a water crossing and the installation of new poles is feasible, new poles may be installed where vegetation removal and visual impacts are minimal. If there is an existing bridge, and with permission of the bridge owner, the fiber optic cable will be installed by directly attaching it to the bridge, typically in a larger conduit than needed for underground installation. Where overhead methods or bridge crossings are unavailable or not permitted, directional drilling will be employed to install the conduits underneath the live stream if it is in a culvert.

Installing New Poles

See Section 2.4.4.3 for details on new pole installation. For water crossings, approximately six new poles will be installed, depending on final engineering and site conditions. The installation of new poles will follow general industry practice (Figure 2.4-20). A specialized truck will use an auger to drill a hole far enough back from the side of the watercourse to avoid impacting the water or riparian vegetation. The pole will be brought to the site and the attachments, including for guy wires if needed, will be installed on the pole while it is horizontal. A boom truck will then lift the pole and install it in the hole. The hole will be backfilled and compacted and the pole will be guyed if appropriate.

The KRRBI Project includes new poles at the crossings of the Klamath River at Orleans (Segment 1) and at Martins Ferry (Segment 2). Poles will be placed immediately adjacent (within 30 feet) of existing copper cable crossings in each case. For the Orleans crossing, poles are more than 100 feet from the high water mark. For the Martins Ferry crossing, poles are more than 200 feet from the high water mark. Engineering for these crossings will be completed and a permit will be obtained from the CSLC before construction. New poles may also be installed for the overhead crossing of Redwood Creek adjacent to Highway 101 in Orick. Poles will be set more than 100 feet from the high water mark.

Bridge Hang

Hanging a fiber optic conduit from a bridge can be accomplished easily using a specialized truck with a multiple-jointed boom and bucket that permits workers to be based on the road but work below the bridge (Figure 2.4-24). Conduit will be attached as specified by the bridge owner, but typically by drilling into the bridge structure just enough to attach anchor bolts or hooks to which the conduit can then be secured. This method has no impact on the watercourse and is generally invisible once completed (Figure 2.4-25). The conduit is typically 2 or 3 inches in diameter, allowing for at least one additional fiber optic cable to be installed in the future.

Figure 2.4-24. Bridge Hang

Figure 2.4-25. Completed Bridge Hang

Directional Drilling for Water Crossings in Culverts

Road owners or managers usually require directional drilling for underground utility installations where culverts must be crossed.

Even if the culvert is several feet deep and the utility could be installed in the road shoulder without any impact to the culvert, the road manager must take into account the need to periodically replace culverts—generally every 15 to 30 years. Typically, directionally drilling the conduits under the culvert is the only acceptable option. Where culverts are 10 or more feet below the road surface, and with the permission of the road owner, the KRRBI Project proposes to install the fiber optic conduits by conventional trenching above the culvert.

The same techniques will be employed as for road crossings (see Section 2.4.4.4, above). Where culverts are very deep (10 feet or more below the road surface), the drilling machine would be set back 150 feet or more from the culvert crossing, using the same rough 5:1 ratio explained above. Where an uncontained live stream is to be crossed, the KRRBI Project will not use directional drilling unless directed to do so, but instead will likely either utilize two new poles and a short overhead span to avoid impacts to the live stream or employ a bridge hang.

2.4.5 Segment Descriptions

Table 2.4-1 shows the approximate mileages of each type of initially proposed installation method for each segment of the middle mile fiber optic cable installation, while Table 2.4-2 details installation method by road manager. Final decisions regarding installation methods will be developed in close coordination with road managers, underlying landowners and land managers, and with agencies with jurisdiction on the overall Project. Table 2.4-2 totals do not reach the full Project length because a portion of the Project crosses overhead on private lands not adjacent to roads and because the PG&E transmission ROW from Orick to Fieldbrook is not in public road ROWs.

Table 2.4-1. Installation Types by Segment, in Miles

Segment	From/To	Existing Transmission	Existing Distribution	New Overhead	Trench	Saw Cut	Directional Drill	Bridge Hang	Existing Infrastructure*	Total
1	Orleans demarcation point-Weitchpec Road	0	1.7	0.3	8.0	3.3	1.3	0.1	0.6	**15.2**
2	Weitchpec Road Turnoff to end of Highway 169 at Wautec, plus Martins Ferry Bridge Crossing and Tulley Creek Road to Yurok facility	0	21.9	0.1	0.6	0.3	0	0	1.1	**24.2**
3	Segment 2 at Martins Ferry Bridge Crossing to Johnsons Road intersection on Bald Hills Road	0	0	0	20.9	0.7	0.3	0	0	**21.9**
4	Segment 3 at Johnsons Road intersection on Bald Hills Road to Orick Tower	0	1.2	0	10.0	0.4	0.1	0.1	0	**11.8**
R5	Orick Tower on 101 to Hiltons, to PG&E transmission line to Murray Rd, Fieldbrook, then west on Murray to Central and Railroad Drive, McKinleyville	25.4	1.9	0	3.5	0	0.2	0	0	**33.1**
Total		**25.4**	**26.7**	**0.4**	**43.1**	**4.7**	**1.9**	**0.2**	**1.7**	**104.1**

* Includes existing fiber (0.5 mile in Segment 1), existing conduit underground and on bridge (0.1 mile in Segment 1 and 1.1 miles in Segment 2)

Table 2.4-2. Installation Methods by Road Manager

Road Owner	Segment	Fiber Optic Cable Installation Methods						Total
		Overhead	Trench	Saw Cut	Directional Drill	Existing Infrastructure	Bridge Hang	
CalTrans								
Highway 96	1	0.5	8.0	3.3	1.3	0.4	0.1	13.6
Highway 169	2	12.7	0.0	0.3	0.0	1.1	0.0	14.2
Highway 101	4,5	1.7	0.3	0.1	0.1	0.0	0.0	2.1
Subtotal, CalTrans		14.9	8.3	3.7	1.3	1.6	0.1	29.9
Humboldt County								
Dredge Road	1	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Weitchpec Road	2	0.3	0.6	0.0	0.0	0.0	0.0	0.9
Upper Capell road	2	3.6	0.0	0.0	0.0	0.0	0.0	3.6
Lower Capell Road	2	3.0	0.0	0.0	0.0	0.0	0.0	3.0
Tulley Creek Road	2	1.1	0.0	0.0	0.0	0.0	0.0	1.1
Bald Hills Road	3,4	0.0	30.6	1.0	0.3	0.0	0.0	32.0
Webster St.	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Barnum Rd.	4	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Murray Road	R5	1.0	2.6	0.0	0.5	0.0	0.0	4.1
Central Ave	R5	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Railroad Drive	R5	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Subtotal, Humboldt		11.5	32.2	1.0	0.5	0.0	0.0	46.0
Other Roads								
McKinnon Hill Road	2	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Bear Grass 40 Road	2	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Subtotal, other roads		0.8	0.0	0.0	0.0	0.0	0.0	0.8
Total, all roads		25.9	42.2	4.7	2.2	1.6	0.2	76.7

2.4.5.1 Segment 1

Segment 1, 15.2 miles total length, starts at the Orleans Karuk Tribal buildings near the Orleans Elementary School at the demarcation point for the Áan Chúuphan Broadband Service and continues to the turnoff for the Weitchpec School Road in Weitchpec.

Main Segment Description

The fiber optic cable will be brought overhead out of the building and will follow the existing joint use utility poles west on Highway 96, west on Dredge Road, then across private land and across Karuk fee land back to Highway 96 near the crossing of Camp Creek—all overhead. About 1.3 miles from its origin, Segment 1 will go underground. While utility poles do continue approximately parallel to the highway south and west to Weitchpec, they are not near the highway and are inaccessible for any needed fiber optic cable repair should they fail during a winter storm (an annual event in this area). Therefore, underground installation is planned from Camp Creek Road to the intersection of Weitchpec School Road. Bridge hangs are

proposed to cross Slate Creek and Bluff Creek. With the exception of about 0.5 mile along Dredge Road (now a Humboldt County Road crossing private lands) and across private lands, Segment 1 is within the CalTrans easement for Highway 96, which crosses Karuk Trust land, private land, land owned in fee by the Karuk Tribe, NFS lands, BLM lands, and lands within the Yurok Reservation.

Segment 1 will augment the service to all Orleans anchor institutions (Orleans Volunteer Fire Department, the USFS Ranger Station, the Orleans Elementary School, the Orleans Head Start, Orleans Medical Clinic, Karuk Tribe Department of Natural Resources, Karuk Tribe Housing Office and Council Chambers, Karuk Tribe Computer/Senior Center and Library, Frontier Communications Orleans Central Office, and CalTrans Maintenance Station) including those served by the existing Áan Chúuphan system in the Orleans area. The KRRBI Project will strengthen their Internet service and reliability.

Land uses adjacent to Segment 1 are predominantly forest land. The first mile of Segment 1 passes through the small village of Orleans on existing poles. Orleans is not designated as "residential" or "commercial," though there are some buildings of each type in the village. The segment does not pass through any agricultural lands. After Segment 1 leaves Orleans in about a mile from its origin, it is all forested lands managed by the USFS. There are small inholdings along the river, but the installation in the inboard road shoulder or ditch along Highway 96 only passes adjacent to the forested portions thereof.

Spurs

- A 0.5-mile-long spur will be constructed to serve the Orleans CalTrans Maintenance Yard and the Karuk Tribal Department of Natural Resources (DNR)/Community Building (Figure 2.4-1a). This spur will begin from the existing overhead Áan Chúuphan fiber optic cable near the Seventh Day Adventist church along Ishi Pishi Road northeast of the demarcation point. A new pole will be erected immediately adjacent to the existing joint use utility pole, and the new fiber optic cable will be strung across the Klamath River, parallel to the existing copper cable crossing owned by Frontier Communications. The new fiber optic cable will connect to a new pole on the east side of the river immediately adjacent to the existing Frontier Communications pole. The spur will then follow the existing joint use poles northeast to the CalTrans yard, then turn due east and utilize an intermediary new pole just in front of the Karuk DNR facility within the CalTrans ROW, then continue to the existing poles at the eastern edge of the Karuk DNR facility.
- About 0.1 mile from its origin, a spur less than 0.1 mile long will serve the existing Frontier Communications Orleans Central Office. This spur will be installed entirely on existing utility poles.

- About 1 mile from its origin, a spur line about 0.1 mile long will serve the existing Orleans Tower by following the existing overhead distribution spur line to near the tower (utilizing the existing lateral overhead line and pole one span length from the main overhead line), then going underground without additional ground disturbance in an existing 3-inch conduit placed for that purpose during construction of the Orleans Tower in 2013. Segment 1 continues in the inboard ditch of Highway 96 to the Weitchpec School Road turnoff where it terminates.

2.4.5.2 Segment 2

Segment 2, 24.2 miles total, begins where Segment 1 leaves the road prism of Highway 96 and follows Weitchpec Road (identified on the ground as Upper Weitchpec School Road and Lower Weitchpec School Road) and continues to the village of Wautec (identified as Johnsons on older maps). The segment also crosses the Klamath River and serves the Yurok Tulley Creek Facility.

Main Segment Description

Segment 2 proceeds from Highway 96 to Highway 169, a distance of about 1.1 miles. The first 0.5 mile is mostly trenched into the northern ditch of the Humboldt County Weitchpec Road except for two saw cut installs to cross Upper Weitchpec School Road as it turns up toward the school and Lake Prairie Road. Segment 2 transitions to overhead on existing multiuse poles at the existing lateral tap for the Yurok Tribal Facilities in Weitchpec. It then continues down Highway 169 to its end at Wautec, following the existing utility poles. The existing utility poles leave Highway 169 to follow Upper Capell Road, crosses several creeks including Miners Creek, then follows Lower Capell Road back to Highway 169, a distance of about 6.6 miles. From Lower Capell Road it follows Highway 169 for about a mile, partially underground. Where the existing power and communications lines were installed underground, the KRRBI Project will also install a fiber optic conduit underground by saw cutting the pavement. At Ka'Pel Creek, it goes overhead on existing poles across the creek to the McKinnon Hill Road (Yurok Tribal Road) to the Ka'Pel Head Start building.

Utility poles were installed in 2017 from Ka'Pel to Wautec. To continue Segment 2 into Wautec, the Karuk Tribe will install fiber on these new PG&E poles with a pole use agreement. No other communication carrier is installed on the new PG&E poles, nor are there plans at this time for another carrier. The last 6 miles of the new power line installation include two substantial portions of underground installation and a bridge hang on the Pecwan Creek Bridge. PG&E completed an installation of an extra conduit that will accommodate the KRRBI fiber optic cable where the powerline goes underground and also on the bridge hang, facilitating the future installation of KRRBI fiber optic cable. This means that there will be no ground disturbance for the KRRBI Project at those underground or bridge locations, because the PG&E plans also call for additional vault installation at each end of the extra underground and bridge hang conduits. The KRRBI will use existing vaults to install the fiber optic cable. Segment 2 will serve the

Yurok Tribal Building in Weitchpec, the Weitchpec Elementary School, the Weitchpec Transfer Station facility, the Ka'Pel Head Start facility, Jack Norton Elementary School in Wautec, and the Wautec Volunteer Fire Department with either fiber optic line drops or wireless connections.

Land uses adjacent to Segment 2 are predominantly forest land. The first 2 miles of Segment 2 passes through the small and scattered village of Weitchpec in an underground (0.5 mile) and overhead (1.5 miles on existing poles) installation. Weitchpec lands are not designated as "residential," and though there are residences in the village, the installation does not pass near to the residences. The segment does not pass through any agricultural lands.

Spurs

- About 0.1 mile from its origin, a 0.3-mile spur to serve the Weitchpec Magnet School will be installed underground along the existing road.
- About 0.3 mile from its origin, a spur less than 0.1-mile long to serve the Yurok Tribal and Community Facility in Weitchpec will be installed on existing overhead utility poles.
- About 3.8 miles from its origin, a 1.1-mile spur to serve the Yurok Tulley Creek Facility (which includes the Yurok Wildland Fire Department, the Yurok Roads Department, and the Yurok GIS Department) will be installed. The spur will be a splice off the main line running to Wautec, and will be installed on the south side of the river on a new pole to be erected immediately adjacent to the existing joint use utility pole. The fiber optic cable will be strung across the Klamath River, parallel to the existing cable crossing owned by Frontier Communications. On the north side of the Klamath River, a second new pole will be erected immediately adjacent to the existing Frontier Communications pole supporting the existing Frontier Communications river crossing. From that new pole, the new fiber optic cable will then be installed on existing joint use poles along Tulley Creek Road until reaching the Yurok Facility.
- About 21 miles from its origin, a 0.2-mile spur will serve the Jack Norton School on existing utility poles.

2.4.5.3 Segment 3

Segment 3 is 21.9 miles long and starts at the intersection of Bald Hills Road and the Martins Ferry Bridge at the spur to the Tulley Creek Facility of Segment 2 and continues to the Elk Camp Fire Station on Bald Hills Road.

Main Segment Description

Segment 3 will pick up the fiber optic cable connection from Segment 2 and will continue underground along Bald Hills Road to the intersection with Johnsons Road and Bald Hills Road at Elk Camp Fire Station. This segment will originate within the Yurok Reservation and travel

across trust, allotment, and private lands within the reservation, then private (including GDR lands), California State, and RNP lands that underlie the Humboldt County easement for Bald Hills Road.

Land uses adjacent to Segment 3 are predominantly forest land and park land. The first 5 miles are within the Yurok Reservation and within dense forest stands, while the next 8 miles cross private parcels, also within dense forest stands. At about 13 miles, Segment 3 crosses into RNP and follows along Bald Hills, which forms its northeastern edge. This edge of the RNP borders on the remaining prairies (that have not been invaded by trees due to fire suppression) for which Bald Hills were named. The remaining 8.9 miles follow this edge to the CDF Elk Camp Fire Station.

Spurs

- About 4.8 miles from its origin, there will be a very short trenched 160-foot spur to serve the existing Yurok Wiregrass broadband tower adjacent to the existing Yurok Veterans Cemetery.
- At its end, there will be a very short trenched 100-foot spur to serve the existing CDF Elk Camp Fire Station.

2.4.5.4 Segment 4

Segment 4 will start at the end of Segment 3 at the intersection with Johnsons Road and Bald Hills Road at Elk Camp Fire Station and will continue to the proposed broadband tower in Orick.

Main Segment Description

From its origin at the end of Segment 3, Segment 4 will extend about 9 miles underground along Bald Hills Road to its terminus at Highway 101. At the terminus of Bald Hills Road, Segment 4 will travel under Highway 101 in a directional drill and be installed underground, trenching along the west side of the highway, until reaching the first existing overhead joint use pole. It will then go overhead on the existing poles from that point to the Orick Tower along Highway 101. Segment 4 total length is 11.8 miles, and the segment will travel across private lands, including those held by GDR, a CDF parcel (Elk Camp Fire Station), RNP lands, and land held in fee by CalTrans along Highway 101. Segment 4 will serve the Orick Tower and the Southern Operations Center for the NPS with a secure fiber drop. Segment 4 will also serve the Orick Volunteer Fire Department, Orick Elementary School, businesses, and residents in Orick with a robust wireless signal from the Orick Tower.

Land use adjacent to Segment 4 is forested park lands for the first 10.3 miles. The last 1.5 miles from the Bald Hills Road intersection with Highway 101 can be characterized as rural residential and some commercial in the small town of Orick.

Spurs

- About 10 miles from its origin at Elk Camp, there will be a short 0.1-mile or shorter spur to serve the proposed RNP visitor center at the old mill site near the intersection of Bald Hills Road and Highway 101.
- About 11 miles from its origin, there will be a 0.1-mile spur to serve the existing Frontier Central Office facility in Orick.
- At the terminus of Segment 4, there is a less-than-0.1 mile spur to the proposed Orick Tower on existing overhead utility poles.

2.4.5.5 Segment R5

Segment R5, at 31 miles long, is designed to connect the KRRBI service area with the larger fiber optic network in the Eureka-Arcata-McKinleyville area. Interconnection with at least AT&T and possibly Suddenlink is planned at the AT&T Central Office in McKinleyville.

Main Segment Description

Segment R5 will travel on existing utility poles west along Highway 101 from the intersection with Segment 4 to Hiltons Road. It then continues overhead, south on the existing PG&E 60-kV transmission line poles, staying northeast of Freshwater Lagoon and following the old highway around Stone Lagoon, then paralleling Highway 101 to Big Lagoon. At Big Lagoon, the PG&E transmission line follows the old A-line railroad grade across Green Diamond land, closely paralleling and mostly adjacent to the Hammond Truck Road. The route, continuing overhead on the PG&E line, then turns southeast, away from the truck road, and crosses Humboldt County's Murray Road near Fieldbrook. The route then leaves the transmission line, following Murray Road overhead and underground west and south into McKinleyville, turning south overhead on Central Ave., and ending at 1555 Railroad Drive in a short underground portion to the AT&T Central Office in McKinleyville.

Land uses along Segment R5 start with rural residential for 1.5 miles in Orick and transition to forested private lands, then commercial forest uses across GDR lands from Big Lagoon to Fieldbrook. The last 4.5 miles along Murray Road, Central Avenue, and Railroad Drive in McKinleyville cross forested lands, rural residential parcels, and small urban area commercial and residential properties, all within Humboldt County road ROWs.

Spurs

- About 1.7 miles from its origin at the intersection of Segment 4, there will be a 0.2-mile spur placed underground down a private farm dirt road to serve the existing Tsunami Wireless broadband tower.
- About 4.6 miles from its origin at the intersection of Segment 4, there will be a 0.1-mile spur overhead on existing distribution poles to serve Stone Lagoon Visitor Center for Humboldt Lagoons State Park.

- About 9 miles south of the spur for the Stone Lagoon Visitor Center, a 60-foot freestanding Rohn tower with a 9-foot by 9-foot concrete foundation will be installed on the west edge of the PG&E ROW and on the west edge of the existing ROW access road on GDR land, about 185 feet to the east of the Hammond Truck Road. The tower will require a spur of 25 feet from the main fiber optic middle mile on the adjacent PG&E pole. This tower will serve the Patrick's Point State Park Visitor Center with a wireless link.

2.4.6 Additional System Components

2.4.6.1 Yurok Signal Connection

Figure 2.4-26 shows the location of the existing Orleans Mountain radio repeater site and Antenna Ridge both on the Six Rivers National Forest. Antenna Ridge is a rocky ridge immediately south of the existing access road to Orleans Mountain that was used in the 1960s to pick up and rebroadcast television signal for the town of Orleans. The Antenna Ridge site was abandoned over a decade ago as people turned to satellite TV and no longer relied on housetop antennas for signal. Remains of the old antennas, a solar panel set with a supporting pole, and a battery box remain on site.

The KRRBI Project will build a two-element repeater system using these two locations in order to pick up and rebroadcast the Yurok wireless broadband signal. The Karuk and Yurok have agreed to share the Yurok connection to the existing fiber optic network near Crescent City, California. This connection is available to the Karuk Tribe wirelessly from the existing Wiregrass Tower just above the Yurok Veterans Cemetery on Bald Hills Road.

This connection will strengthen and provide another signal source for KRRBI customers if anything should happen to one or more of the fiber optic connections either in place (Siskiyou Telephone) or proposed for KRRBI (AT&T or Suddenlink).

Preliminary testing has shown that the signal from Wiregrass easily reaches Orleans Mountain, but topography prevents it from being rebroadcast directly to Orleans, where it will connect with the existing Orleans network and with the proposed future KRRBI fiber optic network linked through Orick to McKinleyville. In order to allow the signal to reach Orleans, a small relay station is needed on Antenna Ridge.

The proposed Yurok Signal Connection element of the larger KRRBI Project will have two components: an additional antenna and radio on Orleans Mountain (to be added to the newly installed and operational Forest Service antenna tower and vault with no ground disturbance), and a small relay station on Antenna Ridge.

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Klamath River Rural Broadband Initiative

Figure 2.4-26 Yurok Signal Connection

SIX RIVERS NATIONAL FOREST

Mckinnon Hill

Segment 2

Miners

169

Wiregrass

Segment 3

Weitchpec

Weitchpec

96

Segment 1

Orleans Broadband Tower

Orleans

96

Antenna Ridge

Orleans Mountain

96

Legend

- Existing Tower
- Proposed New Relay

Fiber Install Route

Segment

- 1
- 2
- 3
- Yurok Reservation Boundary

N

W E

S

0 1.25 2.5 Miles

Yurok Tribe GIS Program

July 5, 2017

Orleans Mountain Antenna

The Karuk Tribe already has a radio repeater and antenna installed on Orleans Mountain. The Yurok Signal Connection will require the addition of two dish antennas, one 24 inches in diameter and one 6 inches in diameter, to the existing tower. These antennas will be connected to radio equipment using weatherproof cable and the existing ice bridge between the tower and the existing Forest Service radio hut.

All needed equipment will occupy a small 3-foot by 2-foot by 2-foot space in the existing hut or vault. This hut space is only necessary if KRRBI cannot make use of the existing battery system and must install batteries. If existing battery power is sufficient, then KRRBI will require space only for two power adapters, about 2 inches by 3 inches by 2 inches each, and the power cable and data cables that run to those adapters. No signal regeneration is needed or proposed. No new ground disturbance will occur for this installation. The Forest Service radio technicians have indicated that sufficient space is available on the tower for the needed antennas. Access will be available on the existing and maintained Orleans Mountain Lookout Road (10N12). Typical drawings are supplied as Figures 2.4-27, 2.4-28, and 2.4-29.

Figure 2.4-27. Yurok Signal Connection, Orleans Mountain Plan

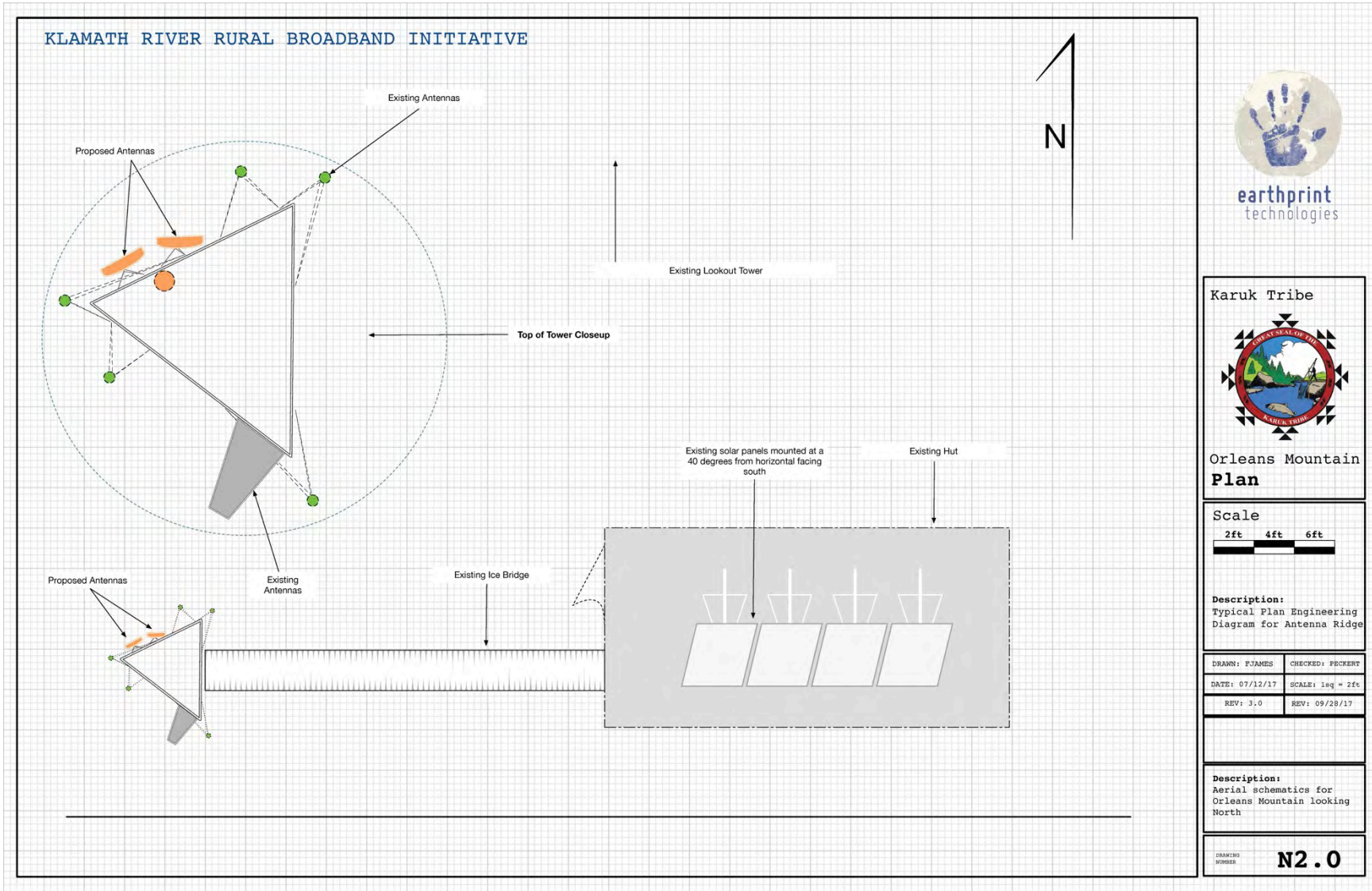


Figure 2.4-28. Yurok Signal Connection, Orleans Mountain Profile

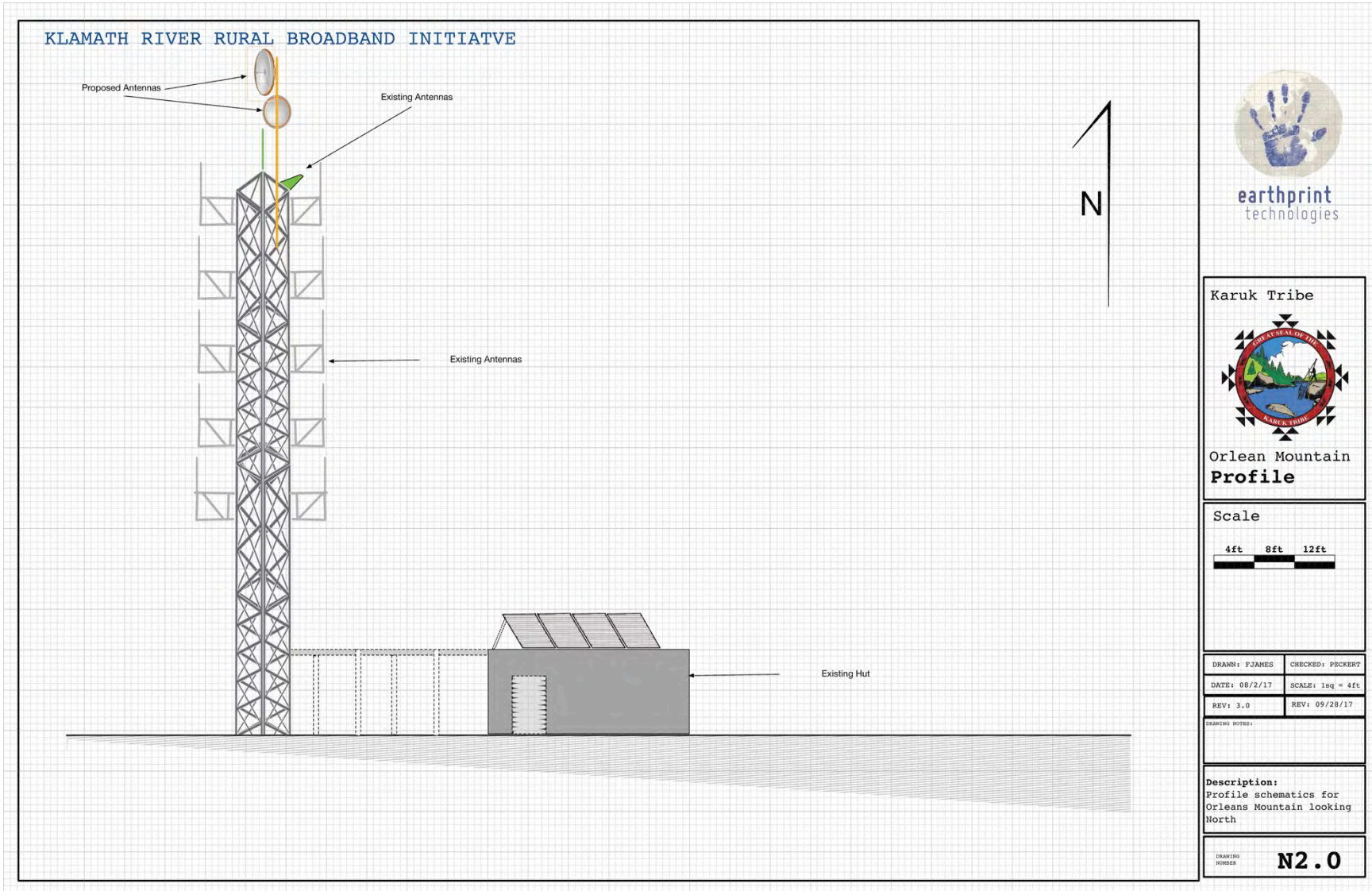


Figure 2.4-29. Yurok Signal Connection, Antenna Ridge Aerial Photo

Antenna Ridge Relay Station

In order to transmit the signal from Orleans Mountain to Orleans, a small solar-powered relay station is needed on Antenna Ridge. The intent is to occupy the same space previously used by the Orleans Community Service Club (OCSC) for the television antenna relay station, now in disuse but with hardware still in place. The Karuk Tribe will remove and clean up the OCSC antennas, battery bank, and solar panels, and will work with the OCSC for their disposition once removed from NFS lands.

In their place, the Tribe will install a state-of-the-art solar-powered facility with a small lattice structure, about 30 feet tall, supporting two antennas. These antennas require power to receive and rebroadcast the signal, so a solar array and a bank of batteries will be installed. No signal regeneration is needed or proposed. The batteries and the radios will be enclosed in a weatherproof 6-foot by 6-foot hut, 8 feet tall, and the solar panels will be mounted on the roof. A security fence will be installed to reduce potential for vandalism and lost signal. See Figures 2.4-30, 2.4-31, and 2.4-32 for plan and profile typical drawings. Details for each component follow.

Figure 2.4-30. Yurok Signal Connection, Antenna Ridge Plan

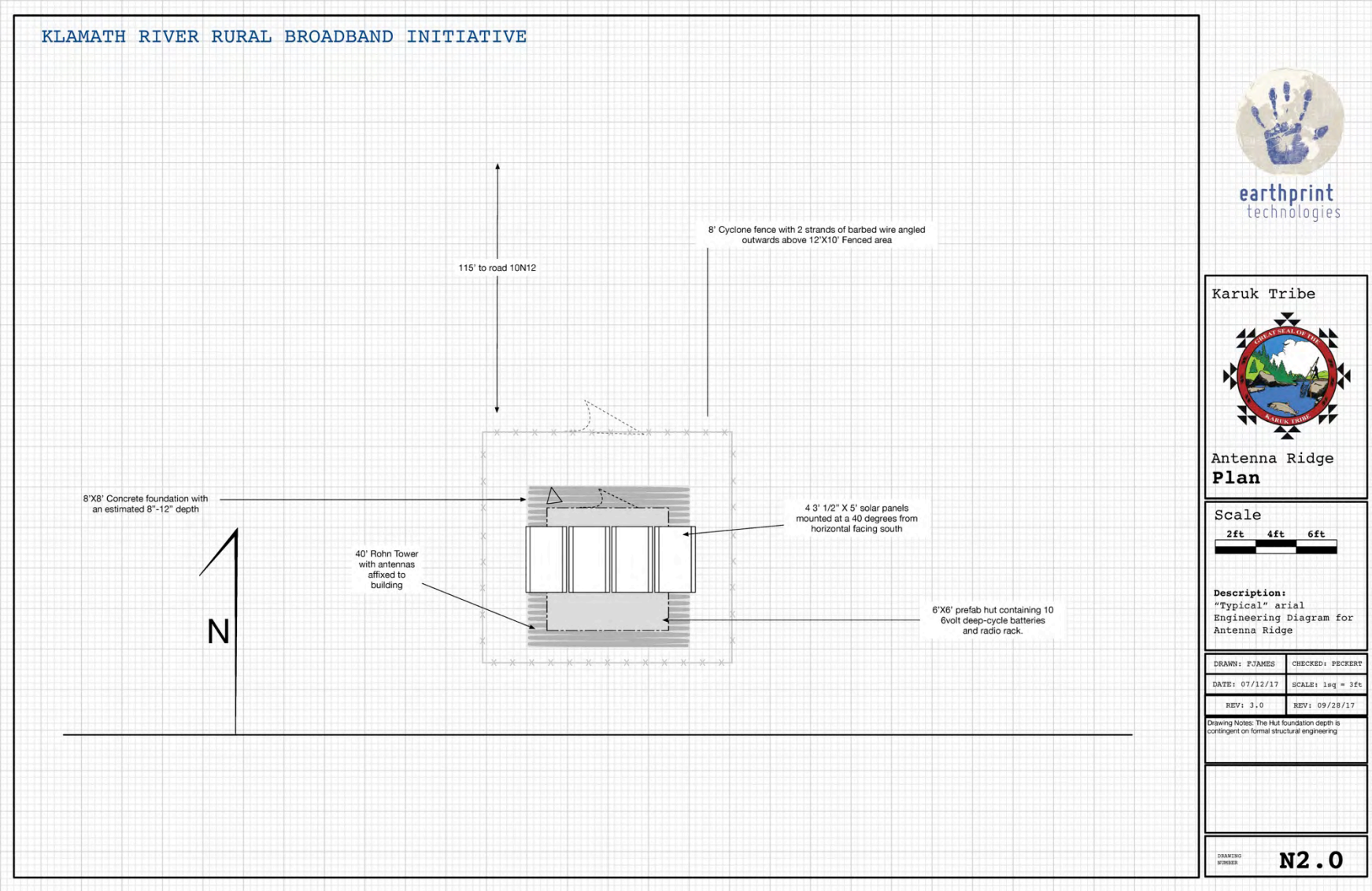


Figure 2.4-31. Yurok Signal Connection, Antenna Ridge Profile

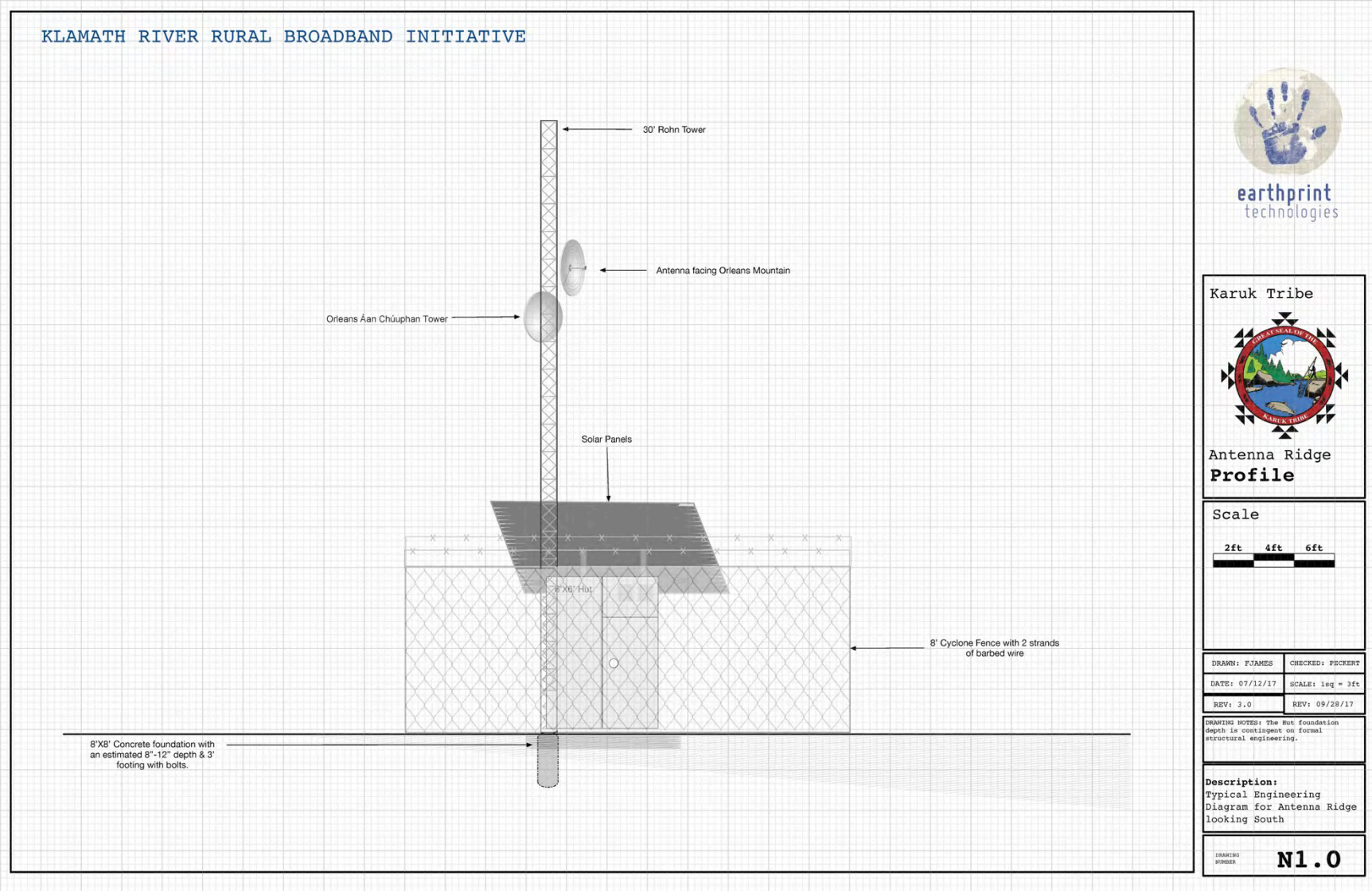


Figure 2.4-32. Yurok Signal Connection, Antenna Ridge Aerial Photo

Tower and Antennas

In order to receive and rebroadcast the signal, a 30-foot Rohn (lattice) tower will be installed on Antenna Ridge. One of the 3-foot by 6-inch antennas mounted on its top will be in line with the signal from Orleans Mountain, and the other similar size antenna, will rebroadcast the signal to the existing Orleans Broadband Tower near the intersection of 15N01 and Highway 96. The tower will be anchored 3 feet in the rock of the ridge and will not require guy wires.

Solar Array

The solar array consists of four standard solar panels, REC 280 modules that are about 3 feet wide by 5.5 feet high by 1.5 inches thick. The three panels will be mounted on a fixed frame on the roof of the hut, mounted at 40 degrees from horizontal and facing due south. The array itself is about 12 feet wide and will overhang the 6-foot-wide hut by 3 feet on either side.

Fence

An 8-foot high cyclone fence will be installed around the facility, 12 feet wide by 10 feet long, with two rows of barbed wire at the top of the fence. A 36-inch-wide locked gate will be provided for pedestrian access to the facility.

Access for Construction

No vehicle or other wheeled or tracked equipment access is planned during construction. Construction equipment will be carried by hand to the site from the road. A generator or truck-mounted air compressor may be used to power some equipment, and a gas-powered hand auger will be used to drill the holes needed to mount the solar array and the antenna pole.

Operations and Maintenance

No parking or vehicle access is contemplated for the Antenna Ridge facility. Access will be on foot from the Orleans Mountain Road.

Figure 2.4-33. Wireless Tower and Hut, Orleans

2.4.6.2 Wireless Towers

Existing Orleans Tower

The Orleans Community Connect Project installed a 90-foot tower southwest of the town center in Orleans in 2013 on property belonging to the Karuk Housing Authority in fee (see Figure 2.4-33). This tower, served wirelessly by the Community Connect Project, will be served by fiber optic cable with the KRRBI Project. Its construction and operation have been permitted through the Community Connect Project.

Fiber optic cable will be brought overhead from the main fiber optic cable to be installed on the existing joint use poles that cross the Karuk Housing parcel where the tower is located. It will be

installed on the existing transformer pole near the tower. It will then be brought down the side of the pole and into the previously installed 3-inch conduit. There is a pulling tape inside the conduit ready for the installation of the fiber optic cable. The cable will be brought up inside the fenced area and terminated inside the building, where it will be connected with existing equipment to provide a secondary broadband connection for the Orleans Tower. Ground disturbance will be limited to the uncovering of the previously installed conduit at the base of the transformer pole.

New Orick Tower

A tower will be erected in Orick as part of the KRRBI Project. Its location is proposed on agricultural land south of Highway 101 (see Figure 2.4-34). The Orick Tower will be a self-supporting lattice tower similar to the Orleans Tower, 90 feet tall, without guy wires, installed in a fenced enclosure that will include a backup generator, a propane tank to supply the generator, and a pre-fabricated building to house the electronics to power and control the signals entering and leaving the tower. The tower will provide wireless broadband signal to the town of Orick. The tower is proposed for installation on private land that is zoned for agriculture. That zoning permits communications structures without a conditional or special permit. Therefore, the construction would be subject only to the Humboldt County building permit process. Figure 2.4-35 shows a plan view and Figure 2.4-36 shows a profile of a typical tower installation.

The self-supporting 90-foot galvanized steel lattice tower proposed for Orick will have three legs and will stand on a poured concrete foundation about 15 feet in diameter, likely using about 10 cubic yards of concrete. Once the foundation is poured and cured, the tower is constructed from its constituent parts on-site in three 30-foot sections. A construction crane will be brought to the site to lift each section. Workers with safety climbing gear will bolt the sections together. After the tower is completed, it will be electrically grounded for safety and for lightning protection for the electronics. Either or during or just after tower construction, two to four small antennas will be secured to the upper portion of the tower to allow for broadcasting the wireless broadband signal. These antennas will be about a foot in diameter and will be secured to the tower near the top, arrayed for maximum coverage of Orick and vicinity.

To ensure public safety, the tower foundation will be enclosed in a 7-foot-tall cyclone fence topped by a 1-foot barbed wire fence. This fence will also enclose a 250- or 500-gallon propane tank, a 10-kW generator, and a pre-fabricated building that will enclose the power supply switching to the tower as well as the controls for the wireless signal deployment. The pre-fabricated building, 8 feet wide by 13 feet long by 8 feet high, will be installed on a separate concrete pad and wired to accept PG&E power. The system will be designed to automatically trigger a propane generator to start up in case of power outages. The generator will sit on a pad adjacent to the hut, and the propane tank will be located well away from any source of spark within the fenced enclosure.

Figure 2.4-34. Orick Tower General Location

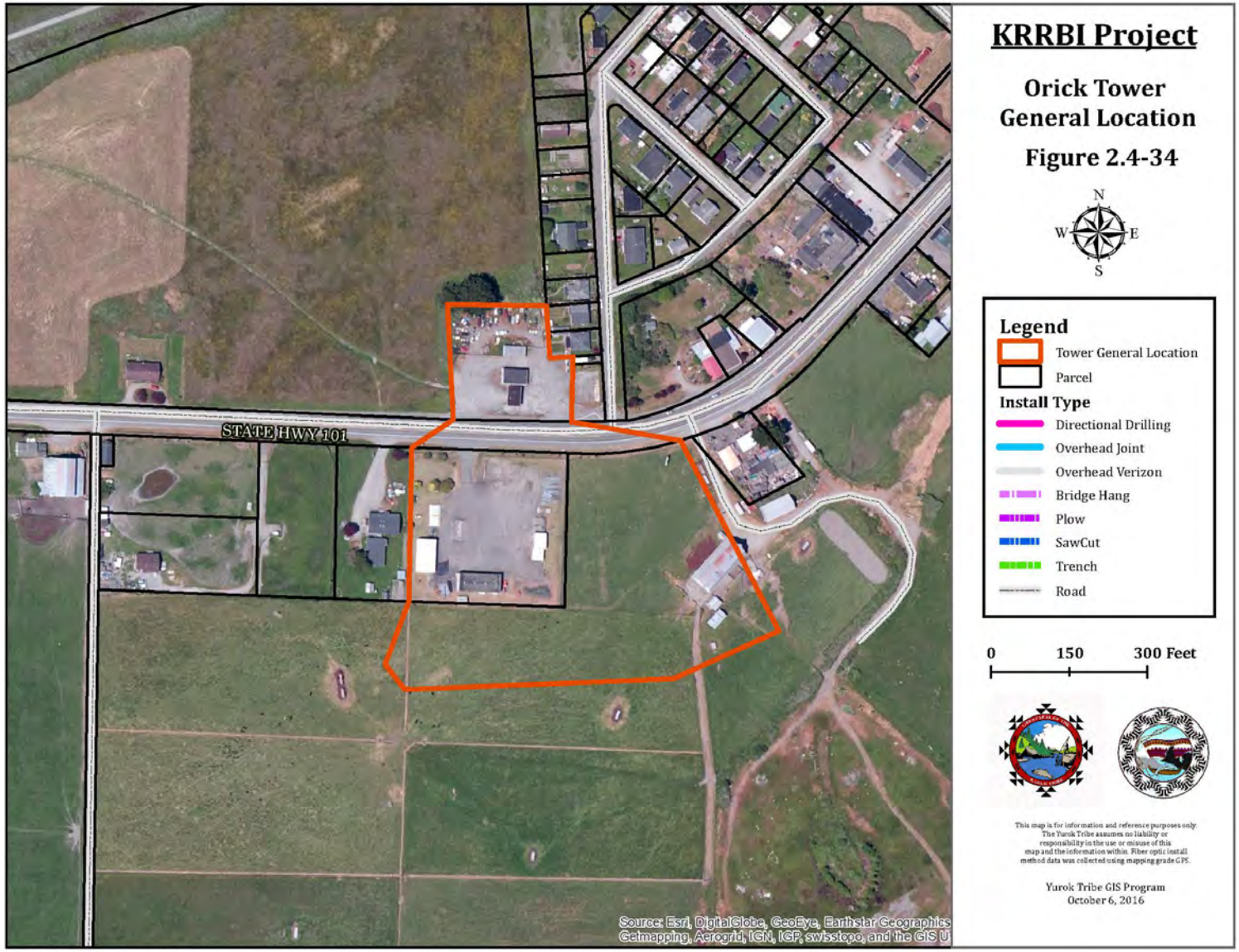


Figure 2.4-35. Typical Tower Profile

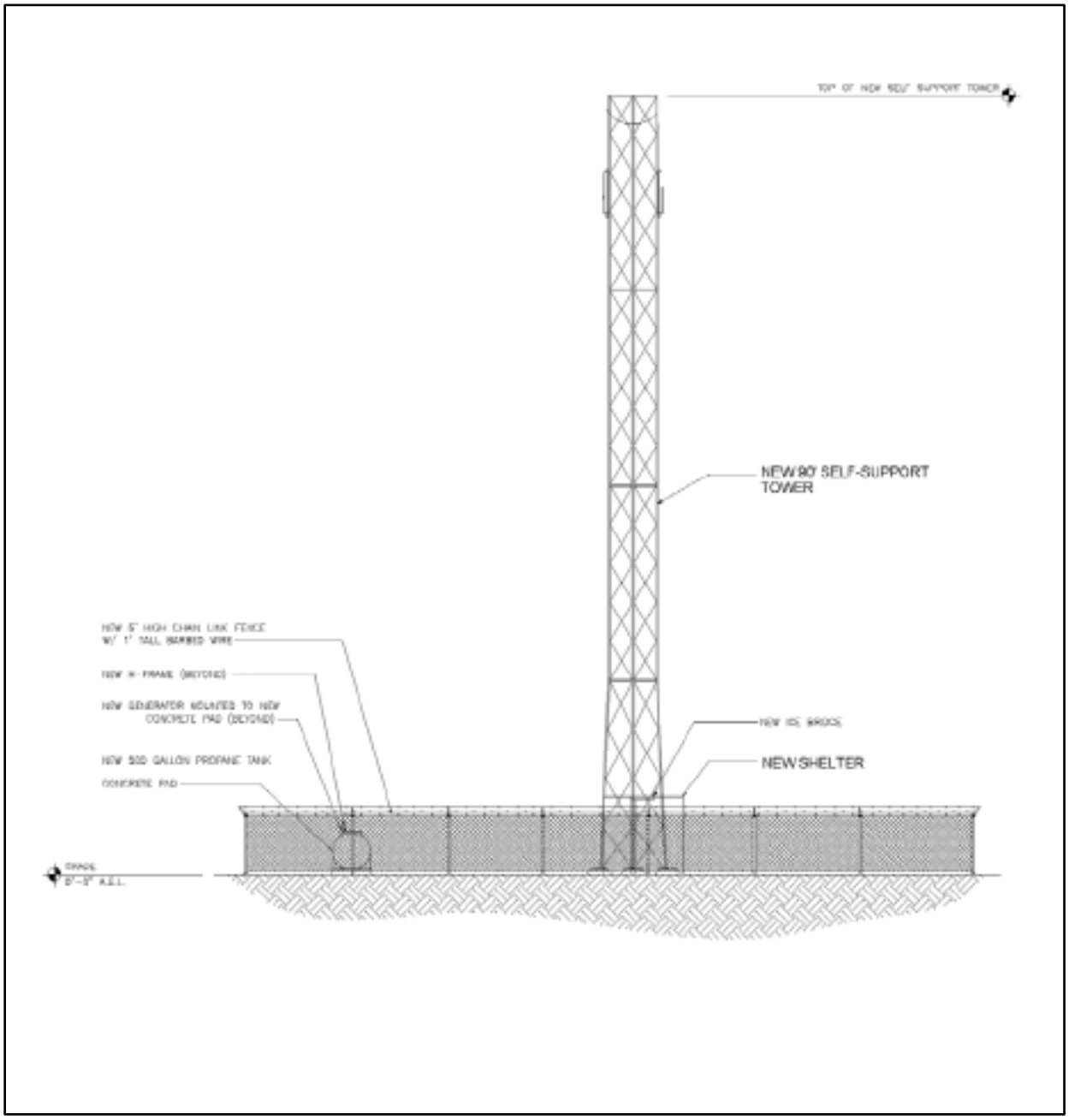
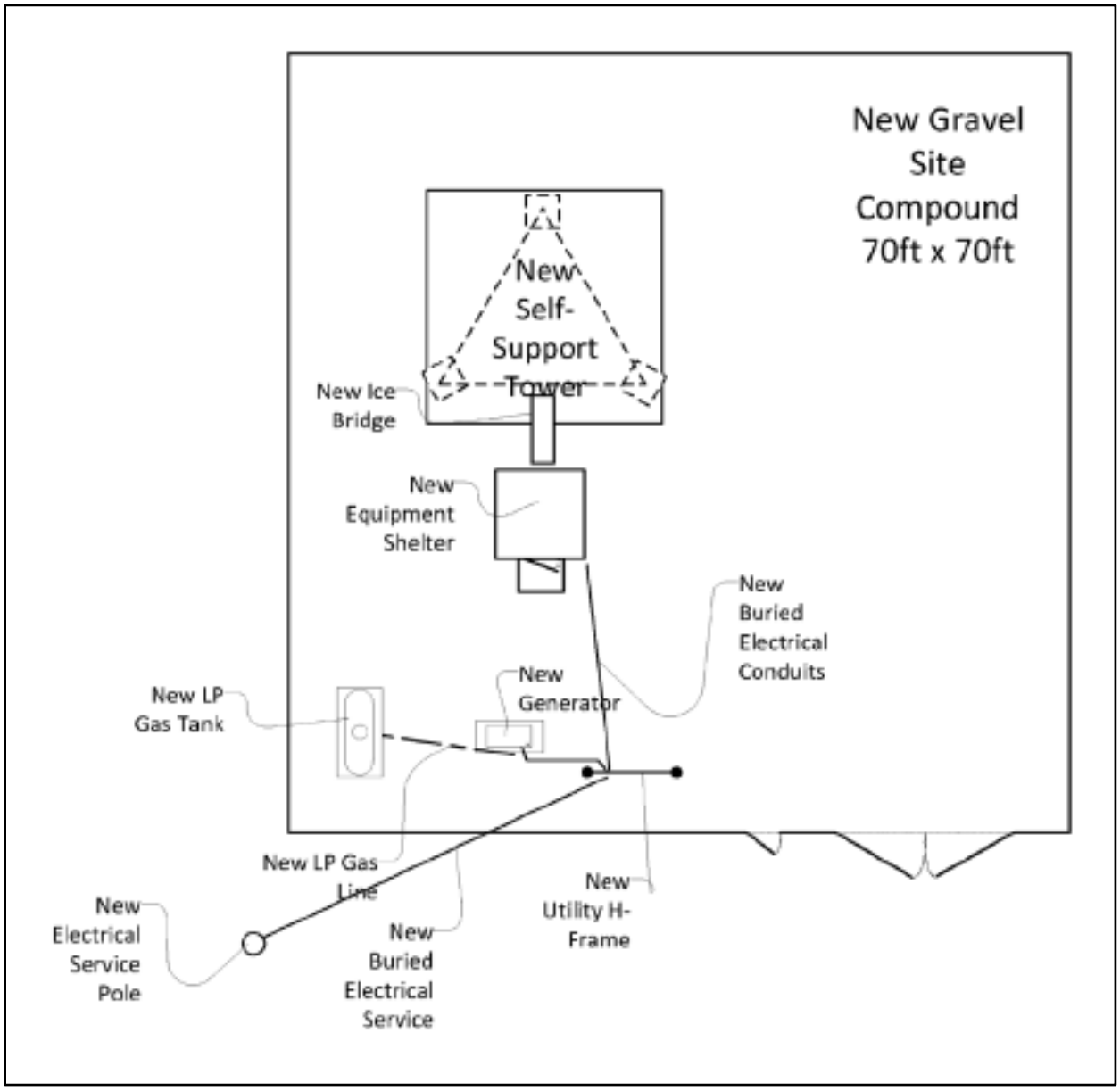


Figure 2.4-36. Typical Tower Site Drawing



Motion-detecting security lighting and cameras will be installed. Lights will activate only if there is motion near the building or generator. The area inside the fenced enclosure will be graveled or paved to control dust and weeds.

The propane-powered generator specifications indicate that its noise level is 63 dB(A) at 23 feet from the generator[9]. It will consume slightly less than a gallon of propane per hour under half load. It will be set up to run 12 minutes per week to maintain all elements of the engine fully lubricated and ready to run in the case of a power outage. The 250-gallon propane tank provides for the weekly maintenance runs and for all the power outages likely to occur in a year, and can be refilled from one of several local vendors as needed. Access to the propane tank and relay hut will be by a gate in the fence of sufficient size to allow for propane truck access. Major repairs on the installation could require a crane or safety climbing equipment and trained personnel.

Total construction ground disturbance for the tower, including the pad for the crane, access road improvements, and distribution power installation, will be less than ½ acre. The permanent footprint will be the area within the fence, which will include parking for maintenance and operation staff. Exact dimensions of the fenced area and the building will be determined in coordination with the landowner and Humboldt County permitting.

Yurok Wireless Towers

The Yurok Tribe, a partner in the KRRBI Project, is managing several existing remote wireless towers on the Yurok Indian Reservation. These towers, and the Yurok system generally, will provide additional backhaul for the KRRBI system. Conversely, the KRRBI Project will strengthen the Yurok system and will provide improved bandwidth and service. In order for the Yurok Wireless Towers to continue to function, generators on two of the towers (Wiregrass and Miners) will be replaced, the entire remote power system at McKinnon Hill will be upgraded, the generator at Wautec will be replaced, and the radio container and uninterruptable power supply (UPS) will be replaced at Weitchpec.

The Weitchpec Tower requires replacement of the existing equipment container because it is inadequate and leaks. The replacement process will use the existing footprint. Only the container and UPS will be replaced at this site.

The Wiregrass Tower site, located on Yurok Trust land, requires a 20-foot extension on its existing tower and a replacement generator. The tower extension will require the installation of guy wires. The existing tower is approximately 30 feet and is self-supporting. With 20 additional feet, the tower will require guy wires for wind loading. The guy wires will require the excavation of 3 holes each of which will require the excavation of approximately 8 cubic feet of earth. The existing diesel backup generator will be replaced with a newer, more efficient

[9] Generac 10-kW specifications, GUARDIAN® SERIES Residential Standby Generators, Air-Cooled Gas Engine, p 3.

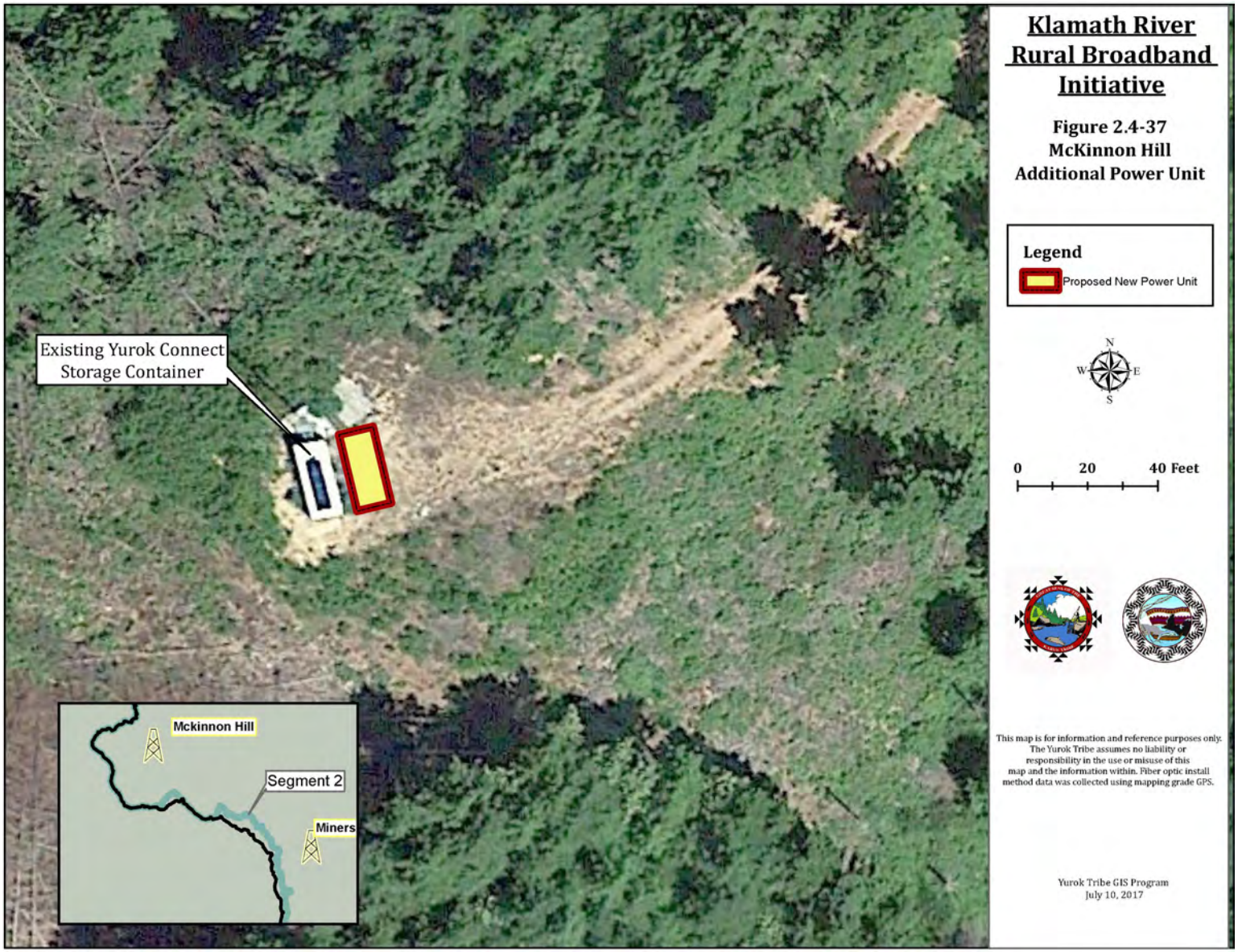
generator. A Supervisory Control and Data Acquisition (SCADA) pack will be installed to remotely monitor fuel levels, battery charge levels, and other equipment status. Additional solar panels will be installed to reduce the use of the backup generator.

The Miners Creek Tower site, located on Yurok Trust land, requires the replacement of its 8-foot by 20-foot Conex equipment container used to house the radio, switching, and electrical equipment because the container roof is unstable and leaks. The new equipment container will occupy the same footprint as the existing container. The existing diesel backup generator will be replaced with a newer, more efficient generator. A SCADA pack will be installed to remotely monitor fuel levels, battery charge levels, and other equipment status. Additional solar panels will be installed to reduce the use of the backup generator. Solar panels will be mounted on the Conex container.

The McKinnon Hill Tower site, located on Yurok Trust land, requires the installation of a redundant power system because the site is located off grid and will function as a major part of the backbone for the entire network. In order to provide a redundant power system, an additional 8-by-20-foot Conex equipment container will be installed and used to house a new generator, fuel tank, battery bank, charge controller, and additional solar panels. The new container will be placed next to the existing container on already cleared land; therefore, no ground disturbance will be required. A SCADA pack will also be installed to remotely monitor fuel levels, battery charge levels, and other equipment status. See Figure 2.4-37.

The Wautec firehouse will become a major backbone intersection point for the Project and will require the installation of a backup generator with automatic transfer switch. The site already has a propane tank and an existing generator pad. The existing generator is in need of replacement and electrical upgrade to work with the newly installed PG&E grid. There will be no ground disturbance to change out the generator and add a switch.

Figure 2.4-37. McKinnon Hill Additional Power Unit



2.4.6.3 Other Last Mile Components

Fiber Drops

Wherever fiber drops are proposed (anchor institutions and areas with clusters of homes), they will be installed underground in "hand-holes" or underground concrete boxes. Underground vaults are typically 3 feet long, 2 feet wide, and 2 feet deep. Where the middle mile fiber is traveling overhead, a loop of the cable will be brought down in an enclosed riser on the pole. In an underground vault adjacent to the pole, two strands of the 144-strand cable will be spliced into and routed from the main cable, likely as part of a 12-strand fiber optic cable. Where the middle mile fiber is traveling underground, the fiber will be brought directly into a vault and spliced as specified above. From the vault, the 12-strand cable will be carried in a conduit underground to the building, antenna, or tower to be served. At the delivery side, an optical network terminal switch, a fiber-to-copper switch, or a fiber-to-wireless signal switch will be installed. These switches require a reliable power source. Where the final service location is within an anchor institution, the institution will likely provide the backup power.

Access Points

Where there are clusters of homes or businesses, an access point may be installed (see Figure 2.4-38). An access point is a radio about the size of a football, mounted on an 8- to 20-foot pole (depending on location). Two to four round dish antennas about 10 to 12 inches in diameter are mounted on top of the pole. The pole may be installed independently, requiring either competent native material backfill or a small poured concrete footing, or attached to a building. These access points then receive and rebroadcast a signal for multiple homes or residences. They are installed within half a mile of the cluster of homes or businesses. Access points can serve line-of-sight, near-line-of-sight, and non-line-of-sight customers, depending on the radio frequencies used. If a building is used to support an access point, mounting brackets are attached to the building and a small stand-off pole may be attached if required.

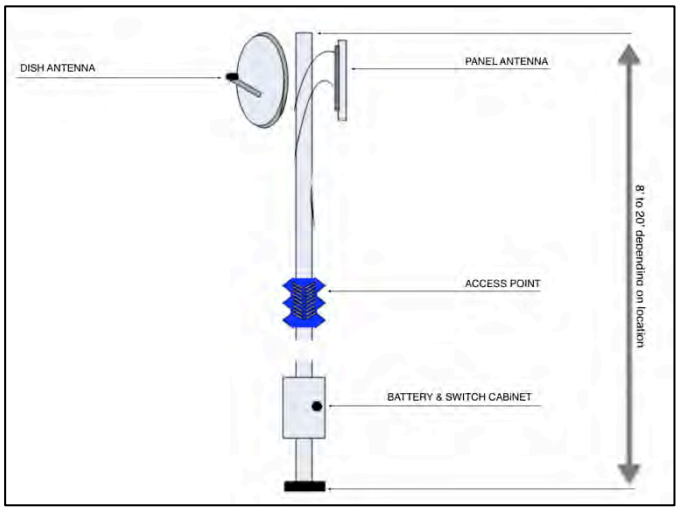


Figure 2.4-38. Access Point

Subscriber Modules

Subscriber modules will receive the wireless signal and translate it to a standard network signal for use in the home or business. A small radio, usually 6 by 6 inches but occasionally 3 by 8

inches, is attached to the side of the building using a one-armed bracket near the top of the house. These radios are designed to run on standard AC power, and connect with a CAT 5/6 Ethernet cable into the building where it will connect to a router for either WiFi or wired use. In some cases, an antenna is installed separately from the radio, with antenna sizes varying from 6 by 6 inches to a 2-foot diameter dish.

2.4.6.4 Service Interconnections

Orleans: The KRRBI Project will interconnect with the Áan Chúuphan fiber optic connection that itself connects to Siskiyou Telephone's fiber optic system. This interconnection will be completed at the central office facility of Áan Chúuphan in the Karuk Tribal Council Chambers Building in Orleans. No ground disturbance or change in appearance of the office will occur. The fiber optic cable that will be attached overhead to existing poles will be brought into the building by the same route that the Áan Chúuphan line utilized and will be interconnected to the existing service system inside the office.

McKinleyville: The interconnection with AT&T will occur inside the existing AT&T central office in McKinleyville on Railroad Drive. The interconnection will be completed within that building by directionally drilling the KRRBI line, from the last overhead mount on existing poles along Central Avenue, into the building, and connecting it with the AT&T fiber optic service as specified by AT&T. In the future, the KRRBI Project may also interconnect with Suddenlink in or adjacent to this same building.

2.4.7 Land Requirements and ROW

The KRRBI Project will seek long-term ROWs or easements from public land managing agencies, from CalTrans where the highway ROW is owned in fee, and from private parties alike for a 10-foot width for the fiber optic cable. Because construction disturbance area will also be approximately 10 feet wide, no additional temporary construction easement will be required. This will allow for long-term maintenance of the system with a minimal impact on other land uses. Table 2.4-3 shows underlying land ownership by Segment and Table 2.4-4 shows land ownership by installation type for the KRRBI Project. Where installation is overhead, no additional easements are needed because the easements acquired by the original pole owners include communications. Where a CalTrans or Humboldt County easement occurs on public (state- or federally managed) lands, the Project must acquire an easement from the underlying land manager as well as from the easement holder, and has or will apply for the dual easements accordingly. Where those road easements cross private land, they generally hold easements that include utilities, and acquisition of permission to occupy the road easement is sufficient. The Project will or has applied for easements from private property owners where no such easements already exist. Where the Project crosses GDR lands, an easement will be obtained from GDR. The final easement obtained will depend on the final installation method, but will be calculated as 10 feet width times the length of the proposed easement, converted to

acres. The ROW acres shown in Table 2.4-4 are the maximum easement acres needed for underground installation.

The Orick Tower will require 0.5 acre of land or less for the fenced installation. Other last mile facilities are unlikely to require additional land, but if needed, they will be included in requests for easements as engineering is completed.

The Karuk Tribe, with the exception of a small portion of trust land at the beginning of the Project in Segment 1 and a small portion of fee land that underlies the existing Orleans Tower and surrounding areas, also in Segment 1, does not own the land over which the Project would cross. Table 2.4-2, above, details the ownership of the roads that the KRRBI Project proposes to occupy.

Table 2.4-3. Miles Crossed by Land Ownership Crossed by Segment

Landowner/ Manager	Project Component								
	Segment					Total for Segments	Orick Tower	Yurok Signal Connection*	Total for all Components
	1	2	3	4	R5				
CalTrans	0.3	0.3		0.9	1.3	2.84	--	--	2.84
California State Lands		0.2	0.4	--	--	0.6	--	--	0.6
CDF	--	--	--	0.1	--	0.1	--	--	0.1
State Parks	--	--	--	--	3.9	3.9	--	--	3.9
County	0.2			0.1	3.3	3.6	--	--	3.6
Yurok Fee	0.3	4.5	1.7	--	--	6.5	--	--	6.5
Yurok Trust	1.5	3.3	0.3	--	--	5.1	--	--	5.1
Yurok Allotment	0.1	2.1	--	--	--	2.2	--	--	2.2
Karuk Trust	0.1	--	--	--	--	0.1	--	--	0.1
Karuk Fee	0.8	--	--	--	--	0.8	--	--	0.8
Hoopa Fee	--	--	0.3	--	--	0.3	--	--	0.3
NFS Lands	8.8			--	--	8.8	--	--	8.8
Redwood National Park	--	--	7.9	9.2	--	17.1	--	--	17.1
BLM	0.6					0.6	--	--	0.6
Private Lands	2.4	13.8	11.3	1.4	22.5	51.4	0.1	--	51.5
Totals	**15.2**	**24.2**	**21.9**	**11.7**	**31.0**	**104.0**	**0.1**	**0**	**104.1**

* Yurok signal connection estimated at ¼ acre, or less than 0.1 mile equivalent

Table 2.4-4. Miles Crossed by Land Ownership by Installation Type

Ownership	Overhead Transmission	Overhead Distribution	Overhead New	Trench	Saw Cut	Directional Drilling	Bridge Hang	Existing Conduit	Existing Fiber	Total
CalTrans	0.7	1.5	0.1	0.3	0.1	0.1	0.0	--	0.2	2.9
California State Lands	--	0.2	--	0.4	--	0.0	--	--	--	0.6
State Parks	3.9	--	--	--	--	--	--	--	--	3.9
CDF	--	--	--	0.1	--	--	--	--	--	0.1
County	--	1.0	--	2.4	--	0.2	--	--	--	3.6
Yurok Fee	4.0	--	0.1	2.1	0.2	0.1	--	0.1	--	6.5
Yurok Trust	--	2.4	0.0	1.6	0.0	0.2	--	0.9	--	5.1
Yurok Allotment	--	1.9	--	0.1	0.2	0.0	--	--	--	2.2
Karuk Trust	--	0.0	0.1	--	--	--	--	--	--	0.1
Karuk Fee	--	0.7	0.1	--	--	--	--	0.0	0.0	0.8
Hoopa Fee	--	--	--	0.3	--	--	--	--	--	0.3
NFS Lands	--	0.1	--	5.0	2.6	0.9	0.1	--	0.1	8.8
Redwood National Park	--	--	--	16.4	0.6	0.1	--	--	--	17.1
BLM	--	--	--	0.5	--	0.0	--	--	--	0.6
Private Lands	20.8	15.1	0.0	13.9	1.0	0.4	0.0	0.2	0.2	51.5
Totals	**29.3**	**22.8**	**0.4**	**43.1**	**4.7**	**1.9**	**0.2**	**1.1**	**0.5**	104.1

Most overhead installations will either occur within a road ROW or within existing utility easements that allow for communications. Exceptions include a single existing joint utility pole in Orleans that is located on private lands in the village of Orleans away from a public road and the poles needed for the crossing of Redwood Creek in Orick. Installation on existing poles may not require additional ROW from the underlying landowner because the easements already acquired by PG&E include communications, and PG&E makes available a portion of their distribution poles under CPUC regulation for communications use.

For underground installation in roadway ditches along Humboldt County roads, the Tribe has signed an MOA with Humboldt County to permit occupancy of its roads. The County has already acquired easements across private lands for its roads, and no further easement acquisition is needed.

For underground installation in roadway ditches on State Highways 96 and 169, the Tribe will submit an encroachment permit application to CalTrans. CalTrans District 1 staff has provided preliminary guidance regarding acceptable installation techniques. An encroachment permit will be acquired prior to construction. CalTrans advised the Karuk Tribe that it will not consider an encroachment permit application until engineering is completed. Final engineering will occur after environmental permitting is completed in order to incorporate any avoidance and minimization measures in the Project design that may be required in addition to the EPMs incorporated into the Project.

For any form of installation across public and state lands, including overhead, additional permission may be required from the public agency and has been applied for. NFS lands and BLM public lands are restricted to Segment 1, and the Karuk Tribe has applied for a special use authorization and ROW grant, respectively, from each agency. NPS lands are found along Segments 3, 4, and 5 (including the West Side Access road), and the Karuk Tribe has filed, or will file, an application for a ROW grant across those lands.

The State of California owns one upland parcel along Segment 3 and claims jurisdiction over the two overhead crossings of the Klamath River at Orleans (Segment 1, DNR extension) and at Martins Ferry (Segment 2). The Karuk Tribe has been in communication with the State of California and will request an easement on the parcel and for the crossings of the Klamath River. CDF owns a small parcel that serves as the anchor point for the west end of Segment 3 and the east end of Segment 4. The Karuk Tribe has begun the easement acquisition process for this parcel. CDPR manages two State Parks elements along Segment R5, and the Karuk Tribe is in discussion with CDPR regarding the need for a separate easement.

The Yurok Tribe owns some of the land in fee and some in trust along Segment 2 and along Bald Hills Road in the eastern portion of Segment 3, and has given its permission for the KRRBI Project, of which it is a joint sponsor, to occupy existing poles across those lands or to install underground in the road ditch. Allotment lands are considered private lands for the purposes of easement acquisition. PG&E has already acquired easements on those lands, and no further easements are required.

2.4.8 Construction Practices

Although final details on construction schedule and staffing will not be available until the construction contractor is hired and has presented the plan for construction, what follows is a likely scenario for construction. Since all proposed construction will be conducted during daylight hours, the need for construction lighting is not anticipated. In the event of an emergency requiring night work, portable light standards with self-contained generators would be utilized only for the duration of the emergency.

The KRRBI Project can be considered for the purposes of construction to consist of the following six elements:

- Overhead and underground fiber optic cable installation, including needed links to anchor institutions;
- Orick Tower construction, including appurtenant building, generator, and electrical connections;
- Yurok Tower generator upgrades and additional component upgrades;
- Yurok signal connection facility construction on Orleans Mountain and Antenna Ridge above Orleans;

- Connection with service providers in the Orleans and McKinleyville "meet-me" locations and "lighting up" or providing service to the fiber optic cable;
- Installation of last-mile components including access points, individual home or business installations, a node in Weitchpec, and additions or changes to antennas and internal wiring on existing towers to facilitate delivery of service.

Details of construction for each of these elements follow. The Karuk Tribe has committed to provide environmental inspectors to ensure compliance with the EPMs outlined in Section 5 and with other permit terms and conditions.

2.4.8.1 Equipment and Staffing for Fiber Optic Installation

Table 2.4-5, below, shows the estimated equipment and staff for each element of fiber optic cable construction. It assumes the following kinds of cable installation: overhead installation (existing or new poles); underground installation (trenching, pavement saw cutting, rock saw cutting, and directional drilling); hanging from existing bridges; and utilization of existing infrastructure, including existing fiber in Segment 1 and existing underground and bridge hang conduit in Segment 2. Figure 2.4-15 shows where each of these techniques is likely to be applied. Traffic control crews will be deployed as needed across the Project.

Table 2.4-5. Fiber Optic Cable Installation Crew and Equipment Needs

Crew Type	Peak # Crews	Crew Composition	Equipment Type	Motor Vehicles
Traffic Control	2	Lead Worker (1) Laborers (2)	none	4x4 Pick-up (1)
Overhead Install on Existing Poles	2	Lead Worker (1) Equip Operator (2) Laborers (4)	Bucket Truck (2) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2)
Overhead Install on Transmission Poles	2	Lead Worker (1) Equip Operator (2) Laborers (4)	All-terrain Bucket Truck (2) Equip. Trailer (1) Utility ATV (2) ATV trailer (2)	4X4 Pick-up (1) 4x4 Crew (2)
Overhead Install on New Poles	2	Lead Worker (1) Equip Operator (2) Laborers (4)	Bucket Truck (2) Backhoe (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2)
Trenching	2	Lead Worker (1) Equip Operator (2) Laborers (4)	Trencher (1) Backhoe (1) Conduit Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Water Truck (shared)
Saw Cutting in Pavement	2	Equip Operator (2) Laborers (4)	Trencher (1) Backhoe (1) Asphalt Saw (1) Conduit Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Water Truck (shared)
Rock Cutting	2	Equip Operator (2) Laborers (4)	Rock Saw Trencher (1) Backhoe (1) Conduit Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Water Truck (shared)

Table 2.4-5. Fiber Optic Cable Installation Crew and Equipment Needs

Crew Type	Peak # Crews	Crew Composition	Equipment Type	Motor Vehicles
Directional Drilling	2	Lead Worker (1) Equip Operator (1) Laborers (2)	Directional Drill (1) Backhoe (1) Vacuum Excavating Equip (1) Conduit Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Water Truck (1)
Bridge Hang	2	Lead Worker (1) Equip Operator (2) Laborers (4)	Knuckle Man-Lifts (2) Equip. Trailer (2)	4X4 Pick-up (1) 4x4 Crew (2)
Vault Placing	2	Equip Operator (1) Laborers (2)	Backhoe (1) Equip. Trailer (1)	4x4 Crew (1)
Cable Placement	2	Lead Worker (1) Equip Operator (3) Laborers (9)	Cable Pulling Equip. (3) Air Compressor (1) Cable Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (3)
Cable Splicing	2	Splicer (2)	Splicing Trailer (1)	4X4 Pick-up (1)
Cable Marker Installation	2	Laborers (4)	Equip. Trailer (1)	4X4 Crew (1)

At peak of construction, there will likely be around eight crew-cab pickup truck trips daily to move crews to and from the construction areas. It is estimated that approximately 24 construction workers per day would be required to construct the proposed Project at its peak. The peak is estimated at approximately 1 month after construction begins, and again the following year about 1 month after re-starting construction.

At least one portable toilet and hand-washing station will be provided per crew. These will be provided and serviced by local providers (EMP G-10).

Traffic Control: Because the KRRBI Project is planned for roadside installation, there will be a need for traffic control to provide for the safety of the workers and the traveling public. Traffic control will include the installation of temporary signage warning of construction, even where all work can be conducted on the road shoulder. Where the equipment must occupy part of a lane, traffic control will restrict travel to a single lane and will provide appropriate flaggers. In general, the flaggers will be intervisible and a pilot car will not be needed. All traffic control will conform to the permits issued by road managers (EPM TRANS-1). Traffic may be stopped for short periods of time to accommodate construction, but access will be available for emergency vehicles at all times (EPM TRANS-2). Traffic control will be conducted from a standard pickup truck that will carry and deploy signs, cones, and flagging stations, and will be staffed by up to three people who will set signs and conduct flagging operations as needed.

Overhead, existing poles: Overhead construction will require up to two bucket trucks with their operators and up to four laborers and one lead worker. For poles with existing communications cable(s) already attached, "make-ready" work must be completed first that readies the poles for a new cable. Make-ready may include limited vegetation trimming to

accommodate the stringing of the cable, and may include moving one or more incumbent providers down on the pole so that the new cable is at the top of the communications space on a joint use pole, typically a requirement of the incumbent communications providers. Typically, make-ready includes attaching brackets for attaching the cable to the poles. The actual installation includes installing attachments, strand, guy wires, and anchors in accordance with specifications; stringing the cable between poles; lifting the cable up to attach to the poles; then tensioning it correctly before final attachments are made. Installation also includes attaching additional guy wires to the top of the pole and to either existing anchors or new anchors. Anchor installation is typically completed by the laborers with the installation crew. Average production is about 8,000 feet per day (about 1.5 miles per day) on existing poles.

Construction on power transmission poles, which tend to make more direct paths and cover more extreme terrain conditions, may require the use of bucket trucks that are built specifically for extreme conditions, having higher axle clearances, larger all-terrain tires, and possibly excavator tracks. In conditions where equipment may not be feasible, up to four installers could climb the poles using pole-climbing equipment and harnesses to mount the hardware and utilize pulley systems to hoist the cable between poles and complete attachments to the poles. Smaller utility all-terrain vehicles (ATVs) can be utilized to haul materials from adequate vehicle access locations to the poles being climbed. Average production for manually climbing poles is greatly reduced to about 1,000 feet per day on existing poles.

Overhead, new poles: Installation of new poles will require a crew consisting of a lead worker, two equipment operators, and up to four laborers to bring and install poles. A standard flatbed or pole truck will deliver the poles to the job site. Either a truck with an auger or a backhoe will dig the holes for the poles, followed by setting the poles into the holes using either a small truck-mounted crane or the backhoe. Once the poles are set and guy wires are installed, fiber installation proceeds as for existing poles. The KRRBI Project anticipates setting two new poles for the Klamath River crossing at Orleans (Segment 1) and two new poles for the Klamath River crossing at Martins Ferry (Segment 2), each immediately adjacent to an existing Frontier Communications crossing. Two poles will be set in Segment 4 to cross Redwood Creek immediately adjacent to an existing Frontier Communications crossing. None of these crossings has yet been engineered, but are anticipated to be very similar to the poles supporting the existing crossings: wood and less than 60 feet tall with guy wires to support the weight and direction of the fiber optic cable. Spans are estimated at 680 feet (Orleans) and 705 feet (Martins Ferry) for the two crossings of the Klamath River, and at 455 feet for Redwood Creek in Orick.

Trenching: One crew (lead worker, two equipment operators, and four laborers) with a backhoe/excavator or a trencher, conduit reel trailer, and equipment trailer will conduct trenching. A water truck plus driver will be available for dust control. A loader plus operator will be used to pick up material from cleaning the ditch where necessary, and will utilize a dump truck plus driver to haul the spoil material from the ditch to an approved dump site.

Maximum number of dump truck trips is estimated at three trips/day. Trenching averages 2,500 feet per day.

Rock Cutting: Where the installation method is listed as trenching or pavement cutting but the underlying material is too hard to cut with a backhoe, specialized rock cutting machinery and crew will be brought in to make the trench. This crew consists of two equipment operators and four laborers, and will use a specialty rock saw trencher and backhoe to complete the trench in the rock. Average production with the rock saw is 500 feet per day.

Paving Saw Cut: There will be two crews for saw cutting in the pavement. The first crew will cut the pavement with a specialized saw mounted on a backhoe or similar equipment, then open the trench with a narrow-bucket backhoe. This crew will have two equipment operators and four laborers. After the conduits are placed, the crew will use material removed from the trench to backfill the trench, which will be delivered if needed with a dump truck. Once the trench is restored to preconstruction height and compaction of base material, the first crew will place a temporary cold asphalt patch in the trench. The second crew, consisting of two equipment operators and two laborers, will then remove the cold patch; prepare the trench with a bituminous emulsion application truck or trailer that will apply the sealant; then add hot mix asphalt into the trench, roll it, and seal the edges with the existing asphalt. The second crew will work with a dump truck that delivers the hot mix from a local commercial source. Average production for pavement cutting is 1,500 feet per day and pavement repaving is 750 feet per day.

Directional Drilling: This element requires a specialized crew that will include a lead worker, an equipment operator, and two laborers. Equipment will include the directional drilling rig, vacuum excavation specialty equipment, and a backhoe to dig the entry and exit pits. Average production for directional drilling is about 1,000 feet per day.

Bridge Hang: A specialty crew of two operators and four laborers will utilize special multiple-jointed personnel hoists (see Figure 2.4-24 for illustration of this equipment) for the installation of conduit and cable on the bridge. Average production is 250 feet per day.

Vault Placement: In general, when there is a transition in installation method (for example, from overhead to underground, or from trenching to directional drilling), a vault is installed to facilitate the splicing and to provide an access point for future maintenance. Vault placement crews consist of an equipment operator and two laborers who can install up to six vaults per day.

Cable Placement: After the conduits are installed in underground installations, the cable must be pulled into the conduit. These operations require a crew of one lead worker, three equipment operators, and nine laborers using three sets of cable pulling equipment, an air compressor, and a cable reel trailer.

Final Splicing: To complete the final fiber optic cable splicing, one operator with a specialized set of equipment in a van, truck, or trailer, plus one laborer will work on roadsides to splice various kinds of installation together and to splice long runs together.

Cable Marker Installation: Once the fiber optic cable is in place in underground installation, it must be marked so that anyone considering ground-disturbing activities will be aware that it is present and know to call the underground location service to determine its exact location. These markers will be installed by a crew of four laborers with a pickup truck and equipment trailer.

2.4.8.2 Equipment and Staffing for Orick Tower Construction

Table 2.4-6 summarizes equipment and staffing for Orick Tower construction.

Table 2.4-6. Orick Tower Installation Crew and Equipment Needs

Crew Type	Peak # Crews	Crew Composition	Equipment Type	Motor Vehicles
Foundation	1	Lead Worker (1) Equip Operator (2) Laborers (6)	Backhoe (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Concrete Truck
Tower Installation	1	Lead Worker (1) Equip Operator (2) Laborers (6)	Erector Crane (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2)
Hut, Generator, Propane Tank Installation	1	Lead Worker (1) Equip Operator (2) Laborers (6)	Backhoe (1)	4X4 Pick-up (1) 4x4 Crew (2) Concrete Truck
Fencing Installation	1	Lead Worker (1) Laborers (4)	Equip. Trailer (1) Small concrete mixer (1)	4X4 Pick-up (1) 4x4 Crew (2)

The Orick Tower construction will start with preparation for and installation of the foundations: one for the tower and one for the hut, propane tank, and generator. Note that the propane tank and generator must be separated by at least 10 feet and may be placed on separate pads, depending on final design. The tower foundation will be dug with an excavator to the specifications of the tower manufacturer—typically deep enough to accommodate the three 3-foot-deep columns that will support the legs, surrounded by an 18-inch-thick concrete pad about 12 feet square. An additional foundation will be installed for the hut, typically 18 inches deep for 1 foot all the way around the perimeter (2 feet wider all around than the building, or 12 by 17 feet) and a 6-inch steel-reinforced concrete pad on which to mount the hut, with pre-installed bolts that will fit the predrilled holes in the hut foundation.

The foundation construction will require a crew of three to assemble and install the rebar and to work with the concrete trucks as they bring in the required volume of concrete to pour the columns for the leg foundations and the pads. Foundation construction will take 3 to 5 days.

Once the foundations are in place, the tower components will be delivered by truck. The tower will be assembled on-site with a crew of three using hand tools and air-powered tools running on an air compressor mounted on a pickup truck. The tower components will be installed into

three 30-foot segments. A telescoping rubber-tired crane will be brought in to install and hold the tower components while the specialty crew with climbing and safety gear bolts the three segments together. A climbing safety system will be installed on the tower for subsequent maintenance and antenna installation needs. Tower installation can be completed in 2 days.

After the tower is in place, the pre-assembled hut will be brought to the site and placed on the pre-set bolts and secured. This process will require a rubber-tired crane to remove the hut from the truck and place it on the foundation bolts and will take 1 day. After the hut and tower are in place, the electrical service panel will be placed, the generator will be placed and secured, and the propane tank will be delivered by the propane fuel company and plumbed to the generator. Installation of these services will take about 1 day each. Immediately after the placement of the hut, the permanent fence will be installed with a large equipment gate and a small person-sized gate to allow for routine pedestrian access for maintenance and service. The fence crew will consist of one lead worker and three laborers with two pickup trucks and a backhoe to dig the holes for the corner fenceposts, pour the concrete footings for those posts, and to tension and apply the chain-link fencing and barbed wire fencing.

After the hut has been installed, an ice bridge will be constructed and installed between the hut and the tower. This bridge allows for the hanging of communications lines below the bridge to protect the lines from high winds, heavy rains, snow, and ice accumulations. The 18-inch-wide ice bridge will be installed about 8 feet above the ground on an independent, grounded, galvanized pipe structure to allow for free pedestrian movement beneath it. Installation of the ice bridge will take about 1 day with two construction workers using hand tools and hand-held power tools.

2.4.8.3 Equipment and Staffing for Yurok Signal Connection

The Yurok Signal Connection will be installed by a qualified electrician and two assistants. No specialized equipment will be needed, but a four-wheel-drive shop truck will be needed to haul the solar panels, batteries, hut, repeater radio, Rohn lattice tower, and antennae. A gas-powered auger may be used to install the foundations for the Rohn lattice tower. Sufficient concrete to construct the foundation and the footing for the tower will be hauled by pickup truck to the site. Water will also be hauled to the site, and the concrete will be mixed by hand on-site for the foundation, footing, and any needed reinforcement for fenceposts. Work will be completed in 2 days. Other tools will be unpowered, battery powered, or powered by a portable generator or an air compressor on the truck.

2.4.8.4 Equipment and Staffing for Fiber Optic Last Mile Installations

Last mile installations may vary on a case-by-case basis, but would typically involve an equipment operator, installer, and two laborers to complete the drop installation. The drop installation would commence at an access location in the fiber ROW and extend a fiber drop cable to the premise location. The operator (with the assistance of the two laborers), utilizing a

small trencher or vibratory plow, would install a fiber cable drop at a minimum depth of 12 inches to the premise. Once at the premise, the installer would complete the termination of the fiber drop with fiber terminal equipment, dependent on the customer's needs. This equipment is mounted on the outside of the building or inside the customer's premise. These installations can take anywhere from 3 to 8 hours to complete.

2.4.8.5 Water Use

Water use for this Project will be limited to support for underground installation methods, dust control, water needed for the directional drills, and water needed for concrete at the Orick Tower site. Table 2.4-7 summarizes water use for fiber optic cable installation. Water will be purchased where available from municipal water sources or withdrawn from approved water sources where other roadwork water is available.

Table 2.4-7. Water Use for Fiber Optic Cable Installation

Install Method	Miles	Water Use per Mile (gal)	Total Water Use (gal)
Overhead	52.5	-	-
Trench	42.6	4,000	170,440
Trench--rock saw	0.5	1,000	473
Pavement Saw Cut	4.7	1,000	4,696
Directional Drill	1.9	1,500	2,850
Bridge Hang	0.2	-	-
Totals	**104.1**		**178,459**

Total estimated water use for the entire Project is estimated at 275,342 gallons.

Water use for construction of the Orick Tower, including dust control, is estimated at 6,000 gallons. Concrete will be delivered from a commercial facility ready to pour. Water use for construction of the foundations on Antenna Ridge is estimated at 200 gallons, which will be carried in a pickup truck to near the site, then carried by hand to the construction site. Concrete will be mixed in small batches by hand on site.

2.4.8.6 Access Roads

The majority of the KRRBI Project is planned along existing roads. In these portions of the Project, no new permanent or temporary access roads will be needed to construct or operate this Project. Existing roads do not need any improvement, either temporary or permanent, for the construction or operation of this Project. No helicopter access will be needed because all poles are located near existing roads or within cleared ROW.

About 25.4 miles of Segment R5 will be constructed utilizing existing transmission poles that, in some places, also support distribution lines and existing communication carriers. Some portions of these lines are built along existing roadways, while other portions are built cross-country where PG&E maintains the ROW in low vegetation. The cross-country portion is located in rugged terrain where existing access is limited to pole maintenance or to maintain the ROW clear of re-growth. In these areas, fiber construction crews will travel using overland-

capable ATVs within the cleared ROW to build the new fiber communications line on the existing poles.

In two other specific locations, crews will need to set new poles at the Klamath River crossing in Orleans and Martins Ferry and the new poles for the crossing of Redwood Creek in Orick. In those locations, a 100-foot temporary, overland access path may be required to construct the newly proposed aerial fiber cable waterway crossings. The temporary paths will gain access to place new poles, new aerial hardware, and new aerial fiber cable across the Klamath River and Redwood Creek. No grading activities will be needed for the temporary overland access paths. However, the disturbed access paths will be restored as required by the landowner or land manager. Temporary overland access paths will be used by:

- A pole-setting truck (two trips) to dig holes and set the new crossing poles;
- A backhoe (two trips) to assist with setting the new crossing poles;
- A pole hardware set-up crew truck (two trips) to install the aerial cable hardware; and
- A cable installation crew truck (two trips) to install the new aerial fiber cable over the river.

Each of the poles is accessible on foot from the road, and laborers needed to assist with the installation will walk in from the existing roads.

2.4.8.7 Laydown and Staging Areas

The construction contractor will be responsible for selecting final laydown and staging areas. For the purposes of this Project, laydown areas are places where reels of conduit and reels of fiber optic cable are stored. Also stored in laydown areas are vehicles, equipment, supplies, and materials. They may be used for worker parking to reduce the number of vehicles along the roads during construction. The Karuk Tribe assumes that there are sufficient areas that are previously disturbed, were used for similar functions in the past, and are or can be fenced and gated to provide security for the stored items. Laydown areas are estimated at 250 by 250 feet, or about 1.4 acres. Known available laydown areas are listed below. None of these areas will need grading, vegetation removal, or other site preparation other than the installation of temporary construction fencing in the case of the laydown areas.

- Segment 1 (L-1): TT construction storage area. Old mill site, paved or graveled, already fenced and secured.
- Segment 2 (L-2): Staging area used for Martins Ferry Bridge, a graveled turnout at the intersection of Highway 169 and the Martins Ferry Bridge, will need temporary construction fencing.
- Segment 3 (L-3): The old landing at the Wiregrass wireless broadband tower location, just above the Yurok Veterans Cemetery on Bald Hills Road. Currently graveled and gated, may need temporary construction fencing.

- Segment 4 (L-4): Use the Orick Tower site for laydown. Will be graveled and fenced.
- Segment R5:
  - L-5A: Old mill site at Big Lagoon on GDR land. Portions are fenced. Additional construction fencing
  - L-5B: Old log landing, still clear, at the gate between RNP land and GDR land at the top of the West Side Access Road, will need temporary construction fencing.
  - L-5C: McKinleyville: Private property of an existing construction, shipping, and trucking company where equipment and materials may be stored during construction under a lease arrangement.

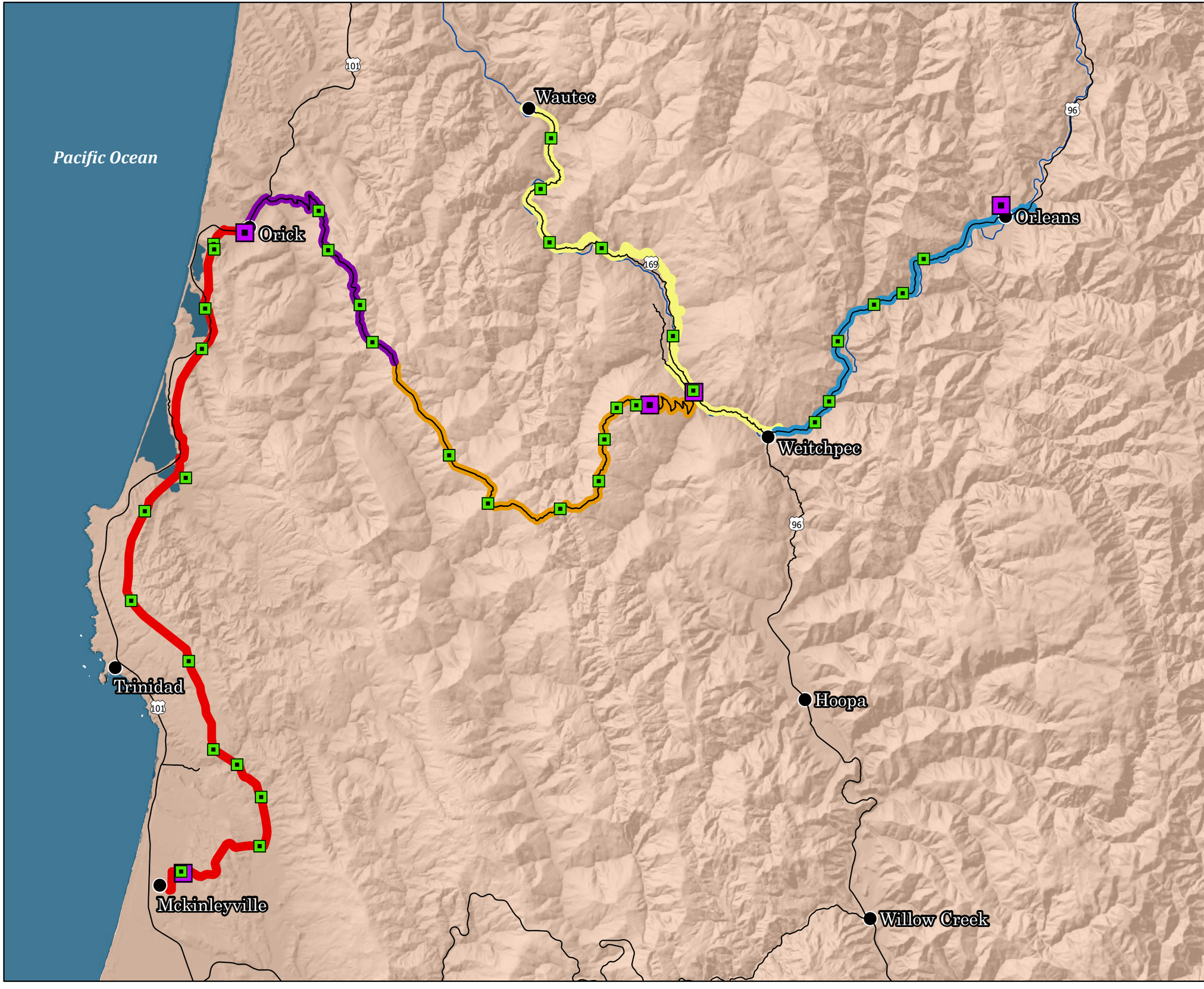
Temporary construction fencing will be determined by the construction contractor, but will likely consist of 8-foot-tall cyclone fencing components and a gate wide enough to admit equipment and large trucks. No electrical power will be needed at either laydown or staging areas.

For the purposes of estimating disturbance, the Project engineers have chosen likely staging areas, although this will be up to the construction contractor. Staging areas, unlike laydown areas, are places where equipment might be stored for a day or two during active construction and will not be fenced. Typically, they are wide turnout areas along each of the roads in the area that have been used for this purpose by other projects, including CalTrans maintenance, in the past. None of the chosen staging areas will need additional grading or ground disturbance for site preparation. There are sufficient previously disturbed turnout areas to cover staging needs. Staging areas shown in Figure 2.4-39 include six for Segment 1, six for Segment 2, seven for Segment 3, four for Segment 4, and 12 for Segment R5 in addition to one larger laydown area each for Segments 1 through 4 and three for Segment R5.

Proponent-proposed measure EPM G-7 states that if the construction contractor wishes to utilize other laydown areas or staging areas, it is up to the contractor to show to the satisfaction of agencies with jurisdiction prior to their use during construction that those areas provide similar or less disturbance than those shown in this document.

Klamath River Rural Broadband Project

Figure 2.4-39
Staging & Laydown Areas



Legend

- Laydown Area
- Staging Area

Fiber Install Route Segment

- 1
- 2
- 3
- 4
- R5

0 1 2 4 Miles

N
W E
S

Yurok Tribe GIS Program
February 3, 2020

2.4.8.8 Worker Housing and Commute

The construction contractor will be responsible for hiring and housing workers. The Tribe estimates that workers for Segments 1, 2, and 3 will be housed in Willow Creek, and workers for Segments 4 and R5 will be housed in Orick. Average commute for Segments 1, 2, and 3 is 37 miles, while average commute for Segment 4 is 11 miles and for Segment R5 is 36 miles. Workers will be encouraged to carpool from their housing to the job site (EPM G-6).

2.4.8.9 Construction Schedule

For the purposes of the PEA, the Karuk Tribe assumes that the NEPA/CEQA process will be complete in winter of 2020 and that all permits will be in place and construction can begin in spring of 2021. Table 2.4-8, below, summarizes the scenario schedule. The darker colors indicate construction without seasonal restrictions due to nesting birds, while the lighter colors indicate that seasonal restrictions may be in place for at least part of the route. No construction is planned during December through February because of the high likelihood of the presence of rockslides and snow on the roads.

It is expected that the work schedules will be highly constrained due to limited operating seasons. When permitted to operate, crews will work 7 days a week, Monday through Sunday, from 6:00 a.m. until 6:00 p.m. where at least 1 mile from a residence or school, or where otherwise limited by the road manager. Note that construction hours include needed pauses for traffic to pass on various one-lane roads and for traffic control on two-lane roads where equipment must use one of the lanes for safety purposes. Hours of construction may be more limited near schools or where otherwise limited by permitting agencies.

Table 2.4-8. Estimated Construction Schedule

Construction Component	2021												2022											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Fiber Installation																								
Orick Tower Construction																								
Yurok Signal Connection																								
Connecting to Service Providers																								
Last Mile Service Installation																								

2.4.8.10 Best Management Practices

The following BMPs will be applied where appropriate throughout the Project area and throughout its duration. Items in parentheses are the applicable EPMs found in Table 5-1 in Section 5.

- Limit soil disturbance and vegetation removal to the minimum necessary to provide for safe and complete installation (EPM SOIL-1).
- Where inadvertent road damage has occurred during construction, roads will be restored to their pre-construction condition as specified by the road manager (EPM TRANS-3).
- Avoid the spread of weeds through worker education and equipment cleaning before entering the Project area (EPMs WEED 1, WEED-2). On federally managed lands, backfill, if needed, will be from certified weed-free sources (EPM WEED-3).
- Fugitive dust produced during construction will be controlled with watering as needed (EPM AIR-1).
- Trucks and heavy equipment used during construction of this Project will meet CARB standards for air pollution control for their model year (EPM AIR-2).
- The SWPPP developed by the construction contractor will provide for erosion and sedimentation control as needed to avoid contamination of streams and rivers (EPM WATER-1).
- Industry standard practices will be used for spill prevention and containment, especially when fueling is needed within the Project area (EPM WATER-2).
- The construction contractor will prepare a Fire Plan. This plan will include a training program for all personnel on the measures to take in the event of a fire, including fire dangers, locations of extinguishers and equipment, emergency response, and individual responsibilities for fire prevention and suppression. The plan will also include the requirement that all motor vehicles and equipment must carry specified fire prevention equipment, and that individuals using handheld power equipment must also have specified fire prevention equipment. Shovels, water, and fire extinguishers will be carried on all equipment and vehicles (EPM FIRE-1).

2.4.9 Post-Construction Cleanup and Site Restoration

Cleanup is an integral part of fiber optic cable installation. Each crew will be responsible for cleaning up the worksite at the end of the day and closing or covering any open trenches to avoid creating a roadside safety hazard. All worksite litter and debris will be cleaned up and removed from the roadside at the end of every day (EPM REC-1). Trenches that must be left open overnight or longer will be covered with steel plates that can withstand light traffic. Where there is a transition between installation methods, such as between trenching and

overhead installation, or between trenching and directional drilling, one crew will finish its installation before the next crew is on site. Therefore, conduits will be exposed, along with the fiber optic cable inside one of them, on the surface for one or more days until the second crew's installation is complete and the two runs of conduit can be connected and buried or secured to a pole. Once the fiber optic cable has been spliced, preconstruction contours will be restored. This means that road shoulders will be graded to their preconstruction configuration and ditches will be left cleaned of debris and vegetation.

All other component installations will also require daily site cleanup. The Orick Tower enclosure will be graveled and maintained vegetation-free. The Yurok Signal Connection site is naturally rocky with very limited vegetation, and no vegetation will be removed during the installation on Antenna Ridge. Antenna installation on Orleans Mountain will require no ground disturbance. Last-mile component installation generally requires no ground disturbance, with the exception of installing poles for access points.

2.4.10 System Operation and Maintenance

Once installed and operational, this system will require very little routine maintenance. Before beginning an operations or maintenance project, KRRBI contractors or their subcontractors will clean all equipment that will operate off-road or disturb the ground. The entire vehicle or equipment will be cleaned at an off-site location (EPM OM-1).

2.4.10.1 Overhead Components

Routine maintenance consists of visually checking on the integrity of the system components, running the backup generators where they have been installed at tower sites, and making annual electrical checks on the switches and other components. These checks will be conducted from the public road in the case of the fiber optic network, using a pickup truck, and be conducted once annually by one staff person. Visual inspection will include all exposed components including the fiber optic cable where overhead, horseshoes, and splice boxes. Aerial cable maintenance includes maintaining proper clearance heights and trimming of vegetation around cables to avoid damage, which can be accomplished with two to three crewmembers, a bucket truck, a chainsaw or hand pruning tools, and wood chipping equipment.

The greatest hazard to the operation of the system is damage to the overhead components from natural events such as storms, falling trees and branches, or fires, and human-caused events like vehicles crashing into poles or vandalism. Underground installation is less vulnerable but still subject to damage by inadvertent exposure, landslides, or cutting by others. A critical element of the KRRBI Project design is to ensure that as much of the Project as possible is accessible by vehicle. The specialized fiber optic cable splicing required for emergency repairs is typically conducted in or from a specialized trailer or truck. While portable equipment is available, it is slow and expensive to use.

When the fiber optic cable is severed or damaged, a repair crew, typically of two people, is immediately dispatched to locate the damage and repair it. If the fiber optic cable is overhead, a bucket truck will be needed to allow one of the workers to lower the line to the splicing trailer or truck, where the second person will repair it, and the first worker, working form the bucket truck, will re-suspend it from the pole. If the cable is damaged in the underground installation, it must be dug up with one operator on a backhoe or excavator several feet on each side of the damaged section, the damaged section repaired or replaced and re-spliced to the original cable, and the cable returned to the conduit and re-buried. This process will likely require three crewmembers, including a specialist to conduct the splicing. Emergency repairs are facilitated by the planned installation of extra cable in vaults and in overhead snowshoes, allowing the cable to be extracted, repaired, and replaced with minimal disturbance. To avoid inadvertent damage to environmentally sensitive areas, the Tribe will provide crews and contractors with maps showing environmentally sensitive areas; these maps will include work zones as well as ROW areas where ground disturbance will be avoided (EPM OM-2).

2.4.10.2 Underground Components

Membership in USA North 811 means that locates will be provided for other third-party construction activities near the underground cable easement, thus avoiding damage to the cable. For underground portions, vaults and markers will be inspected. Missing markers will be replaced with the same type of marker.

2.4.10.3 Wireless Towers

For the Orick Tower and for the existing towers in the Karuk and Yurok systems, an inspector will drive to the site in a pickup truck and test the various components once a month. Testing is expected to take less than 2 hours per site per month. The tower itself does not require maintenance but is subject to an annual safety inspection, conducted by a trained worker using climbing harness and safety lines. The propane tank is filled once a year, or more often if there are extended power outages requiring backup power to keep broadband available. The propane generator is maintained by automatic weekly operation to keep all parts lubricated and ready to work instantly in the case of a power outage and will run about 12 minutes per week. A single crewmember inspects the generator monthly as part of other duties, which include inspecting the power sources and electronic connections for each of the radios.

2.4.10.4 Wireless Subscriber Modules

The largest maintenance task in the system is maintaining subscriber radios and antennas. The Karuk Tribe owns the antennas and radios that are placed at each subscriber's residence or business, and charges a nominal lease fee for them. The expanded system will require ongoing maintenance of the subscriber system, replacing radios if they fail, and repointing or replacing antennas as needed.

2.4.10.5 System Monitoring and Control

Once fully operational, KRRBI will have a dedicated monitoring system that automatically detects any failures in the system. These failures may include, but are not limited to:

- Physical damage to the fiber optic cable somewhere in the system (e.g., a backhoe inadvertently digs up the fiber optic cable and severs it while working on an emergency road drainage problem);
- Physical damage to a node (e.g., someone shoots at an antenna and damages it);
- Electrical failure at a node or at a switch that controls all or part of the system (e.g., power outage and a failure of the backup power to cover the outage); or
- Electronic failure of a node or a switch.

The monitoring system is designed to continuously test for and report on the health of each of the nodes, points of presence, and other physical switches in the system. It can "ping" each of the switches, nodes, and radios to determine the health of each one. If the signal of the "ping" does not reach past a particular node to the next node, the monitoring system deploys an alarm and the technician can follow up to determine the location of the failure and initiate repairs. Repairs can be as simple as rebooting a switch remotely or as complex as summoning a repair crew to isolate and repair a broken fiber cable.

The fiber optic network will use standard routing protocols to self-heal whenever an outage is detected. When a connection goes down, the routing protocol automatically re-routes traffic to secondary and backup connections, and a notification is sent to technical staff to repair the issue.

To meet subscriber security and privacy requirements, the KRRBI fiber network is designed to separate traffic both physically and logically to prevent subscribers from accessing the data of other subscribers. The network design will be compliant with healthcare (HIPAA), credit card (PCI) and government (NIST) security standards.

2.4.10.6 Maintenance Staffing

Staffing for maintenance of the KRRBI system will include the following:

- An office manager, who will be responsible for managing and billing for subscriptions, taking new applications, and closing accounts as needed for both residential and commercial subscribers. This person will also be responsible for maintenance of any licensing and interconnection agreements with other utilities.
- A network manager, who will be responsible for the administration and configuration of the entire system and will be the person who manages the various power backup options for each component of the system. This person will also monitor and maintain

the electronics of the fiber optic cable system, and will be responsible for detecting failures in the network and dispatching repair teams.

- Two wireless technicians, one for the coastal communities (Orick and vicinity) and one for the inland communities (Orleans, Weitchpec, Tulley Creek, and the downriver communities to Wautec). These technicians are responsible for the initial installation of radio and antenna for each subscriber, maintenance of those radios and antennas, and the maintenance of the wireless tower sites and generators.

Maintenance of the physical fiber plant is periodic and can be economically managed through a third-party maintenance agreement with a regional company whose personnel and resources periodically maintain the fiber plant and respond to emergency situations to fix damaged cable and bring the network back online.

2.4.11 Foreseeable Consequences of the KRBBI Project

At this time, the Karuk Tribe does not have any future phases planned once KRRBI completes construction. There are several predictable outcomes that may result from the KRRBI Project, and exciting possibilities for future regional improvements to the broadband landscape. The CPUC has approved two CASF projects (described below) after the KRRBI Project was approved; combined, these three projects will have far-reaching impacts on the far Northern California Region.

Resolution T-17539 granted funding to the Siskiyou Telephone Company for the Happy Camp to Somes Bar Fiber Connectivity Project. This project is now largely completed as of 2020. Once the KRRBI Project and the Siskiyou Telephone project are complete, true east-to-west fiber will exist in California from Eureka to Yreka. Most fiber optic installations in Northern California run north to south. Currently, the northernmost east-to-west fiber in California travels along Highway 36 from Red Bluff to Fortuna. The reduced transport costs and redundancy offered by the combination of these two projects will greatly enhance the reliability and reduce the costs for broadband access in the north state.

Resolution T-17548, awarded to Inyo Networks for the Digital 299 project, will provide an additional east-to-west fiber run, from Eureka to Redding, including the junction of Highways 299 and 96 in Willow Creek. The Hoopa Valley Reservation Tribe is applying for a CASF grant in 2020 to complete the fiber interconnection on Highway 96 from Willow Creek to Weitchpec. This potential future project could connect these two communities and provide additional redundancy to the Hoopa Valley Tribe, Digital 299, and KRRBI.

The KRRBI will also connect to the Yurok Tribe's existing network, which provides support for the Yurok government offices in Klamath, California, in Del Norte County. Although the connection to Klamath will be wireless rather than fiber optic, KRRBI will bridge a north-to-south gap that currently exists between Trinidad and Crescent City. Another potential future project could provide a fiber link between Orick, where KRRBI would have fiber, and Crescent

City, which would allow for a coastal fiber connection to Oregon, because Crescent City has fiber connections north to Brookings, Oregon, and northeast to Grants Pass, Oregon. Currently, the only other fiber optic connections to Oregon occur along Interstate 5 and Highway 97, in the central and eastern portions of the California-Oregon border.

The KRRBI will address the broadband needs of the communities directly served by its fiber optic and wireless services. The KRRBI will also strengthen the telecommunications infrastructure of the remote region of the redwood coast in far northern California, becoming part of a much broader landscape of communication installations that will provide Internet access and broadband to dozens of unserved and underserved communities. The public safety, educational, health care, and economic impacts of KRRBI will be substantial. Only future generations will perceive the far-reaching and meaningful consequences of the KRRBI on the people of California.

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3 Environmental Assessment

The Karuk Tribe is committed to avoiding and minimizing as many environmental impacts through Project design as feasible. Through early conversations with the relevant agencies, additional measures have been incorporated as part of the Project. In addition, EPM G-1 specifies that Environmental Compliance Monitors will be hired by the Tribe to monitor construction activities and to report to the Tribe and to the agencies regarding construction compliance with permit terms and conditions. Monitoring activities will be structured in accordance with an Environmental Compliance Management Plan, developed by the Tribe and approved by the lead state and federal agencies prior to construction. Further, the construction contractor will be required to develop and implement a Health and Safety Plan (EPM G-8) and a Worker Environmental Awareness Program (WEAP) (EPM G-9).

3.1 Aesthetics and Visual Resources

3.1.1 Regulatory Setting

The regulatory setting for aesthetics and visual resources includes the management plans prepared for the RNP, Six Rivers National Forest, the scattered tracts of Public Land managed by the BLM, CDPR, and the Humboldt County General Plan. The current management plan for the State Parks does not explicitly address aesthetics. There are two important features on the landscape that receive special regulatory attention: the Klamath River, designated as "recreational" under the Wild and Scenic Rivers Act, and the RNP. Other nearby features include several state parks along Highway 101, some managed with the RNP and some managed independently.

3.1.1.1 Wild and Scenic River Designation for the Klamath River

The Wild and Scenic Rivers Act states, in part:

> It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. (Wild & Scenic Rivers Act, October 2, 1968)

The Klamath River, from 3,600 feet below Iron Gate Dam to the mouth, is listed under this act on January 19 1981[10]. Of its total 286 miles designated, 251 of those are designated "recreational," including the stretch from Orleans to Weitchpec (Segment 1) and the stretch within the Yurok Reservation from Weitchpec to Wautec (Segment 2) and on to the mouth. The recreational designation was assigned to those rivers or sections of rivers that are readily

[10] http://www.rivers.gov/rivers/klamath-ca.php, accessed 4/28/20.

accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The management of the river varies by underlying land ownership. Where the land is managed by the USFS, the Six Rivers National Forest Plan describes how the USFS will manage the river for recreational uses. Where the river crosses isolated tracts of land managed by the BLM, the Arcata Resource Management Plan directs river management for its values as a Wild and Scenic River. Where it is privately owned outside the Yurok Reservation, the Humboldt County General Plan and Humboldt County zoning ordinances are used to maintain the area's aesthetic values. Within the Yurok Reservation, the Yurok Tribe specifies the protection of the river and surrounding areas for its cultural as well as aesthetic values.

3.1.1.2 USFS

The USFS manages the Klamath River along Segment 1 for its recreational values. The existing 21-year-old plan for the Six Rivers National Forest (1995) identifies the recreational river portion as "Management Area 15". Visual objectives for this management area include a Visual Quality Objective of partial retention within the recreational river corridor and in middleground areas visible from the recreational river corridor. The goals for "Partial Retention" are as follows: "Maintain the area in a near-natural appearing condition. Provide an attractive, forested landscape where management activities remain visually subordinate to the character of the landscape. Manage human activities so they are subordinate to the character of the landscape. Roads and trails may be constructed. Bridge crossings and numerous river access points may occur.[11]"

3.1.1.3 NPS

The RNP was designated in 1968 and expanded in 1978. It is managed as the Redwood National and State Parks together with some of California State Parks that were designated to preserve important stands of old-growth redwoods. The KRRBI Project crosses only the federally designated park. The RNP was established "to preserve significant examples of the primeval coastal redwood (*Sequoia sempervirens*) forests and the streams and seashores with which they are associated, for purposes of public inspiration, enjoyment, and scientific study, there is hereby established a Redwood National Park in Del Norte and Humboldt Counties, California." (Public Law 90-545, October 2, 1968.)

Its expansion 10 years later to encompass much of the lower watershed of Redwood Creek was completed "[I]n order to protect existing irreplaceable Redwood National Park resources from damaging upslope and upstream land uses, to provide a land base sufficient to insure preservation of significant examples of the coastal redwood in accordance with the original

[11] USDA Forest Service. 1995. Six Rivers National Forest Management Plan.

intent of Congress, and to establish a more meaningful Redwood National Park for the use and enjoyment of visitors (PL 95-250, March 27, 1978)."

The 2000 plan for the RNP does not explicitly address visual resources but includes them throughout the plan as part of the visitor experience. The general intent is to allow visitors to enjoy scenic vistas and to have the opportunity to view not only the old-growth redwoods for which the park was initially designated, but also to view the active management of the park for landscape restoration and cultural resources.

3.1.1.4 BLM

The BLM manages three isolated tracts of land in the vicinity of Segment 1. Segment 1 crosses one of these tracts at about milepost (MP) 26.1 on Highway 96. The 1991 Arcata Resource Management Plan specifies that this area be managed as part of the "Isolated Tracts Management Area[12]." There are no visual resource guidelines for these tracts.

3.1.1.5 Humboldt County

The 2017 Humboldt County General Plan specifies:

> **WR-S9. Projects in Proximity to Wild and Scenic Rivers**. Projects located within state designated wild, scenic, or recreational river basins shall be consistent with the guidelines in the State Wild and Scenic Rivers Act as amended.[13]

The Plan further calls for consideration of visual impact of any proposed project and for minimizing any adverse effects on visual resources.

3.1.2 Environmental Setting

3.1.2.1 Fiber Optic Cable

The fiber optic installation portion of the Project will be located entirely above or within roadways in rural Humboldt County, with the exception of Segment R5, which will be installed on existing PG&E transmission line poles that in part travel cross-country in an existing ROW from Orick to Fieldbrook. Proposed installation methods are discussed in Section 2 and mapped in Figure 2.4-15, above. Where existing overhead poles are available and accessible for subsequent vehicle-based maintenance, the fiber optic line will be installed on those poles using a joint attachment agreement with the incumbent communications carrier or with PG&E. Where existing poles are not available, the Project will be installed underground, either immediately adjacent to the existing roadway or within the road prism where necessary and permitted.

[12] USDI. BLM. 1992. Record of Decision. Arcata Resource Area Resource Management Plan and Environmental Impact Statement, as amended in 1995 for incorporation of the NW Forest Plan.

[13] Humboldt County. 2017. Humboldt County General Plan. Available online at http://www.humboldtgov.org/205/Plans last accessed 4/29/2020.

Segment 1 is proposed for location either on existing poles (through Orleans) or underground (from Camp Creek to Weitchpec) along Highway 96. Highway 96, a paved two-lane road with some shoulders, is located within the inner canyon of the Klamath River along Segment 1, varying from 100 to 500 feet above the river, and is generally screened from the river by intervening forest vegetation. The Klamath River along this section is designated as recreational within the Wild and Scenic River program.

Segment 2 lies entirely within the Yurok Indian Reservation and follows the existing alignment of electric power poles to Wautec. Where the electric service has been installed overhead, the KRRBI fiber optic cable will be installed on the same poles. Where the electric service has been installed beneath the pavement on Highway 169 or attached to the Pecwan Creek Bridge, the KRRBI fiber optic cable will follow that same installation technique. This alignment follows or parallels Highway 169, a one-lane paved dead-end road that is located in the inner canyon of the Klamath River. The road is generally located well above the river and is screened by forest vegetation from the river, with some notable exceptions. Where visibility from the river raised cultural concerns, the Yurok Tribe and PG&E cooperated to bury the electric line, and fiber optic cables for the KRRBI will also be buried in that area. The Klamath River along this section is designated as recreational within the Wild and Scenic River program.

Segment 3 begins in the Yurok Reservation in dense mixed conifer forest at the Martin's Ferry Bridge and follows the one-lane, paved Bald Hills Road steeply up the hillsides with a series of nine sharp switchbacks, all of which are within the Reservation. It continues through dense forest until emerging, with the road, into the prairies and meadows along the ridge that give the road and the area its name. Where it emerges into the first large open area is the boundary of the RNP, and the road is unpaved for the next 7 miles where it follows the boundary between the RNP to the south and private lands to the north. It continues through the Lyons Ranch Historic District, and into young, dense redwood and Douglas-fir timber stands where the paved road begins again. It ends in the timbered area at the intersection of Johnsons Road with Bald Hills Road. Elk Camp CDF Fire Station, staffed during the summer, is located at this intersection. Segment 3 will be installed entirely underground. The only visible evidence of its presence, once constructed, will be the access vaults (about one per mile) and the markers that indicate the presence of underground utilities. In visually sensitive areas, the markers can be omitted and additional detection systems installed in the vaults and along the fiber optic line (See section 2.4.4.6, above, and EPMs VIS-1, VIS-2).

Segment 4 continues underground, installed in the roadside ditch or in the edge of the road along the ridge in young-growth timber, and starts the descent through older forests until reaching some of the iconic groves of ancient redwoods for which the RNP was established. The road is narrow, two-lane, and partially paved with a patchwork of repairs. The route passes trailhead access points along Bald Hills Road and also passes through the Lady Bird Johnson redwood grove. The route follows the road as it switchbacks through the old redwood

forest until Bald Hills reaches the large Redwood Creek valley near Orick. The route then runs adjacent to an abandoned lumber mill yard and turns west on Highway 101 just east of the community of Orick. The fiber optic cable will be on existing poles through Orick, a small community with mixed residential and commercial properties clustered along the two-lane Highway 101.

Segment R5 will start at the Orick Tower and continue south on Highway 101 for about a mile on existing overhead distribution poles until switching over to the existing 60-kV transmission line poles. Those poles travel cross-country in an existing, partially cleared ROW, heading south and traveling along a low ridge or between the ridge and Highway 101 to the east of Freshwater Lagoon and Stone Lagoon. The existing transmission line crosses Stone Lagoon RV Park to the east of the lagoon.

From Stone Lagoon to Big Lagoon, the existing PG&E ROW crosses multiple private parcels as well as State Parks lands, both dominated by dense young stands of redwood, Douglas-fir, and hardwoods. ROW clearing, conducted by PG&E, is limited in this section to trimming or removal of trees that could interfere with the conductors directly. The ROW is east and above Highway 101 in this section.

From Big Lagoon south to a mile north of the bridge over the New River, the transmission line, and the proposed Segment R5, closely follow the Hammond Truck Road, also known as the A-Line Road or CR1000 and BL3000 (in GDR nomenclature). This road serves as an all-year access road to GDR lands, which are actively managed for timber production. Adjacent vegetation includes younger redwoods, other conifers, and hardwoods forming a dense forest on either side of the road. The PG&E ROW is kept cleared of all taller vegetation and is dominated by brush up to 6 feet tall.

At a point about 1.1 miles north and east of the crossing of Little River, the PG&E transmission line and Segment R5 leave the Hammond Truck Road and turn to the southeast, crossing through dense young stands of redwoods, other conifers, and hardwoods in a cleared ROW. The route then follows an old railroad grade down to Murray Road, part of which has been converted to a truck road, the last mile of which serves a series of smaller private parcels along L2000 or Old Railroad Grade Road.

Segment R5 will be buried in the shoulder of the road about 400 feet along Old Railroad Grade Road before turning west along Murray Road on existing overhead distribution poles for half a mile. This area has substantial clearings for pasture and homes as well as dense young stands of redwoods, other conifers, and hardwoods. West of the available distribution lines, the fiber optic cable will be buried in the shoulder of the road within the road easement for about 3.1 miles until emerging from the forest and into scattered, mostly cleared, rural residential parcels with available overhead joint use poles. At that point, the fiber optic cable will be hung on existing poles for about half a mile until Murray Road reaches Central Avenue. The route then

follows Central Avenue into the north end of downtown McKinleyville on existing overhead poles through suburban residential, scattered rural residential, and some commercial properties. The route ends after a short underground portion from Central Avenue along Railroad Drive to the AT&T central office in a mixed residential and commercial neighborhood.

3.1.2.2 Orick Tower

The final mile wireless installation will require a 90-foot (estimated) tower in Orick. In the area proposed for installation, there are existing overhead utility lines, abandoned commercial buildings, a CalTrans storage yard, and pasture lands. See Figure 2.4-34, which shows the general location.

3.1.2.3 Yurok Signal Connection

The Yurok Signal Connection includes the Orleans Mountain component, which will show no change to existing conditions, and the Antenna Ridge component, which will have a minor change of visual appearance. Current conditions on Antenna Ridge include four poles with antennas, a small set of solar panels mounted on a pole, and a partially damaged battery box with remaining batteries.

3.1.3 CEQA Checklist Criteria for Potential Impacts

AESTHETICS: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

3.1.4 Analysis of Potential Impact to Visual Resources

3.1.4.1 Fiber Optic Cable

Highway 96 and the basic alignment of the electric power poles were in place when the river was designated "recreational" in 1981, as was Highway 169 and the county and tribal side roads in the Klamath River canyon. The Yurok Tribe has been awarded a series of grants to provide electricity for the first time to the river communities downriver of Weitchpec. Where overhead lines would intrude on the visual setting of important cultural areas, the powerlines and telephone line were installed underground. The same approach is in place for the last 6 miles of

the electrification Project from Ka'Pel to Wautec, and all lines are underground or on a bridge attachment in culturally sensitive areas.

The KRRBI fiber optic cable would be installed in a similar manner for the portion of Segment 1 in the road prism of Highway 96, which is within the Wild and Scenic River corridor for 7.8 miles. It will not be visible from the river or by recreationists traveling on Highway 96 to view or recreate in the river, and would meet the USFS partial retention Visual Quality Objective.

The fiber optic installation will have no appreciable impact on the visual environment because it will be installed either underground or attached to existing poles. Where placed underground, the fiber must be marked so that other users of the area do not inadvertently dig it up. Traditional fiber markers are white plastic poles with orange tops and lettering indicating the nature of the underground utility. In areas with high scenic sensitivity, such as the National Park, these markers will be 2-foot tall 4-by-4-inch treated wooden posts with attached dulled metal signs that are legible but not visually intrusive, or as specified by the land managing agency (EPM VIS-1).

It is feasible to use an underground marking technique that utilizes specialized devices installed in the underground vaults that allow for precise location of the fiber optic cable between vaults (EPM VIS-2). However, without visible markers, it is probable that road maintenance crews and others using heavy equipment for efforts like driveway maintenance will be unaware that the cable is in the area. Therefore, to avoid damage to the fiber cable in the future, this EPM is proposed for use only where absolutely necessary to meet stringent NPS requirements.

3.1.4.2 Orick Tower

The 90-foot tower for wireless signal routing in the town of Orick will be visible from Highway 101. Figures 2.4-35 and 2.4-36 show a model of the tower. The setting includes commercial and residential structures, overhead power lines, and a storage yard for CalTrans. Adjacent to the tower will be a hut, and both will be enclosed in a 7-foot fence topped with two strands of barbed wire to reduce damage due to vandalism. There will be no permanent lighting, but there will be a motion-sensitive light at the entrance.

The tower and its accessory structures will be new on the landscape, but is not planned in the vicinity of sensitive viewers and will be in the vicinity of other commercial structures. It will not be visually intrusive. It will not substantially degrade the existing visual character or quality of the site, nor will it create a new source of substantial light or glare.

3.1.4.3 Yurok Signal Connection

The addition of two antennas to the top of the existing lattice tower on Orleans Mountain will not change the visual impact of the existing tower to observers. The remaining work will be conducted inside the vault and will not be visible. Figures 2.4-27, 2.4-28, and 2.4-29 show a

plan, a profile, and a current conditions photograph, respectively, of the proposed work on Orleans Mountain.

The proposed changes on Antenna Ridge will change the existing landscape element that currently includes several antenna poles, solar panels, and a battery box. These elements are not visible now from the road that accesses Orleans Mountain and are not visible without binoculars from Orleans Mountain. The existing poles will be removed, and a short tower with a hut will be installed. Figures 2.4-30, 2.4-31, and 2.4-32 show a plan, a profile, and a current conditions photograph, respectively, of the proposed work on Antenna Ridge. These new elements will not be visible from the road or from Orleans Mountain without binoculars. The Karuk Tribe has reviewed the proposed installation and has stated that the installation will have no adverse visual effect on sacred sites.

3.2 Agriculture and Forest Resources

3.2.1 Regulatory Setting

CEQA requires consideration of the possible conversion of certain classes of farmland and forestland to non-agricultural or non-forestry uses, respectively. The State of California regulates timber production through several means, including the California Timberland Productivity Act of 198214, which required all parcels listed on a 1977 list that were not contested to be designated as Timberland Production Zones (TPZ): "Land use under a TPZ will be restricted to growing and harvesting timber, and to compatible uses approved by the county (Gov. Code 51110(b))". The Humboldt County General Plan states: "There are 1.2 million acres of private forested land and 0.3 million acres of public forested land in Humboldt County, covering more than 80% of the County's land area. Roughly 990,000 acres are zoned Timber Production Zone (TPZ), two-thirds of which are held by timber companies.

The Humboldt County general plan and zoning ordinances protect agriculture in some locations, including in the town of Orick and vicinity. They further protect timberlands through TPZ zoning and restrictions on subdivision for larger parcels of non-TPZ forestland. Lands with a Williamson Act contract also require special consideration, though utility uses are not necessarily a conflict with ongoing agricultural uses and are so recognized in the Act.

3.2.2 Environmental Setting

The fiber optic portion of the Project will be entirely installed either on existing poles or underground within county and state rural road ROWs. There are no areas of Unique Farmland or Farmland of Statewide importance in the Project area. The Project does not cross any lands with a Williamson Act contract. Table 3.2-1 shows the miles crossed in lands zoned in Humboldt County as TPZ or Prime Farmland:

[14] California Government Code 51000 et. seq. available online at http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=51001-52000&file=51100-51104, last accessed 6/22/16

Table 3.2-1. Miles Crossed by Segment for TPZ and Prime Farmland

Land Use Type	Segment 1	Segment 2	Segment 3	Segment 4	Segment R5	Total
TPZ	0.7	6.4	15.9	1.0	20.0	44.0
Prime Farmland	0.0	1.9	6.9	0.3	1.1	10.2

The fiber optic cable route travels adjacent to and through many parcels zoned TPZ, including GDR lands along Segments 3 and 4 along Bald Hills Road and along Segment R5 between Big Lagoon and Murray Road. NFS lands along Segment 1 and RNP lands along Segment 4 and portions of Segment 3 are forested, as is much of the private and trust lands within the Yurok Reservation along Highway 169 and Tulley Creek Road in Segment 2 and along Segment 3 on Bald Hills Road. Note that while existing roads and the existing transmission line ROW do cross prime farmland and TPZ lands, the roads are not vegetated and are not part of the managed lands in those designations, and the transmission line ROW is excluded from timber management for the safety of the transmission line. Installation in the roadside ditch or on existing poles through these areas does not affect those land uses.

The Orick Tower will be located within a 1-mile radius of the intersection of Highway 101 and Lundblade Road in Orick. This location allows the KRRBI Project to serve the anchor institutions in Orick as well as a large majority of the residences, including more remote farm residences. One private property is under consideration for the tower location. The private parcel is currently used for cattle production. If the tower were to be located on that property, a small portion of the ranch would become a fenced and graveled yard surrounding the 90-foot tower and fence. This would represent a loss of about ½ acre of prime farmland. This use of prime farmland is a permitted use under Humboldt County Code.

Orleans Mountain and Antenna Ridge are both located on rocky ridges on NFS lands.

3.2.3 CEQA Checklist Criteria for Potential Impacts

AGRICULTURE AND FOREST RESOURCES: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

AGRICULTURE AND FOREST RESOURCES: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

3.2.4 Analysis of Potential Impact to Agriculture and Forest Resources

3.2.4.1 Fiber Optic Cable

The installation of fiber optic cable, either overhead on existing utility poles or underground within the road easements of Bald Hills Road, Highway 101, Old Railroad Grade Road, and Murray Road, will not affect the adjacent farmland, including prime farmland, or farming operations. It will not convert land to non-agricultural use.

The installation of fiber optic cable on existing poles or within the road prisms or ditches is a compatible use and will have no effect on the management of lands zoned as TPZ for timber production. Where crossing lands managed by GDR in Segments 3, 4, and R5, the Project will coordinate closely with GDR land and road managers to conduct the installation in a manner that avoids conflict with active logging, road maintenance, or construction operations. The Project will not convert land to non-timber use or interfere with the use of the land for timber production.

The presence of a buried or overhead fiber optic cable will not induce growth or encourage removal of lands from TPZ or farmland category for the purposes of subdivision, because fiber optic cable does not provide the needed infrastructure for such activities.

3.2.4.2 Orick Tower

If the tower were to be located on the private property currently under consideration, a small portion of the ranch would become a fenced and graveled yard surrounding the 90-foot tower and fence. This would represent a loss of about ½ acre of prime farmland. The Orick Tower would have no impact on any lands zoned TPZ.

3.2.4.3 Yurok Signal Connection

No ground-disturbing activities are proposed for Orleans Mountain to install the antenna and radio needed for the Yurok Signal Connection. The minor changes to existing structures on Antenna Ridge for the Yurok Signal Connection will have no impact on agricultural lands or on lands zoned TPZ.

3.3 Air Quality

3.3.1 Regulatory Setting

The U.S. Environmental Protection Agency sets national ambient air quality standards for six common air pollutants called criteria air pollutants, as mandated by the federal Clean Air Act of 1970[15]. The California Air Resources Board also administers California ambient air quality standards for the 10 air pollutants designated in the California Clean Air Act. The KRRBI Project is entirely within the North Coast Unified Air Quality Management District (NCUAQMD), which includes the counties of Del Norte, Trinity, and Humboldt.

3.3.2 Environmental Setting

There are two weather stations in the Project area: one in Orleans (data since 1905) and one in Orick (data since 1913). Average precipitation in Orleans is 51 inches and in Orick is 67 inches. Virtually all of the precipitation falls as rain, and most of it falls in the winter rainy season from November through April. Fog is common along the coast in Orick throughout the year, but is particularly common in the summer months. Thus, the average monthly high temperature in Orleans is seen in July at 93.1 degrees Fahrenheit (°F), but in Orick, the average monthly high temperature is seen in September at only 70.6°F. Average monthly low temperatures are reached in January in both communities, in Orleans at 35.2°F and in Orick at 36.7°F. The hills between Orleans (604 feet elevation) and Orick (10 feet elevation) reach 2,640 feet at School House Lookout on Bald Hills Road[16]. There is slightly more snow at that elevation, and rainfall averages approximate those of Orick.

The NCUAQMD is listed as "attainment" or "unclassified" for all the federal and state ambient air quality standards except for the state 24-hour particulate matter of 10 micrometers and smaller (PM_{10}) standard in Humboldt County only. The District has not exceeded the federal annual standard for particulate matter during the last 5-year period. Primary sources of particulate matter in the Eureka area are on-road vehicles (engine exhaust and dust from paved and unpaved roads), open burning of vegetation (both residential and commercial), residential wood stoves, and stationary industrial sources (factories)[17].

Air quality is generally good in the Project area. Most remote rural homes are heated with wood, as firewood is cheap or free, easily accessible, and not dependent on unreliable power or sometimes-expensive propane, the other two fuel alternatives for most homes. A limited number of homes are heated with fuel oil since they are located where fuel delivery is possible. Many remote rural roads are unpaved and during the summer are very dusty. These factors may have contributed to Humboldt County's only "non-attainment" category of PM_{10}, though

[15] https://www.epa.gov/laws-regulations/summary-clean-air-act accessed 4/29/2020
[16] School House is an NWS RAWS weather station: http://raws.dri.edu/cgi-bin/rawMAIN.pl?caCSHH
[17] http://www.ncuaqmd.org/index.php?page=aqplanning.ceqa#T1, accessed 3/8/20

most of the population, and concern, is concentrated from the Humboldt Bay communities of Eureka and Arcata south through Garberville.

Sensitive receptors, which are few along the Project route, are as follows:

- Segment 1: Orleans Elementary School and Head Start
- Segment 2: Weitchpec School, Ka'Pel Head Start, Jack Norton School
- Segment 3: No sensitive receptors
- Segment 4: Orick Elementary School
- Segment R5: No sensitive receptors

All construction near those schools will be installation of overhead components, estimated to take less than 1 day near each of those schools. There are no hospitals or long-term care facilities along the route.

3.3.3 CEQA Checklist Criteria for Potential Impacts

AIR QUALITY: Would the Project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☐	☒
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☐	☒
GREENHOUSE GAS EMISSIONS: Would the Project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☒
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

3.3.4 Analysis of Potential Impact

The following sections discuss potential impacts on air quality, and is fully supported by Appendix A, the Air Quality Report.

3.3.4.1 Fiber Optic Cable

The Project will have two kinds of impact on air quality: PM_{10}, and fugitive dust, neither of which are expected to be substantial.

During construction, there will be minor contributions of PM_{10} and other pollutants generated through the creation of diesel and gasoline exhaust from the equipment used for installation of

the fiber optic cable. Emissions from trucks and equipment will be reduced as required by California law, based on the type of equipment and model year (EPM AIR-2).

Construction will also generate some fugitive dust during the driest part of the year, though the construction contractor is required to control fugitive dust emissions by watering to minimize this impact (EPM AIR-1).

The use of fiber optic cable installation equipment would be temporary and for a limited duration, and therefore will not have a significant impact on air quality. The Project does not include the manufacture or processing of materials that may release substantial pollutant concentrations or objectionable odors. The Project will not result in the exposure of substantial pollutant concentrations to sensitive receptors or create objectionable odors affecting a substantial number of people. Construction-related air impacts will be less than significant.

Greenhouse gas emissions are similarly temporary, short-term, and less than significant. Because of the temporary nature of the greenhouse gas contributions, coupled with the modest quantity of emissions, the proposed Project will not have a significant impact on the environment, nor conflict with applicable plan, policy, or regulation for the purposes of reducing greenhouse gas emissions. The amount of work required and directly related to this Project is small, short-term, and will not generate a significant amount of greenhouse gases, nor conflict with any plan or policy regulating such gases.

The Karuk Department of Natural Resources is working collaboratively as Co-Lead of the Western Klamath Restoration Partnership to integrate GHG reduction factors into forest management principles and practice.

During normal operation of the fiber optic cable portion of the Project, there are virtually no emissions that could affect air quality. The Project does not routinely generate any pollutants through the use of fiber optic cable, wireless towers, or last mile antennae, radios, and routers.

3.3.4.2 Orick Tower

Construction of the Orick Tower would occur over a period of 2 to 3 weeks and will have a negligible impact on air quality. During construction, there will be minor contributions of PM_{10} and other pollutants generated through the creation of diesel and gasoline exhaust from the equipment used for the construction of the wireless tower and its appurtenant structures. Emissions from trucks and equipment will be reduced as required by California law, based on type of equipment and model year (EPM AIR-2).

The only impact on air quality during operation will come from the use of the propane generator at Orick. Each generator is designed to run on propane and will consume slightly less than 2 gallons per hour under full load. It will be set up to run 12 minutes a week to maintain all elements of the engine fully lubricated, to keep the starter battery charged, and ready to run

in the case of a power outage. The contribution of this use of a propane generator will have a negligible impact on air quality.

3.3.4.3 Yurok Signal Connection

Construction of the Orleans Mountain and Antenna Ridge components of the Yurok Signal Connection will occur over a period of 2 to 4 days and will have a negligible impact on air quality. Access to the construction sites will be with pickups, which will have very minor contributions of PM_{10} and other pollutants generated through the creation of diesel or gasoline exhaust. Construction may use diesel- or gasoline-powered equipment over the course of a single day for foundations for the hut and antenna on Antenna Ridge. All other work on Antenna Ridge will be conducted by hand or with battery-powered tools.

3.4 Biological Resources

3.4.1 Regulatory Setting

Plant and animal resources on federally managed lands are regulated by the management plans promulgated by the agencies managing those lands. They are also protected by national and state laws regarding wildlife and special status plants. GDR, in compliance with those laws, has written and is executing conservation plans for several species on its lands.

3.4.1.1 Federal Endangered Species Act

The federal Endangered Species Act of 1973 (ESA) protects endangered and threatened species by prohibiting federal actions that would jeopardize the continued existence of such species or result in the destruction or adverse modification of habitat of such species. Under Section 7(a)(2) of the ESA, the BIA, as the lead federal agency, may consult with federal resource agencies (i.e., USFWS) and prepare a Biological Assessment if listed species and/or critical habitat are present in an area to be impacted by proposed Project activity.

3.4.1.2 California Endangered Species Act (California Fish and Game Code Sections 2050-2116)

CESA parallels the federal ESA. As a responsible agency, the California Department of Fish and Wildlife (CDFW) has regulatory authority over State-listed endangered and threatened species. The State legislature encourages cooperative and simultaneous findings between state and federal agencies. The proposed Project would comply with this act.

3.4.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act[18], enacted in 1940 and amended several times since, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs. "Take" includes disturbing an eagle in a way that interferes with its normal breeding, feeding, or sheltering behavior. For construction

[18] 16 U.S.C. §§ 668-668c, 1940 as amended.

projects like KRRBI, this means that noise or other disturbance associated with installation must be shown to be similar to or less than the disturbance level to which the eagles are already acclimated.

3.4.1.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act[19] was passed in 1918 to put an end to the commercial trade of migratory birds and their feathers. This Act decrees that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected. Virtually all birds in the United States are covered by this law (exceptions are made for non-native species like English sparrows and starlings). In effect, it means that it is illegal to "take" a bird or a nest. For construction projects like KRRBI, that means that any vegetation removal conducted during nesting season (typically spring and summer) should be preceded by a search for bird nests and may be postponed if nests are found until the birds have fledged their young.

3.4.1.5 USFS Sensitive Species

Forest Service Sensitive species are plant and animal species identified by a Regional Forester for which population viability is a concern (FSM 2670.5). The analysis of effects must include an assessment of the effects, if any, on Forest Service Sensitive species; if necessary, this assessment is documented in a Biological Evaluation.

3.4.1.6 USFS Management Indicator Species

Forty-one Forest fish and wildlife species are identified as management indicator species or assemblages for a variety of habitats that are affected by resource management activities on the Forest in the 1985 Six Rivers National Forest and Land Management Plan. Management Indicator Species are not federally listed as threatened, endangered, or Forest Service Sensitive; but they have the potential to be affected by Project activities.

3.4.1.7 BLM Sensitive Species

BLM Sensitive species are species that are not federally listed that occur on BLM Public Lands, where BLM "has the capability to significantly affect the conservation status of the species through management." BLM's policy is to "ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered."

3.4.1.8 California Special Status Species

CDFW has identified California Species of Special Concern (CSSC) that are also protected. The purpose is to identify animals that need conservation in order to avoid the need to list under the CESA.

[19] 16 U.S.C. §§ 703-712, 1918, as amended.

CSSC are defined as those species, subspecies, or distinct populations of native animals and plants that currently satisfy one or more of the following (not necessarily mutually exclusive) criteria:

- Extirpated from the state totally or in their primary seasonal or breeding role and were never listed as state threatened or endangered.
- Listed as federally, but not state, threatened or endangered.
- Meet the State definition of threatened or endangered but have not formally been listed.
- Experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify them for state threatened or endangered status.
- Have naturally small populations exhibiting high susceptibility to risk from any factor(s) that, if realized, could lead to declines that would qualify them for state threatened or endangered status.

3.4.1.9 GDR Conservation Plans

GDR has reached agreement with the USFWS, National Marine Fisheries Service, and CDFW on the management of aquatic species and on the management of the northern spotted owl (*Strix occidentalis caurina*) where it exists on or adjacent to GDR lands[20].

3.4.2 Environmental Setting

3.4.2.1 Habitat and Vegetation

The Project is located in the Klamath River valley from Orleans to Wautec following existing state highways (Segments 1 and 2), over the Coastal Range to the west coast following Bald Hills Road (Segments 3 and 4), through the coastal plain in the town of Orick, following State Highway 101 (Segments 4 and R5), then in the coastal hills and valleys south to the "meet-me" point in McKinleyville (Segment R5). Following is a description of habitat and vegetation by Project component.

Fiber Optic Cable

Segment 1: The Project will be located overhead on existing joint-use poles from its origin in Orleans at the Karuk Tribe's Áan Chúuphan demarcation point south about a mile to where the poles leave the roadside at about Camp Creek Road. The poles travel along state Highway 96. The bases of the poles are kept clear of vegetation for fire prevention purposes, and the distribution and telephone lines travel in front of residences and businesses in Orleans. Starting at Camp Creek Road, the fiber optic cable will be installed on the outside edge of the highway,

[20] Simpson Timber Company. 1992 as amended. Habitat Conservation Plan for the Northern Spotted Owl on the California Timberlands of Simpson Timber Company. Green Diamond Resource Company. 2006. Aquatic Habitat Conservation Plan and Candidate Conservation Agreement with Assurances. CDFW. 2014. Consistency Determination for the Northern Spotted Owl Habitat on California Timberlands.

in the maintained shoulder. Roadside vegetation is dominated by introduced invasive species such as Dyers woad, Scotch broom, star thistle, chicory, Himalaya berry, and English Ivy. Adjacent terrestrial habitats include mixed Douglas-fir and hardwood forests and developed residential land parcels. Where the highway crosses perennial streams, the adjacent vegetation is typically alder-dominated riparian forest with willows and Himalaya berry in the understory.

Segment 1 Spurs: The spur that will extend from the existing Áan Chúuphan fiber optic cable to the CalTrans maintenance yard and to the Karuk DNR offices includes a new overhead crossing of the Klamath River, immediately adjacent to an existing communication cable crossing and planned to be at the same height above the river. The additional cable crossing will be similar visually to the existing cable. It also includes two new poles, each installed adjacent to the poles carrying the existing communication cable. The pole to the northeast will be located outside the riparian area of the Klamath River in a young forested area with hardwoods and conifers. A single new pole, to be located in the Highway 96 ROW in previously disturbed soils and vegetation, will be installed just southwest of the DNR driveway. The fiber optic cable will be attached to the new and the existing poles. On existing poles, it will be attached between the distribution conductors and the existing communication cable. Vegetation under the existing line includes young mixed conifer/hardwood forest, invasive species including Himalaya berry (*Rubus armenaicus*), and shrub species including introduced (e.g., *Pyracantha*) and native (e.g., *Ceanothus* sp.).

The spur to the Frontier Communications Central Office in Orleans will be mounted to existing poles between the existing distribution power conductors and the existing communications cable. The spur to the existing Áan Chúuphan Tower will be mounted to existing poles below the existing distribution power conductors and will use the existing spare conduit placed during initial tower construction to complete the connection underground. No ground disturbance is anticipated for the underground portion of the installation.

Segment 2: The Project will be located underground in the high-side ditch along the existing Weitchpec Road from its intersection with Highway 96 for 0.5 mile, then continue overhead on existing joint-use poles to Ka'Pel along Highway 169 and the upper and lower Capell roads. All of Segment 2 is within the Yurok Indian Reservation and travels through conifer and hardwood forests disturbed by road construction, road maintenance, and the recent installation of the utility poles. Like Segment 1, roadside vegetation includes mostly invasive annual and perennial plant species. Adjacent vegetation includes mixed Douglas-fir and hardwood forests. Where the highway crosses perennial creeks, the adjacent vegetation includes riparian forests dominated by alder with some Douglas-fir and other riparian vegetation. Himalaya berry is a common invasive in riparian areas.

Segment 3: The Project will be located in road prism of the Bald Hills Road from its intersection with the Tulley Creek Road at the west end of the Martins Ferry bridge to the intersection with Johnsons Road near the CDF Elk Camp Fire Station. The Bald Hills Road travels through mixed

Douglas-fir and hardwood forests, many of them recent plantations, until reaching the RNP boundary and the beginning of the meadows or "balds" that give the road and the area its name. The meadows are remnants of much larger meadows that were maintained through routine application of intentional Native American burning before EuroAmerican settlement began around 1850[21]. Douglas-fir and other trees have steadily invaded these meadows since suppression of burning became common in the late 1800s and early 1900s. The segment terminates at Elk Camp in a mixed young-growth redwood/Douglas-fir/hemlock forest.

Segment 4: The Project will be located in road prism of the Bald Hills Road from its intersection with Johnson Road at Elk Camp to its intersection with Highway 101 just north of Orick. Bald Hills Road travels largely through mixed young-growth redwood/Douglas-fir/hemlock forest stands along the ridge, then descends through several groves of old-growth redwoods, the best known being the Lady Bird Johnson Grove. Bald Hills Road travels through the Redwood Creek floodplain with alders and other facultative wetland species as well as non-native invasive species like Himalaya berry just before its intersection with Highway 101. After a short underground portion along Highway 101, the remainder of Segment 4 will be installed overhead on existing joint-use poles. Segment 4 will cross Redwood Creek in an overhead crossing parallel and immediately adjacent to the existing telephone cable crossing just west of the Highway 101 bridge over Redwood Creek, about 2.2 creek miles from its mouth at the Pacific Ocean. Terrestrial habitats are predominantly developed residences, commercial buildings, and pasture along this stretch of Highway 101. Aquatic habitat at the Redwood Creek crossing includes alders and willows.

Segment R5: The Project will be installed overhead on existing poles along Highway 101 for about 0.6 mile before continuing overhead, south on the existing PG&E 60-kV transmission line poles, staying northeast of Freshwater Lagoon and following the old highway around Stone Lagoon, then paralleling Highway 101 to Big Lagoon. At Big Lagoon, the PG&E transmission line follows the old A-line railroad grade across GDR land, closely paralleling and mostly adjacent to the Hammond Truck Road. The route, continuing overhead on the PG&E line, then turns southeast, away from the truck road, and reaches Humboldt County's Murray Road near Fieldbrook. The route then leaves the transmission line, following Murray Road overhead and underground west and south into McKinleyville, turning south overhead on Central Avenue, and ending at 1555 Railroad Drive in a short underground portion to the AT&T central office in McKinleyville.

Most of this segment (88 percent) will be installed on existing poles with minimal or no ground disturbance. The remaining 12 percent will be installed in roadside ditches by trenching or by directional drilling. Where the Project encounters culverts, the fiber optic line will be installed by directional drilling underneath the culverts. Using existing utility poles and installing the

[21] National Park Service. ND. Lynne Mager. The Bald Hills. Secret Spaces.

fiber optic cable overhead, or directionally drilling under culverts, will avoid impacts on the perennial streams and their associated wetlands, which are vegetated with alders and willows. Vegetation along Murray Road includes young forest stands, pasture, farmland, and rural residence yards and gardens.

Orick Tower

The Orick Tower is proposed for construction in agricultural land, adjacent to a barn and driveway. Surrounding vegetation is grass. Domestic cattle are the predominant animal life.

Yurok Signal Connection

The Antenna Ridge component of the Yurok Signal Connection will be built on a rocky ridge with adjacent scattered *Ceanothus* and *Arctostaphylos* shrubs.

3.4.2.2 Special Status Species

Study Area

The Direct Impact Area (DIA) is an area 10 feet on either side of the proposed centerline for the Project, as there will be no ground or vegetation disturbance further away from the line than that distance. The Indirect Impact Area (IIA) varies by species (depending on the species' sensitivity to construction noise, light, dust, etc.) and may extend up to a half-mile mile on either side of the centerline. Because there are species that may be disturbed by construction even if the species is located well away from the DIA, the full study area, or Biological Assessment Area (BAA), was defined as a half-mile area on either side of the proposed centerline for the KRRBI fiber optic line, plus a half-mile area on either side of Alternative 5.

Literature and Database Review

The study included special status animals and plants within Humboldt Count. The study for wildlife began with the list published periodically by the California Department of Fish and Wildlife—the Special Animals List[22]. This list of species was reviewed, and species outside the influence area of the Project, or with no habitat in the Project area, were eliminated from consideration. This resulted in a list of special status species with suitable habitat potentially present in the BAA.

The definition of "special status species" is found in the California Natural Diversity Database (CNDDB) publications referenced above, is used as specified in those publications, and is incorporated herein by reference.

On June 8, 2016, the CNDDB was queried for recorded instances of special status animal and plant species on quadrant maps that are crossed by this Project. The CNDDB provides "location and natural history information on special status plants, animals, and natural

[22] California Department of Fish and Wildlife, Natural Diversity Database. April 2016. Special Animals List. Periodic publication.

communities to the public, other agencies, and conservation organizations[23]." The CNDDB also states "Records in the database exist only where species were detected. This means there is a bias in the database towards locations that have had more development pressures, and thus more survey work.[24]"

On December 9, 2016, and again on March 7, 2020, the CNDDB database was queried for recorded instances of special status animal and plant species on quadrant maps crossed by the DNR spur in Segment 1 and by the Yurok Signal Connection on Orleans Mountain and Antenna Ridge.

Results are returned from the CNDDB by 24,000-scale topographic quadrant maps, as refined by the BAA. Table 3.4-1 shows quadrants returning results by segment and includes results for Alternative 5. Alternative 5 is further discussed in Section 4.

Table 3.4-1. Quadrants Returning Results by Segment

Segment 1	Orleans, Weitchpec, Hopkins Butte, and Fish Lake
Segment 1 DNR Spur	Orleans
Yurok Signal Connection	Orleans Mountain
Segment 2	Weitchpec, Johnsons, and French Camp Ridge
Segment 3	Weitchpec, French Camp Ridge, and Bald Hills
Segment 4	Bald Hills, Johnsons, Orick, Holter Ridge, and Rodgers Peak
Segment R5 and Alternative 5	Orick, Rodgers Peak, Bald Hills, Crannell, Trinidad, Arcata North, and Fern Canyon

The query is conducted by overlaying the BAA on the GIS database. That database represents species presence by polygons of varying sizes, depending on the reliability of the data and the species. A species presence is returned if its polygon is overlapped by the BAA, even though the species' sighting might have been outside the BAA.

The query does not return information on the northern spotted owl (NSO) or marbled murrelet (*Brachyramphus marmoratus*) in the list with all other species. Instead, NSO and marbled murrelet survey information is provided in separate sets of tables. The Forest Service, Yurok Tribe, GDR, and the NPS all survey annually for NSO in the Project area. The most recent available data filed with the CNDDB were reviewed for this report.

The results from the CNDDB search, results from other searches known to the author from the general area, and the refined list from the initial CDFW lists were all reviewed. Species without suitable habitat along the proposed Project route were dismissed. Species were also eliminated if they occupy a habitat type that is technically within the BAA but not at all impacted by the Project. For example, Segment R5 travels near and parallel to Highway 101. Within half a mile of the centerline, there are rocky coastline or outer dune habitats, but the Project will not have

[23] California Department of Fish and Wildlife, Natural Diversity Database. 2016. California Natural Diversity Database Info (accessed 7/2/2016, 12/9/2016, and 3/7/2020) at: http://www.dfg.ca.gov/biogeodata/cnddb/cnddb_info.asp,

[24] California Department of Fish and Wildlife. 2016. CNDDB Quick Facts. Electronic version available online (accessed July 2, 2016) at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=43527&inline=1

any impact on those habitats and species using those habitats were eliminated from consideration.

Results

Table 3.4-2 shows a summary of the results of the CNDDB search with additional species known to the author with presence in the BAA. Full discussion is found in Appendix B, Biology Report. The updated CNDDB search results (maps and tables, March 2020) are provided under separate cover as a supplement to Appendix B. Table 3.4-2 provides the species common and scientific names, global and state ranking for imperilment, and listing where appropriate as federally or state-listed species under the respective endangered species acts. Designations from the California Native Plant Society are listed in addition for native plants. Global and state imperilment estimates are represented by codes as shown below. Global ratings ("G") are further detailed where a subspecies or variety requires a separate rating and is represented by a secondary T code that follows this same ranking. State codes ("S") apply only to the species within California. A species may be relatively secure globally but very rare and imperiled where it exists in California, so global and state ratings may be dramatically different.

Global and State Rank Codes:

- 1 Critically Imperiled
- 2 Imperiled
- 3 Vulnerable
- 4 Apparently Secure
- 5 Secure

Abbreviations under the federal and state ESAs are: E = listed as endangered, T = listed as threatened, C = candidate for listing under that ESA. Abbreviations in the California (CA) special status column include those used in the CSSC, where W = CDFW Watch List, S = CDFW Sensitive List, FP = CDFW fully protected, and CSSC = other list within the CSSC list.

The following alphanumeric codes are the California Native Plant Society List, California Rare Plant Ranks (CRPR):

- 1A Presumed extirpated in California and either rare or extinct elsewhere
- 1B Rare or Endangered in California and elsewhere
- 2A Presumed extirpated in California, but more common elsewhere
- 2B Rare or endangered in California, but more common elsewhere
- 3 Plants for which more information is needed – Review List
- 4 Plants of limited distribution – Watch List

The CRPR use a decimal-style threat rank. The threat rank is an extension added onto the CRPR and designates the level of threats by a 1 to 3 ranking with 1 being the most threatened and 3 being the least threatened.

Table 3.4-2 is a summary of all the species reviews conducted for this Project. Details for each of the habitats crossed or nearby and the species considered can be found in the Biology Report, provided as Appendix B to this report. Animal species are listed in taxonomic order while plant species are alphabetical by scientific name. Where there is a possible impact shown to the species, proposed mitigation measures are also listed, including but not limited to BMPs for sedimentation control. The Comments column provides brief rationale for determinations of potential effect, which is provided in greater detail in the Biology Report.

Table 3.4-2. Species Identified or with Habitat within a Half-mile Buffer on KRRBI Centerline

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA/ CNPS	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
BIRDS												
RUGR	Ruffed grouse	*Bonasa umbellus*	G5	S3S4	N	N	W	2	N	Y	N	Woods; no effect.
FTSP	Fork-tailed storm petrel	*Oceanodroma furcata*	G5	S1	N	N	CSSC	none	N	N	N	Dismiss. No habitat in IIA.
DCCO	Double-crested Cormorant	*Phalacrocorax auritus*	G5	S4	N	N	W	none	N	N	N	Dismiss. No nesting habitat in IIA, no effect.
GBHE	Great Blue Heron	*Ardea herodias*	G5	S3	N	N	S	1, 4	N	N	N	Found along Klamath, Redwood Creek. No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
BCNH	Black-crowned Night Heron	*Nycticorax nycticorax*	G5	S4	N	N		4	N	N	N	Dismiss. Behind Orick Hill, no impact.
CACO	California Condor	*Gymnogyps californianus*	G1	S1	E	E		none	N	Y	N	No presence. Yurok Tribe planning eventual re-introduction.
COHA	Cooper's Hawk	*Accipiter cooperii*					W	none	N	Y	N	No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
NOGO	Northern Goshawk	*Accipiter gentilis*	G4	S3	N	N		1	N	Y	N	Found higher in Slate Creek, Bluff Creek drainages. No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
SSHA	Sharp-shinned Hawk	*Accipiter striatus*					W	none	N	Y	N	No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
GOEA	Golden Eagle	*Aquila chrysaetos*	G5	S3	N	N	FP	none	N	Y	N	No effect. Very unlikely to nest within 0.25 miles due to current disturbance levels.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
NOHA	Northern Harrier	*Circus cyaneus*	G5	S3	N	N	CSSC	none	N	Y	N	No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
WTKI	White-tailed Kite	*Elanus leucurus*	G5	S3S4	N	N	FP	none	N	Y	N	No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
BAEA	Bald Eagle	*Haliaeetus leucocephalus*	G5	S3	D	E	FP	1,2,4	N	Y	N	No effect. Construction activity similar to existing disturbance levels
OSPR	Osprey	*Pandion haliaetus*	G5	S4	N	N	W	1-R5, Alt5	N	Y	N	No effect. Common along Klamath River; construction activity similar to existing disturbance levels.
SNPL	Snowy Plover	*charadrius alexandrinus nivosus*	G2G3	S2S3	T	N	CSSC	R5	N	N	N	Dismiss. No habitat in IIA.
MAMU	Marbled Murrelet	*Brachyramphus marmoratus*	G4	S1	T	T		3,4,R5, Alt5	N	Y	M	Seasonal restrictions for old-growth murrelet habitat, within portions of the RNP.
RHAU	Rhinoceros Auklet	*cerorhinca monocerata*	G5	S3	N	N	W	none	N	N	N	Dismiss. No habitat in IIA.
TUPU	Tufted Puffin	*Fratercula cirrhata*	G5	S1S2	N	N	CSSC	none	N	N	N	Dismiss. No habitat in IIA.
NSO	Northern Spotted Owl	*Strix occidentalis*	G3T3	S2S3	T	N	CSSC	1-R5, Alt5	N	Y	M	Seasonal restrictions in RNP adjacent to suitable habitat. No active nests within 0.25 mile of Project area per 2020 CNDDB data.
VASW	Vaux's Swift	*Chaetura vauxi*	G5	S2S3	N	N	CSSC	none	N	Y	N	Dismiss. Ample habitat available.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
BLSW	Black Swift	*Cypseloides niger*	G4	S2	N	N	CSSC	1	N	N	N	Dismiss. Extremely rare record in Humboldt County.
PEFA	Peregrine Falcon	*Falco peregrinus*	G4T4	S3S4	D	N	FP	none	N	Y	N	No effect. Historical presence near Segment 1 and Yurok Signal Connection. Unlikely to nest adjacent to proposed route or Orleans Lookout due to current disturbance levels.
OSFL	Olive-sided Flycatcher	*Contopus cooperi*	G4	S4	N	N	CSSC	none	N	Y	N	No effect. Habitat in conifer forests with openings.
WIFL	Willow Flycatcher	*Empidonax traillii*	G5T3T4	S1S2	N	E		none	Y	Y	M	Seasonal restrictions in RNP. Directional drill to avoid Seg 4 Redwood Creek riparian.
PUMA	Purple Martin	*Progne subis*	G5	S3	N	N	CSSC	none	N	Y	N	No effect. Habituated to human presence.
BANS	Bank Swallow	*Riparia riparia*	G5	S2	N	T		none	N	Y	N	Dismiss. SW of Orick, nesting colony at distance from Project.
YBCH	Yellow-breasted Chat	*Icteria virens*	G5	S3	N	N	CSSC	none	Y	Y	M	Common species along rivers, riparian nester; Any nests in DIA discovered during Project construction buffered until fledged.
YWAR	Yellow Warbler	*Dendroica petechia*	G5	S4	N	N	CSSC	none	Y	Y	M	Riparian canopy nester; removed from construction activities. Any nests discovered during Project construction in DIA buffered until fledged.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
GRSP	Grasshopper Sparrow	*Ammodramus savannarum*	G5	S3	N	N	CSSC	none	N	Y	N	Grassland along Bald Hills, Any nests discovered during Project construction in DIA buffered until fledged.
MAMMALS												
APRU	Humboldt mountain beaver	*Aplodontia rufa var. humboldtiana*	G5TNR	SNR	N	N	None	R5	N	Y	N	Overhead attachment to existing poles, No effect. Habituated to human presence.
ERDO	North American porcupine	*Erethizon dorsatum*	G5	S3	N	N	None	R5	N	Y	N	Abundant forested habitat, historic sighting (1960).
PABA	Pallid bat	*Antrozous pallidus*	G5	S3	N	N	CSSC	3,4	Y	Y	M	Bat roost avoidance during construction of bridge hangs.
TBEB	Townsend's big-eared bat	*Corynorhinus townsendii*	G3G4	S2	N	N	CSSC	none	Y	Y	M	Bat roost avoidance during construction of bridge hangs.
SHBA	Silver-haired bat	*Lasionycteris noctivagans*	G5	S3S4	N	N		3,4	N	N	N	No effect. Forest rooster.
YUMY	Yuma myotis	*Myotis yumanensis*	G5	S4	N	N		4	Y	Y	M	Bat roost avoidance during construction of bridge hangs.
WFVO	White-footed vole	*Arborimus albipes*	G3G4	S2	N	N	CSSC	none	N	N	N	Dismiss. No habitat in IIA.
STVO	Sonoma tree vole	*Arborimus pomo*	G3	S3	N	N	CSSC	3-4, Alt5	N	N	N	Dismiss. Arboreal, Douglas-fir habitat abundant, no habitat in IIA.
HUMA	Humboldt marten	*Martes caurina humboldtensis*	G5T1	S1	N	C	CSSC	none	N	N	N	No impact. Known near Johnson's, very rare species, possible dispersal habitat use at night.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
MYEV	Long-eared myotis	*Myotis evotis*	G5	S3	N	N	None	R5	N	N	N	No roosting habitat nearby, overhead construction.
PAFI	Pacific fisher	*Pekania pennanti*	G5T2T3	S2S3	N	N	CSSC	1-R5, Alt5	N	N	N	No effect. Well distributed throughout the nearby forested habitat.
REPTILES AND AMPHIBIANS												
STSA	Southern torrent salamander	*Rhyacotriton variegatus*	G3G4	S2S3	N	N	CSSC	2-R5, Alt5	N	Y	M	BMPs to limit sedimentation.
DNSA	Del Norte salamander	*Plethodon elongatus*	G4	S3	N	N	CSSC	1	N	Y	M	BMPs to limit sedimentation.
NRLF	Northern red-legged frog	*Rana aurora*	G4	S3	N	N	CSSC	2-R5, Alt5	N	Y	M	BMPs to limit sedimentation.
FYLF	Foothill yellow-legged frog	*Rana boylii*	G3	S3	N	N	CSSC	1, 4, R5	N	Y	M	BMPs to limit sedimentation.
PTFR	Pacific tailed frog	*Ascaphus truei*	F4	S3S4	N	N	CSSC	R5, Alt5	N	Y	M	BMPs to limit sedimentation.
WPTU	Western pond turtle	*Clemmys marmorata*	G3	S4S3	N	N		none	N	N	N	Dismiss. Banks of rivers, easy dispersal.
FISH												
CCTR	Coast cutthroat trout	*Oncorhynchus clarkii clarkii*	G4T4	S3	N	N	CSSC	2-R5, Alt5	N	Y	M	BMPs to limit sedimentation.
SONCC	Chinook salmon	*Oncorhynchus tshawytscha*	G4T1	S2	T	N		1	N	Y	M	BMPs to limit sedimentation.
CCTS	Coho salmon	*Oncorhynchus kisutch*	G4T1	S2	T	N		none	N	Y	M	BMPs to limit sedimentation.
NCST	North Coast steelhead	*Oncorhynchus mykiss*	G5T2	S2S3	T	N		none	N	Y	M	BMPs to limit sedimentation.
EULA	Eulachon	*Thaleichthys pacificus*	G5	S3	T	N		4, R5, Alt5	N	N	M	BMPs to limit sedimentation.
LOSM	Longfin smelt	*Spirinchus thaleichthys*	G5	S1	C	T		R5	N	N	N	Dismiss. No habitat in IIA.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
TIGO	Tidewater goby	*Eucyclogobius newberri*	G3	S3	E	N	CSSC	R5	N	N	N	Dismiss. No habitat in IIA.
INVERTEBRATES												
WEPE	Western pearlshell	*Margaritifera falcata*	G4G5	S1S2	N	N		1, R5	N	Y	M	In Klamath River, Little River; BMPs to limit sedimentation
HOLA	Hooded lancetooth	*Ancotrema voyanum*	G1G2	S1S2	N	N		1	N	Y	M	Red Cap Gulch: BMPs to limit sedimentation.
ORSH	Oregon shoulderband	*Helminthoglypta hertleini*	G1	S1	N	N		1	N	Y	M	Klamath River; BMPs to limit sedimentation.
TRSH	Trinity shoulderband	*Helminthoglypta talmadgei*	G2	S2	N	N		1	N	Y	M	Camp Creek; BMPs to limit sedimentation.
JUOR	Redwood juga	*Juga orickensis*	G2	S1S2	N	N		4, R5, Alt5	N	N	N	In downtown Orick, overhead install; BMPs to limit sedimentation.
BSBU	Behren's silverspot butterfly	*Speyeria zerene behrensii*	G5T1	S1	E	N		4, R5, Alt5	N	N	N	Dismiss. Extirpated; recorded 1975 vicinity of Orick, currently now only found in Mendocino, CA.
OBBE	Obscure bumble bee	*Bombus caliginosus*	G4?	S1S2	N	N		4, R5, Alt5	Y	Y	N	No adverse effect. Mobile while foraging; minor vegetation removal.
WBBE	Western bumble bee	*Bombus occidentalis*	G2G3	S1	N	N		1, 2, 4, R5, Alt5	Y	Y	N	No adverse effect. Mobile while foraging; minor vegetation removal.
SCBB	Suckley's bumble bee	*Bombus Suckleyi*	GU	S1	N	N		1	Y	Y	N	No adverse effect. Mobile while foraging; minor vegetation removal.
PLANTS												
ABUM	Pink Sand Verbena	*Abronia umbellata breviflora*	G4G5T2	S1	N	N	1B.1	R5	N	na	N	Dismiss. No habitat impact in DIA.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
ASUM	Bald Mountain vetch	*Astragalus umbraticus*	G3	S2	N	N	2B.3	2, 3	Y	na	N	No impact. Occasional roadside.
CAAM	Humboldt Bay owl's clover	*Castilleja ambigua humboldtiensis*	G4T2	S2	N	N	1B.2	R5	N	na	N	Dismiss. No coastal marshes and swamp habitat in DIA.
CAAN	Seaside bittercress	*Cardamine angulata*	G4G5	S3	N	N	2B.2	R5	N	na	N	Dismiss. No habitat in DIA.
CAAR	Northern clustered sedge	*Carex arcta*	G5	S1	N	N	2B.2	R5	N	na	M	Avoid wetlands by overhead installation or directional drilling.
CALE (1)	Lagoon sedge	*Carex lenticularis limnophila*	G5T5	S1	N	N	2B.2	R5	N	na	N	Dismiss. No bog, marsh, gravelly beach or shoreline habitat in DIA.
CALE (2)	Bristle stalked sedge	*Carex leptalea*	G5	S1	N	N	2B.2	R5, Alt5	Y	na	M	Avoid wetlands by overhead installation or directional drilling.
CALI	Oregon coast paintbrush	*Castilleja litoralis*	G3	S3	N	N	2B.2	R5	N	na	N	Dismiss. No sandy coastal bluff scrub habitat in DIA.
CALY	Lyngbye's sedge	*Carex lyngbyei*	G5	S3	N	N	2B.2	none	N	na	N	Dismiss. No coastal salt marsh habitat in DIA.
CAME	Mendocino coast paintbrush	*Castilleja mendocinensis*	G2	S2	N	N	1B.2	none	N	na	N	Dismiss. Outside of Project area along PP State Park bluffs. No coastal scrub habitat impact in DIA.
CAPR	Northern meadow sedge	*Carex praticola*	G5	S2	N	N	2B.2	4	Y	na	M	Avoid wetlands by overhead installation or directional drilling.
CASA	Deceiving sedge	*Carex saliniformis*	G2	S2	N	N	1B.2	R5	Y	na	M	Coastal prairies, scrub, marshes, swamps; Humboldt Lagoons SP. Avoid wetlands by overhead installation or directional drilling.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
CAVI	Green-yellow sedge	*Carex viridula viridula*	G5T5	S2	N	N	2B.3	R5	Y	na	M	Freshwater swamps and bogs. Avoid wetlands by overhead installation or directional drilling.
COLA	Oregon goldthread	*Coptis laciniata*	G3	S3	N	N	4.2	3	N	na	N	No impact. Closed canopy/wet soils species; impact not expected in open areas of the proposed route.
DINU	Naked flag moss	*Discelium nudum*	G4G5	S1	N	N	2B.2	R5	N	na	N	Dismiss. No coastal bluff scrub or unstable silt banks of rivers habitat in DIA.
EMNI	Black crowberry	*Empetrum nigrum*	G5	S1?	N	N	2B.2	R5	N	na	N	Dismiss. No coastal habitat in DIA.
ERBL	Waldo daisy	*Erigeron bloomeria nudatus*	G5T4	S3	N	N	2B.3	R5	N	na	N	Dismiss. No serpentine slopes and meadows habitat in DIA.
ERRE	Coast fawn lily	*Erythronium revolutum*	G4G5	S3	N	N	2B.2	1, 2, 3	N	na	N	Dismiss. Recorded on GDR lands 2005/2006; unlikely to be in roadside ditches; no habitat in DIA.
GICA	Pacific gilia	*Gilia capitata pacifica*	G5T3	S2	N	N	1B.2	R5	N	na	N	Dismiss. No coastal bluff and prairies habitat in DIA.
GIMI	Dark-eyed gilia	*Gilia milefoliata*	G2	S2	N	N	1B.2	R5, Alt5	N	na	N	Dismiss. No habitat along Crannell or Dows Prairie Road in DIA.
JUDU	Dudley's rush	*Juncus dudleyi*	G5	S1	N	N	2B.3	1	N	na	M	Orleans area; moist stream banks, ditches, around springs; overhead install past Camp Creek. Avoid wetlands by overhead installation or directional drilling.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
JUNE	Sierra rush	*Juncus nevadensis inventus*	G5T3T4	S1	N	N	2B.2	R5	N	na	N	Dismiss. No coastal habitat in DIA.
KOHO	Small groundcone	*Kopsiopsis hookeri*	G4?	S1S2	N	N	2B.3	1	N	na	N	No population impact. Parasitic on common salal and huckleberry, abundant outside DIA.
LACA	Beach layia	*Layia carnosa*	G2	S2	E	E	1B.1	R5	N	na	N	Dismiss. No coastal dunes habitat in DIA.
LAJA	Seaside pea	*Lathyrus japonicus*	G5	S2	N	N	2B.1	R5	N	na	N	Dismiss. No seashore habitat in DIA.
LAPA	Marsh pea	*Lathyrus palustris*	G5	S2	N	N	2B.2	R5	N	na	N	Dismiss. No shoreline habitat in DIA.
LECO	Heckner's lewisia	*Lewisia cotyledon var heckneri*	G4T3	S3	N	N	1B.2	1, 2	N	na	N	Dismiss. NO shady north slope rocky slopes and cliffs habitat in DIA.
LIOC	Western lily	*Lilium occidentale*	G1	S1	E	E	1B.1	Alt 5	Y	na	N	No impact to roadside vegetation as this is overhead installation in Dows Prairie and Crannell Road.
LLLA	California globe mallow	*Iliamna latibracteata*	G2G3	S2	N	N	1B.2	3, 4	Y	na	M	Prefers mesic areas. Avoid wetlands by overhead installation or directional drilling.
LYCL	Running pine	*Lycopodium clavatum*	G5	S3	N	N	4.1	R5	Y	na	N	Recolonizes readily after disturbance. No mitigation needed.
MOHO	Howell's montia	*Montia howelii*	G3G4	S2	N	N	2B.2	1, 2, 4	Y	na	N	Disturbance-accommodating species. No mitigation needed.
MOUN (1)	Woodnymph	*Moneses uniflora*	G5	S3	N	N	2B.2	R5	N	na	N	No impact. Not a disturbed habitat species, overhead installation on Central Avenue.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
MOUN (2)	Ghost-pipe	*Montropa uniflora*	G5	S2	N	N	2B.2	4	N	na	N	No impact. Not a roadside species. Found along Bald Hills Road in old-growth Redwood forest.
OEWO	Wolf's evening primrose	*Oenothera wolfii*	G2	S1	N	N	1B.1	1 (maybe), Alt5	N	na	N	No impact. Unlikely to be present in road shoulders, reported on Freshwater Lagoon Spit.
PLRE	Nodding semaphore grass	*Pleuropogon refractus*	G4	S4	N	N	4.2	none	N	na	N	Known above Freshwater Lagoon, near but not along R5. Avoid wetlands by overhead installation or directional drilling.
PICA	White flowered rein orchid	*Piperia candida*	G3	S3	N	N	1B.2	1, 2	N	na	N	No impact. Not a disturbed habitat species, unlikely along roadside.
POCA	Oregon polemonium	*Polemonium carneum*	G3G4	S2	N	N	2B.2	R5	N	na	N	NO impact. Unlikely to be present. 1930s report south end of Big Lagoon.
ROCO	Columbia yellow cress	*Rorippa columbiae*	G3	S1	N	N	1B.2	1	N	na	N	Dismiss. 1956 reference in Camp Creek. No impact from overhead installation.
ROTR	Tracy's mistmaiden	*Romanzoffia tracyi*	G4	S2	N	N	2B.3	R5	N	na	N	Dismiss. Along coast outside of IIA.
SATR	Tracy's sanicle	*Sanicula tracyi*	G4	S4	N	N	4.2	3	N	na	N	No impact. 1929 record in Wiregrass area along Bald Hills Rd.
SIMA	Siskiyou checkerbloom	*Sidalcea malviflora patula*	G5T2	S2	N	N	1B.2	3, 4, historic south of R5	Y	na	M	Roadcut rare species. Avoid road cut during installation.
SIOR	Coast checkerbloom	*Sidalcea oregana eximia*	G4G5	S3	N	N	2B.2	1	Y	na	M	Roadcut rare species. Avoid road cut during installation.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments Present	Likely Habitat in DIA	Likely Habitat in IIA	Possible Adverse Impact	Comment
SISC	Scouler's catchfly	*Silene scouleri scouleri*	G5T4T5	S2S3	N	N	2B.2	R5	N	na	N	N. end of Freshwater Lagoon, no habitat in DIA, historic (1937).
THRO	Robust false lupine	*Thermopsis robusta*	G2	S2	N	N	1B.2	2	Y	na	Y	Project will not provide additional impact over routine road maintenance.
TRCY	Cylindrical trichodon	*Trichodon cylindricus*	G4	S2	N	N	2B.2	R5	Y	na	Y	Roadcut rare species found near R5 between Trinidad and PP State Pk along 101 N of Big Lagoon. Avoid road cut during installation.
VIPA	Alpine marsh violet	*Viola palustris*	G5	S1S2	N	N	2B.2	R5	N	na	N	Big Lagoon Rancheria area. Wet areas will be avoided by overhead installation or directional drilling.

3.4.3 CEQA Checklist Criteria for Potential Impacts

BIOLOGICAL RESOURCES: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service, or NOAA Fisheries?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

3.4.4 Analysis of Potential Impact

3.4.4.1 Habitat and Vegetation

The Project will not adversely affect wetlands or other aquatic habitats because it will avoid impacts to those habitats through overhead installation, bridge hanging, or directional drilling. The Project will not adversely affect terrestrial habitats because the fiber optic cables will be installed in or along existing roads that do not contribute to those habitats, or they will be attached to existing overhead power and communication poles that are not along existing roads. Vegetation removal for fiber optic installation will mimic or replicate the periodic removal conducted by road maintenance crews on state highways and county roads and by PG&E ROW maintenance crews along the 60-kV transmission line south of Orick. Vegetation that thrives along roadsides readily recolonizes disturbed areas, and no long-term adverse effects are anticipated.

Installation of the hut and tower at Antenna Ridge will not disturb vegetation because it will be conducted on rock.

Roadsides and utility ROWs are also typically weed-infested. EPMs WEED-1, WEED-2, and WEED-3 all help prevent the spread of weeds from one area to another and avoid introducing new weeds with the construction equipment, while EPM REC-1 requires full cleanup after

construction. These measures will avoid the introduction of new weed species and will limit the spread of existing species.

The Project plans to avoid all wetlands by either overhead installation on existing or new poles, by bridge hangs over aquatic habitats, or by directional drilling. If any permanent wetland impacts are anticipated, EPMs WET-1 and WET-2 would apply. These measures require the Project to conduct wetland delineations and to develop site-specific crossing plans and measures to mitigate impacts where appropriate, and specifies that the Karuk Tribe will obtain all needed permits prior to construction in wetlands.

3.4.4.2 Animals

This Project will not affect individuals or lead toward federal or state listing or loss of viability of these species. In general, the Project will avoid adverse impacts on animal species by installation in or along roads, which most species avoid or are habituated to. EPM BIO-1 will protect the nests of migratory birds found in vegetation planned for removal during breeding season by means of a preconstruction survey and avoidance of vegetation removal until the birds have fledged their young. This measure protects all migratory birds, including those in Table 3.4-2, above, such as yellow-breasted chat or yellow warbler. Therefore, there will be no adverse impacts on any migratory birds.

There are several species where the indirect effects of noise could be an adverse effect if construction were to be conducted during breeding season and nesting birds were to be present within audible range of the construction. Those species are shown in Table 3.4-2 as needing the additional avoidance mechanism of limited operating seasons. EPM BIO-2 specifies that limited operating periods imposed by RNP and GDR to protect bird species, especially marbled murrelets and NSO, will be followed. Although there are no known active NSO nests within 0.25 mile of the Project, including Yurok Signal Connection, EPM BIO-3 specifies that data acquired by routine NSO surveys (conducted by land managing agencies and companies) from the season prior to construction will be examined to determine if new NSO nests have been established within 0.25 mile of the Project centerline or ancillary facilities. If so, the nests will be buffered by 0.25 mile, and no disturbance will be allowed until the young have fledged or the nest is abandoned.

The wetland area along Redwood Creek at the intersection of Bald Hills Road and Highway 101 will be avoided by a directional drill, thus protecting nesting birds (including listed species) from adverse effects of noise, if any are present there (EPM G-4).

While it is unlikely that any bats roost under the various bridges proposed for bridge hangs, EPM BIO-5 specifies a pre-construction survey for listed species of bats under the bridges. If there are maternal colonies of any bat species, the bridge hang will not be conducted until after the young have been weaned.

Listed water-dependent species, including fish, invertebrates, amphibians, and reptiles not present in the DIA, will be protected from the adverse effects of sedimentation by control of erosion and sedimentation (WATER-2). See Section 3.8.4.1 for further discussion of control of erosion and sedimentation.

3.4.4.3 Plants

The Project would have virtually no impact on vegetation, and one of the Project EPMs is to limit vegetation removal to the minimum necessary to allow for safe and complete installation (SOIL-1). Where the fiber optic cable will be installed overhead on existing poles, the existing utilities periodically trim overhanging or intruding vegetation to avoid power or communication outages during winter storms or tree failures. In order to install an additional cable on these poles, some trimming would be necessary for worker safety during installation. Further maintenance trimming would be handled by PG&E, the incumbent communications provider, or the KRRBI maintenance team as needed. Where the fiber optic cable will be installed on new overhead poles to avoid impacts to wetlands, some overhanging or intruding vegetation will be trimmed to avoid damaging the fiber optic line during winter storms. Vegetation will be cleared in an area about 3 feet in diameter to install the poles.

Where the fiber optic line will be installed in the road shoulder or ditch, some vegetation will be removed. This vegetation is also annually mowed or dug out of the ditches to maintain the integrity of the road drainage system on state highways (Highways 96, 169, and 101) and periodically removed from the ditches for the same reason on Humboldt county roads. Installation of the fiber optic cable will disturb the roadside vegetation in much the same way as routine road maintenance. The Karuk Tribe anticipates that the vegetation common to the roadside ditches will rapidly recolonize the installation area as it does after ditch maintenance.

Damage to old-growth redwood roots will be avoided by directionally drilling beneath them where needed within RNP (BIO-4). Redwood tree roots are relatively shallow, but extend horizontally several feet from the tree. Where specified by RNP staff, the Project will be designed to directionally drill at least 6 feet, or the distance specified by the RNP staff, where feasible, below the roots of specific old-growth redwoods that are found immediately adjacent to Bald Hills Road in the last 2 miles before its intersection with Highway 101. Listed wetland plants will be avoided by avoiding permanent impacts to wetlands (G-5) or by a specific plan for wetland restoration after construction (WET-2). Roadside road-cut rare species will be avoided because the installation method will not disturb the road cuts. For species that may be found in ditches, the installation method is no different from routine ditch and road maintenance that has occurred and will continue to occur in these areas. If the species has recolonized after road maintenance, it will also recolonize after fiber optic cable installation.

For the installation of the Orick Tower, pasture vegetation may be permanently removed if the tower is placed in pastureland. Pasture vegetation is introduced grasses and forbs, including

invasive species like Himalaya berry, and provides habitat principally for cattle. The proposed tower location is immediately adjacent to the barn where animals have been corralled in the past and where substantial vehicle and pedestrian traffic have compacted the soil and reduced the vegetation cover. About ¼ acre of vegetation may be replaced by a leveled graveled yard containing the tower, the hut, and a small parking area as well as the propane tank and generator. The pasture vegetation impact will be minimized by restricting the fenced area to the minimum needed for the tower. The removal of this small area, already outside the area managed for pasture, will have negligible impact on the larger pasture area.

3.5 Cultural Resources and Tribal Cultural Resources

3.5.1 Regulatory Setting

The Karuk and Yurok Tribes are proposing this Project within their respective ancestral territories with the explicit intent of improving living and working conditions for tribal and nontribal members of the communities in those territories. Each proposed ground-disturbing activity has been reviewed by the Tribes for impacts to cultural resources, including tribal cultural resources, before being proposed as part of this Project description. For the Tribes, protection of cultural resources includes Tribal cultural resources as a matter of course and of tribal policy.

Laws for the protection of cultural resources include federal and state laws. The principal federal law is the National Historic Preservation Act (NHPA).

3.5.1.1 National Historic Preservation Act of 1966, as amended (16 USC 479)

Section 106 of the NHPA established the National Register of Historic Places (NRHP), which is a list of historic properties of national, state, and local significance. Under Section 106, agencies are required to consider the effects of their actions on properties that may be eligible for or are listed in the NRHP.

3.5.1.2 National Environmental Policy Act

The National Environmental Policy Act of 1969, as amended, requires analysis of potential environmental impacts to important historic, cultural, and natural aspects of our national heritage (United State Code, section 4321, *et seq.*; 40 Code of Federal Regulations (CFR), section 1502.25).

3.5.1.3 California Environmental Quality Act

The California Environmental Quality Act of 1970, as amended, requires analysis of potential environmental impacts to historical resources, which includes prehistoric and historic resources. The Act states "A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the

environment." (14 CCR 15064.5 (b). California Assembly Bill 52 recently added Tribal Historical Resources to resources required for consideration.

3.5.2 Environmental Setting

3.5.2.1 Area of Potential Effect

Study Area

The study area, for the purposes of literature review, identification of previous surveys and recorded sites, and review of the tribal databases, includes lands comprising the immediate Project area and adjacent areas to a distance of 0.5 mile on either side of the centerline of the KRRBI proposed route and 0.5 mile on either side of the alternative alignments (termed Study Area). The Study Area also includes a 0.5-mile radius circle around components of the Yurok Signal Connection.

Area of Potential Effect (APE) for Direct Effects

The APE, and therefore the survey width, varies depending on the install method (listed below), and is intended to define the area of pedestrian survey, where recent satisfactory prior surveys have not been conducted:

- Install on existing poles: a circle 10 meters in radius centered on the pole.
- Install on new poles: survey a 20-meter circle around the existing poles that support the existing overhead crossing, because new poles will be installed immediately adjacent.
- Underground install (trenching, plowing, or directional drill): The equipment and field personnel will be restricted to the road shoulder itself. There will be no disturbance beyond the shoulder or ditch. Trenching will be to a depth of 42 inches below the bottom of the ditch, and directional drilling will be at least 12 inches and up to 36 inches below resource concerns like culverts. This possible disturbance area is entirely encompassed by a 10-meter swath from the edge of the traveled roadway (edge of pavement where road is paved, or edge of gravel or other surface where road is not paved). Pedestrian survey will be conducted on both sides of the road.
- Bridge hang: Survey a 10-meter-wide circle centered on the bridge abutment or bridge anchor point where terrain permits (35 percent slope or gentler) on each side of the bridge.
- Antenna Ridge, Yurok Signal Connection: 20-meter-diameter circle centered on the existing antennas.

APE for Indirect Effects

To provide for adequate consideration and evaluation of the indirect auditory and visual impacts that could occur during construction and the possible indirect visual impacts from standard utility markers used to indicate underground installations, an APE for indirect effects

of 0.5 mile on either side of the centerline of the Project will be used where known resources require such consideration. This will include areas within RNP and other areas that may be considered based on the results of the literature review and tribal consultation. Pedestrian surveys will be confined to the direct APE.

3.5.2.2 Cultural Resources Records Search

The cultural resources research and field studies were divided into those conducted by the Karuk Tribe in Karuk ancestral territory and those authorized by the Yurok Tribe in Yurok ancestral territory. For the purposes of this Project alone, and without making any claims for either Tribe, the area included in the Karuk ancestral territory study includes all of Segment 1 from Orleans to MP 26.5 on Highway 96, about 12.5 miles southwest of Orleans. The area included in the Yurok ancestral territory study includes a portion of Segment 1, starting at MP 29.9 on Highway 96, about 8 miles downriver of Orleans, and all of Segments 2 through R5 as far as Little River. From Little River south to the AT&T central office in McKinleyville, the Project crosses Wiyot ancestral territory. The survey of the route in Wiyot ancestral territory was conducted by the same contractor as for Yurok ancestral territory, with prior notification to the Wiyot Tribal Historic Preservation Officers, who did not object.

This joint responsibility was negotiated between the Tribes for the purposes of this Project only on July 15, 2015. Historically, there were various people from different language groups living along the Klamath River between the modern Orleans and Weitchpec. Ethnographic sources indicate that there were five languages spoken by people residing in that stretch. In the years before Euro-American settlers arrived, some places were exclusively Yurok, and some were exclusively Karuk. The shared interest area has been designated to take this variety into account.

The cultural resources pre-field research was limited to the Study Area as defined above of about 0.5 mile on either side of the proposed centerline for Segments 1 through R5, for Alternative 5, and to an area of a 0.5-mile radius around Orleans Mountain and Antenna Ridge for the Yurok Signal Connection component. The objective of the records search was to identify any previously documented resources within the Study Area to determine the nature and type of each listed resource and to understand its most recently documented condition.

Karuk Ancestral Territory

Records searches were conducted at the Northwest Information Center (NWIC) at Sonoma State University in Rohnert Park, California on December 10, 2015, and December 14, 2016. A search was also conducted at the Heritage Resources Center, Six Rivers National Forest, for records pertaining to areas of National Forest along Segment 1. A record search was conducted at the CalTrans District 1 office in Eureka on May 16, 2017. The Karuk Tribe also maintains a comprehensive and confidential database of cultural resource information that was consulted as well.

Yurok Ancestral Territory

The Yurok Ancestral Territory records search was initially conducted at the NWIC on May 5, 2017 (IC File # 16-1505) and October 20, 2017 (IC File # 17-1200). This search included the southern portion of Segment 1, starting at MP 26.5 on Highway 96, about 8 miles downriver of Orleans, and all of Segments 2, 3, 4, and Alternative 5. Two records searches were conducted for additional information in Segment 2 and for Segment R5 on December 18, 2019 (IC File # 19-1014) and on January 21, 2020 (IC file # 19-1202). The NWIC provided all information on file regarding pre-contact and historic-era resources found within the Study Area. The search results also included cultural resource investigation reports that were conducted within the Study Area.

The Yurok Ancestral Territory records search area passes through private land as well as public land managed by the NPS, USFS, the BLM, and the California Department of Parks and Recreation (CDPR). In order to conduct a comprehensive record search, all information on file regarding pre-contact and historic-era resources found within the Segment 1, 2, 3, 4, R5, and Alternative 5 APEs, as they pass through these various public lands, was requested from the above-listed agencies. Additionally, the Yurok Tribe maintains a comprehensive and confidential database of cultural resource information that was consulted as well.

Data was requested from NPS on August 18, 2016, and delivered to the Yurok Tribe's Cultural Resources department on October 28, 2016. Mr. William Rich made an additional inquiry that was answered October 24, 2017, for Segments 3, 4, and Alternative 5. Mr. Rich requested data from the USFS and the BLM on October 17, 2017, that covered a small portion of Segment 1. Mr. Rich also requested data from the California DPR on August 7, 2017, for Alternative 5 and the vicinity of Segment R5. The search of the Yurok Tribe's database of cultural resource information on June 16, 2017, and October 25, 2017, included all of Segment 2 and portions of Segment 3.

Wiyot Ancestral Territory

Two records searches were conducted for Segment R5 on December 18, 2019 (IC File # 19-1014) and on January 21, 2020 (IC file # 19-1202). The NWIC provided all information on file regarding pre-contact and historic-era resources found within the Study Area. The search results also included cultural resource investigation reports that were conducted within the Study Area. Initial information on Alternative 5, which also passes through Wiyot Ancestral Territory, was conducted at the NWIC on May 5, 2017 (IC File # 16-1505) and October 20, 2017 (IC File # 17-1200).

3.5.2.3 Records Search Results

Table C-1, Appendix C, summarizes the records search results. Eligibility information is supplied for properties in the direct APE only. Note that where eligibility has not been determined or recommended, the Karuk Tribe will assume eligibility and avoid the sites where

feasible. Table C-2, Appendix C, summarizes the studies that have been conducted in the Study Area. These two tables are public information, while the rest of Appendix C is confidential to protect sensitive information. Further details are supplied by ancestral territory and by segment in the following text.

Karuk Ancestral Territory

Segment 1 (North)

The records search shows that at least 16 technical studies have been conducted in the Study Area from the 1950s to date. Of those studies, 6 include a portion of the APE, of which none was conducted in the last 5 years. The results of the records search identified 21 sites in the Record Search Study Area, of which 6 were located in the APE. None is from the prehistoric period, 6 are historic-period, and zero are multi-component sites. None of the 6 sites previously identified within the APE have been evaluated for eligibility for listing in the NRHP.

Yurok Signal Connection

A visit was made to the NWIC on December 14, 2016, to gain more information about archaeological sites and other historic properties not previously known, and also to investigate potential viewshed impacts. In view of these concerns, the radius for information was set at 3 miles (ca. 4,830 meters). In addition, tribal documents were consulted to determine if there were anticipated impacts to any ceremonial activities.

No cultural resources were found in the immediate work area. A number of sites were found within this larger radius of investigation. These included one historic site (Orleans Mountain Lookout), one historic trail, and five sites with prehistoric components. In addition to these, there were four longer archaeological studies that applied to some part of this wider circle. These studies included some extra information from interviews, but did not yield any additional sites besides those noted. All of the prehistoric-era sites were considered to be outside of any potential impact area for the work on Antenna Ridge.

Segment 1 Spur to DNR

Previous records searches and ethnographic information were presented at the December 2016 meeting, which demonstrated that the Project was in a generally sensitive area. The Project area occurred within the "Karok Panamenik World Renewal District", which was found eligible for the NRHP in 1978. There were three documented archaeological sites nearby, and three archaeological studies were consulted that discussed the documented sites in the area. Of these sites, two are located on the west side of the river, and one is located on the east side. The two sites located on the west side are located a considerable distance from the potential APE of the pole replacement work, although they are within the standard 0.5-mile radius. There is one site on the east side of the river. It is a known and documented site, and in view of the ethnographic evidence surrounding it, it is possible that the new pole location is within that site.

Yurok Ancestral Territory

Segment 1 (South)

NWIC Search: The NWIC records search revealed 17 technical studies on file that have been conducted within the Segment 1 (south) Study Area from the 1950s to the present. Of those studies, 7 included portions of the APE, one of which was conducted in the last 5 years. The NWIC records search identified one archaeological site located 0.4 mils southwest of the APE (P-12-001930). No sites have been documented within the direct Segment 1 APE.

USFS Search: On October 25, 2017, Brandy Clarke, Pathways Intern - Archaeologist, responded to William Rich and Associates' request for a USFS file search. Ms. Clarke stated that no cultural resource surveys have been conducted within the vicinity of Segment 1 because it passes through USFS land. Additionally, no resources have been recorded in this area.

BLM Search: On October 25, 2017, Sharyl Kinnear-Ferris, BLM Arcata Field Office Archaeologist, responded to William Rich and Associates' request for a BLM file search. Ms. Kinnear-Ferris stated that no cultural resource surveys have been conducted within the vicinity of Segment 1 because it passes through BLM land. Additionally, no resources have been recorded in this area. Ms. Kinnear-Ferris did state that they do have one survey on file, located immediately north of the BLM parcel. This survey is also on file at the NWIC (IC File #S-15519).

Segment 2

NWIC Search: The NWIC records search revealed 82 technical studies on file that have been conducted within the Segment 2 Study Area from the 1950s to the present. 28 of these studies include a portion of the APE; however, the 4 latest were conducted in 2014 by CalTrans and none was conducted in the last 5 years. The NWIC identified 11 resources located within the Study Area. Eight resources are located outside the APE. Three resources are located in the Segment 2 APE. Other resource information has been transferred to the Yurok Tribe.

Yurok Cultural Resource Database Record Search: The Yurok Tribe conducted a records search for the portion of the KRRBI Project within the reservation boundary using the confidential Yurok Tribe files. This search indicates that 86 previous surveys have been conducted within the vicinity of the Segment 2 APE. No specific tribal cultural resource sites are known to exist in the area of direct impacts for the proposed Project that require further tribal disclosure (Frankie Joe Meyers, Yurok Tribe THPO, pers. comm., November 15, 2017).

Segment 3

NWIC Search: The NWIC records search revealed 23 technical studies on file that have been conducted within the Segment 3 Study Area from the 1950s to the present. Of those studies, 13 include a portion of the APE; however, none was conducted in the last 5 years. The NWIC also found seven archaeological sites located within the Segment 3 Study Area. Four of these sites (P-12-000626, P-12-001638, P-12-002329, and P-12-002591) are located within the APE. Of the four sites previously documented, one is a contributor to a Historic District nominated to the

NRHP in 2002, one was recommended eligible as a contributor to an Archaeological District, and two have been recommended individually eligible through preliminary survey evaluation.

NPS-REDW Record Search: Segment 3 passes through RNP, along Bald Hills Road, between the park boundary at Schoolhouse Peak (southeast) and Elk Camp (northwest). The Segment 3 record search at NPS-REDW shows that 30 technical studies have been conducted within the Segment 3 Study Area from the 1950s to the present. Of those studies, 21 included a portion of the Segment 3 APE, 3 of which were conducted in the last 5 years. Additionally, a historic district, archaeological district, ethnographic landscape, 41 archaeological sites, 47 isolated artifacts and features, and 13 ethnographic resources are located within the Segment 3 Study Area.

The three districts (Lyons Ranches Historic District, Bald Hills Archaeological District, and Bald Hills Ethnographic Landscape) encompass portions of the Segment 3 APE, and 10 of the previously identified sites are located within the APE (P-12-002329, CA-HUM-0442, CA-HUM-0443, CA-HUM-0448, CA-HUM-0452, CA-HUM-0446/H, P-12-000626 [CA-HUM-0625], REDW-2004-06, REDW-2004-07, and P-12-002323 [REDW-2005-02]). Additionally, five of the ethnographic resources are located within the Segment 3 APE (Childs Hill Area 6; Coyote Peak Area 17; Elk Camp & Logging Community Area 9; Tomlinson Area 11,12,14,23; and Women's Rock & Flower Dance Place on Bald Hills). All other resources are located outside of the APE.

Yurok Cultural Resource Database Record Search: The search results of the Yurok Cultural Resource Database included a list of 12 archaeological sites documented within the vicinity of Segment 3. Seven of these sites are located within the Segment 3 APE (CA-HUM-0442, CA-HUM-0443, CA-HUM-0446/H, CA-HUM-448, CA-HUM-0452, CA-HUM-0625 [P-12-000626], and REDW-2004-06).

Segment 4

NWIC Search: The NWIC records search revealed 16 technical studies on file that have been conducted within the Segment 4 Study Area from the 1950s to the present. Of those studies, 11 include a portion of the APE; however, none was conducted in the last 5 years. The NWIC also found five archaeological sites located within the Segment 4 Study Area. One of these sites (P-12-000255) is located within the APE on both sides of US Highway 101, approximately 1 mile north of Orick, California.

NPS-REDW Record Search: Segment 4 passes through RNP along the western portion of Bald Hills Road (between Elk Camp and US Highway 101), and along US Highway 101 from the town of Orick, north approximately 6 miles to Boyes Creek. The Segment 4 record search at REDW, shows that 25 REDW technical studies have been conducted within the Segment 4 Study Area from the 1950s to the present. Of those studies, four include a portion of the Segment 4 APE; however, none were conducted in the last 5 years.

RNP also found that one historic district, one archaeological district, one ethnographic landscape, 41 archaeological sites, 47 isolated artifacts and features, and 13 ethnographic resources are located within the Segment 4 Study Area. The three districts (Lyons Ranches Historic District, the Bald Hills Archeological District and the Bald Hills Ethnographic Landscape) encompass portions of the Segment 4 APE, and six of the previously identified sites (CA-HUM-0668, CA-HUM-0669, CRF-BHR-06 [P-12-002329], CRF-BHR-09, Trinidad Trail, and Old Redwood Highway) are located within the APE. Additionally, two of the ethnographic resources are located within the Segment 3 APE (Elk Camp & Logging Community Area 9, Gans Area 15).

Of the 11 resources located within the APE, the two districts have been nominated to the NRHP. One of the sites within the APE is listed as an eligible contributor, and another was recommended as a potential contributor through preliminary survey evaluation. The Ethnographic Landscape has been recommended potentially eligible for the NRHP through a preliminary survey evaluation, and both of the listed ethnographic resources are considered contributing elements. Lastly, one of the previously identified sites was recommended eligible through a preliminary survey evaluation, and three of the sites have not been evaluated.

Yurok and Wiyot Ancestral Territory

Segment R5

NWIC Record Search: The NWIC records search for Segment R5 revealed 172 technical studies on file that have been conducted within the Segment R5 Study Area from the 1950s to the present. Of those studies, 67 include a portion of the APE, of which 8 were conducted in the last 5 years. The NWIC records search also found 44 sites and 1 isolated artifact located within the Study Area. 4 of these sites (P-12-000947, P-12-001627, P-12-002313, P-12-003601) are located within the APE, all of which are railroad grade segments.

Alternative 5

NWIC Record Search: The NWIC records search for what is now Alternative 5 revealed 134 technical studies on file that have been conducted within the Alternative 5 Study Area from the 1950s to the present. Of those studies, 43 include a portion of the APE, of which 10 were conducted in the last 5 years. The NWIC also found 27 sites and four isolated artifacts and features located within the Study Area. Four of these sites (P-12-001627, P-12-001847, P-12-002189, and P-12-003601) are located within the APE. All are railroad lines from the historic-era and none has been evaluated for NRHP eligibility.

NPS-REDW Record Search: Alternative 5 passes through RNP along Hilton Road, from 0.9 mile southwest of Orick, to McDonald Creek, approximately 2 miles east of Big Lagoon. The Alternative 5 record search at REDW shows that 13 technical studies have been conducted within the Alternative 5 Study Area from the 1950s to the present. Of those studies, 7 include a portion of the Alternative 5 APE; however, none were conducted in the last 5 years. Four

resources are located within the Alternative 5 Study Area. Two of these resources (Trinidad Trail [Tall Trees Trail] and Trinidad-Klamath Trail [Yurok Coastal Trail]) are located within the APE. Of the two resources located within the APE, one has been recommended eligible for the NRHP, and one has not been evaluated.

3.5.2.4 General Prehistory and Ethnohistorical Setting

Karuk

The Karuk Tribe has over 3,000 members currently, and according to Kroeber's estimates in 1925, the population was also over 3,000 when Euro-Americans first arrived in numbers in 1850. Although removals and massacres followed, Kroeber estimated that nevertheless, the population never fell below 775, the figure in 1910. The Karuk are aboriginal and have always lived in this land. It is to be expected that there is much evidence of their habitation and lifeways within this territory. L. L. Kidder wrote a diary of his arrival in this land in March 1850 (excerpted in *Siskiyou Pioneer 2* [1979]) and described his experience with the Native people:

> Up to the time we arrived at the Klamath River [along a mountain trail from Trinidad towards mine works on the Salmon River] we had not seen any Indians, but now they were very numerous and there was a large village of them at the ferry. They were the best looking and most intelligent looking Indians we had met in the state, and, the whites having never mingled with them, they seemed very friendly and came around and endeavored to learn our language. … They lived in quite good houses, which we had never seen Indians do before, they having so much beautiful and free splitting timber that they could split out planks nearly as nicely as they could be sawed.

The Karuk at that time lived in more than 100 villages sited along the Klamath River and tributaries. Of these, 12 (Bright villages #106-117) lie close to the river between Orleans and Aikens Creek. Of these, 3 have been surveyed thoroughly: at Aikens Creek, Red Cap Bar, and opposite Savorum Mountain. The exact locations of these and other tribal resources are confidential, and kept at the Karuk THPO office. In general, a village site would be likely to contain house pits, with middens, burials and other features within the vicinity. Furthermore, these villages form a nexus for trails, gathering areas, and spiritual areas.

Table 3.5-1 shows the names of some of the Karuk villages in the Project area.

Table 3.5-1. Karuk Village sites (related 1959 by Lottie Beck) -downriver from Panamnik

Village Number (Beck / Bright)	Village name	Name translation (Ferrara)
102	**panámni'ik**	"the flat place"? (Orleans)
103	**chiivníshshukach**	"little peeking out"
104	**káttiphirak**	"mugwort plant place"? (Ferris Ranch)
105	**ukram'íppan**	"pond end"

Table 3.5-1. Karuk Village sites (related 1959 by Lottie Beck) -downriver from Panamnik

Village Number (Beck / Bright)	Village name	Name translation (Ferrara)
106	**tishánni'ik**	(none) (@Camp Creek)
107	**kusripish'amáyav**	"delicious madrone berries"
108	**afchúufich**	"little shit creek" (Crawford Creek)
109	**tûuyvuk**	(uncertain) (@ Ullathorne Creek)
110	**sahvúrum**	"toward the river" + ? (@ Boyce Creek)
111	**vuunvárak**	"flowing down from upriver" (Nancy's Elbow)
112	**ikchúnna'am**	"grinding place"
113	**ahcha'íppanach**	? + "little top"
114	**vúppam**	(none) (opposite mouth of Red Cap Creek)
115	**ishrámma'an**	"behind a deer-lick" (@ Slate Creek)
116	**iníinach**	"little crossing" (@ old mouth of Bluff Creek)
117	**ishpúutach**	(none) (Old Bluff Creek campground)

Yurok

Yurok people have lived in Northwestern California along the Redwood Coast and the Klamath River since Noohl Hee-Kon (time immemorial). Traditionally Yurok people living on the upper region of the Klamath River are Pe-cheek-lah, lower region of the Klamath River Puelik-lah, and the coast, Ner-er-ner. Oohl translates to mean "Indian people" and describes Yurok people together. The name Yurok comes from the Karuk word for "downriver." which is the most widely used word to describe the Tribe and people.

There are more than 70 known villages within the ancestral territory, most of which are situated along the Klamath River and along the Pacific Coast[25]. Table 3.5-2 shows the names of the Yurok villages in the Project area based on Waterman (1920) and on Gates[26].

Table 3.5-2. Yurok Village Locations

Waterman Survey		Thomas Gates Survey	
Village Name	**Location**	**Village Name**	**Location**
Weitspus	The village that preceded the modern-day community of Weitchpec (Waterman 1993: Rectangle G)	Wecpus	At the later site of Weitchpec
			A river trail crossing from the northeast side of the Klamath to the southwest side about 0.4 mile downriver from the mouth of Pine Creek
Wahsek	Located on the northeast side of the Klamath about 0.5 mile downriver from Martin's Ferry and shown as having no trail connection (Waterman 1993: Rectangle F)	Wahsek[w]	Reached by the northeast side trail, which stops here

[25] T.T. Waterman 1993 [1920] Yurok Geography. Trinidad, CA: Trinidad Museum Society.
[26] Thomas Gates. 1993. Ph.D. Dissertation, Humboldt State University.

Table 3.5-2. Yurok Village Locations

Waterman Survey		Thomas Gates Survey	
Village Name	**Location**	**Village Name**	**Location**
		Tsetskwi	On the northeast side of the river just above Rube Creek, reached by the downriver trail, which recrossed the Klamath here
Aukweya	About 2.0 miles downriver from Otsap	Okweya	Between Rube Creek and Miner's Creek
Merip	About 2.0 miles downriver from Aukweya	Merip	Between Chqui Creek and Mawah Creek
Waase	About 0.8 mile downriver from Merip	Wa?aey	Just downriver from Mareep Creek
Murek	About 2.5 miles downriver from Waase	Murek	0.3 mile downriver from Cappel Creek
Himel	About 0.6 mile downriver from Murek (Waterman 1993: Rectangle E)	Himet	About 0.6 mile downstream from Murek
		Wr?rgr	About 3 miles downriver from Himet
		Sregon	About halfway between Tsokik Creek and Knulthkarn Creek
Pekwan	Just downriver from the mouth of Pekwan Creek	Pek^{w}on	Just downstream from Pecwan Creek
Qootep	About 0.5 mile downriver from Pekwan	Kotep	About 0.5 mile downstream from Pekwon
Woxtek	About 0.5 mile downriver from Quootep		
Woxhkero	About 0.2 mile downstream from Woxtek (Waterman 1993: Rectangle D)		

Within each village, houses were constructed primarily of redwood and each house had a name. Families and descendants are associated with these specific house names (Waterman 1920: 208). Families and/or houses within villages owned specific resource gathering areas such as fishing holes, acorn-gathering spots, trapping areas, and hunting locations. Glen Moore Sr., who was from the village of Srey-gon, explained in an interview in 1996 that, "most Indian people had fishing spots, they have the right to fish. Sometimes its [fishing hole] is handed down through relations. You can give a fishing place to someone else".

The sweathouse is another structure found within each village. Men typically did not spend the night in family houses; instead, they stayed in the sweathouse. The sweathouse was also used for ceremonial purposes such as purification before hunting or ceremonies.

Yurok villages situated along river and coastal lines tend to be located near resource gathering areas such as good fishing access or coastal gathering sites. River villages tend to be on ancient river terraces and decrease in elevation the further downriver they are, providing easy access to fishing holes along the Klamath. Coastal villages are situated along lagoons or mouths of rivers, adding additional food resources to ones provided by the ocean. The mountain areas

above the water areas were mostly used for gathering and hunting (Waterman 1920: 183, Bearss 1969[27]).

An elaborate trail system exists that connects villages, prayer sites, and gathering areas (Waterman 1920). Trails were to be treated with respect and travelers were to stay within the trail (Waterman 1920:185). Many of the traditional trail systems are still in use today as many of our current highways and arterial routes lay on top of the old trails, including Highway 169 and Bald Hills Road.

The river is vital part of Yurok life providing food resources such as salmon, sturgeon, eel, and other fish. Gill nets, dip nets, weirs, basket traps, and hooks are used to obtain fish from the River. On the coast, many species are harvested for consumption including mussels, clams, seaweed, and many other resources. The primary game for hunting is deer and elk, but other smaller animals are also eaten. The other primary food source for the Yurok is acorns. Acorn gathering grounds and camps are found throughout the mountains and prairies in Yurok territory. Acorns are processed into a mush, which is cooked in large baskets with hot stones.

Wiyot

The study area lies within the traditional territory of the Patawat division of the Wiyot Indian Tribe. This group occupied lands from Little River to south of Mad River (Nomland and Kroeber 1936; Curtis 1970; Merriam 1998:reel 32), while two other divisions of the tribe inhabited areas farther south.

The Wiyot language has been categorized as Algonquian-based and they referred to themselves as the Soo-lah-te-luk (Merriam 1998:reel 32). The name "Wiyot" itself is derived from the Yurok term "weyet or "weyot" (Loud 1918:297); the Yurok Tribe, who lived to the north, also spoke a language classified as Algonkian (Teeter 1964:1). Although the Wiyot and Yurok languages are distinctly different, linguists have linked the two in "a provisional group called Ritwan" that is alternatively classified as Algic (Elsasser 1978:155). Linguistic research implies that the two groups are distantly related, and this "unlikely Yurok-Wiyot proximity" has been hypothetically explained as "parallel migrational responses by two similar but separate groups at different times to similar geographic and ecological pressures and/or opportunities" (Moratto 1984:483, 564).

According to Humboldt State University professor and California native linguist Victor Golla, the Wiyot arrived in the Humboldt Bay area approximately 2,000 years ago, inhabiting a lagoon environment that afforded the use of coastal resources. The Yurok then came later date, subsequent to the arrival of the first Athabascan speakers, who arrived sometime within the last 1,400 years (Golla 2003).

[27] Bearss, Edwin C. *History Basic Data: Redwood National Park, Del Norte and Humboldt Counties, California*. US Department of the Interior, National Park Service, Division of History, Office of Archeology and Historic Preservation, 1969.

The living habits of the Wiyot have been summarized most notably by Curtis (1970), Loud (1918), Nomland and Kroeber (1936), and Elsasser (1978). Interviews with Wiyot tribal members born in the mid-nineteenth century have provided at least a partial picture of what the traditional lifestyle may have been like. The photographer and ethnographer Edward S. Curtis relates that "Wiyot houses were like those of the Klamath river tribes, with plank walls and gabled roof, and a deep excavation occupying the greater part of the enclosed square" (Curtis 1970:71). Ethnographer L. L. Loud describes a slightly different structure with a shallow pit in the center, and also tells of sweat houses that were half subterranean and "at least sixteen feet square" (Loud 1918:267). Wiyot redwood canoes were similar to those of the Yurok and were used primarily on the bay and rivers, although "in calm weather [the Wiyot] sometimes fished outside the heads" (Curtis 1970:72-76).

Animals were hunted or caught in various ways. Elk were pursued by a hunter and his dogs in a running chase that could last as much as 2 days. Deer and sometimes elk were caught in rope snares. Bears were trapped in deadfalls, or, if hibernating in a hollow log, suffocated by smoke after the openings had been partially blocked. Waterfowl were hunted from blinds; the expenditure of "thirty to forty wooden-pointed arrows would succeed in killing perhaps six or eight waterfowl out of a flock" (Curtis 1970:73). Salmon might be taken in gill nets or in either of two types of fish weirs. Smelt were caught in surf nets and other fish by other means. Clothing was mostly made from deer skins. Women and girls wore basketry caps. Basket-making materials included spruce and willow roots, bear grass, maidenhair and Woodwardia ferns, and a dye made from alder bark juice (Curtis 1970:71-72). The women wove twine baskets for carrying and cooking foods (Curtis 1970:76-77).

The principal line of travel and communication linked the following three geographical divisions of the Wiyot (Curtis 1970; Nomland and Kroeber 1936; Merriam 1976; Loud 1918):

- The Batawat (Patawat) or northern geographical division of Wiyots, which inhabited the Mad River from its mouth Blue Lake, the coast from Mad River to Little River, and the inland areas of McKinleyville and Fieldbrook.
- The Wiki or central division, which occupied the Humboldt Bay shoreline, islands and local areas environs.
- The southerly Wiyot was the division of the lower Eel River.

Known sites of the Patawat Wiyot near the Project area were virtually all at, or on the coast.

The earliest records of this area come while taking on "wood and water" at Trinidad Bay, by the Hezata Expedition of 1575. Coming upon a stream that Hezata named the "Rio de las Tortolas" (river of the doves) which, it appears, was what is now called Little River (De La Sierra 1775:23). Hezata's party traveled up the river a "half a league from its mouth" (De La Sierra 1775:23-24) (a distance of about 1.5 miles). The various reports made at the time do not indicate the presence of a village or dwellings in the vicinity. In 1849, the Josiah Gregg Party reached the

coast at Little River, went north, and then returned south, crossing the river on their way toward Humboldt Bay. L. K. Wood, in his account of the journey, makes no mention of encountering Indians at or near the river (Lewis 1943:131, 134).

The principal ethnographers who wrote about the Wiyot and Yurok Tribes both claim that village sites and other named locations were located within the vicinity of the Project area. T. T. Waterman (1920) mentions five places named by the Yurok:

1) "Okweges"—"where the people get strawberries"—located near the mouth of Strawberry Creek (Waterman 1920: Rectangle K-Map 33; #75).
2) "Oksolig"—a place name translated "where he fell" or "where they painted him". Located in the dune area approximately due west of today's Crannell Road interchange (Waterman 1920: Rectangle K-Map 33; #74).
3) "Rtskrgrn"—"everybody looked"—the large rock north of Little River now known as Princess Rock (Waterman 1920: Rectangle K-Map 33; #72).
4) "Srepor"—a village on the north side of Little River near the north end of Moonstone Beach that at one time had four houses and a sweathouse (Waterman 1920: Rectangle K-Map 33; #71).
5) "Metsko" —name of Little River (Waterman 1920: Rectangle K-Map 33; #73).

L. L. Loud (1918) lists five Wiyot locations in the Project vicinity:

1) "Dolokoli"—a site near the mouth and on the south side of Widow White Creek (Loud 1918:287).
2) "Kwesperkogoli" —Strawberry Creek (Loud 1918:288).
3) "Itchgaro"—Little River – name said to refer to a kind of footprint in the flat rock at the crossing (Loud 1918:288).
4) Site 2 —"Pletkosomili" and "rock-small"—a village near the mouth of Little River that seems to be consistent with "Srepor" (Loud 1918: 286, 408).
5) Site R —camping place at the head of Lindsey Creek for gathering topodreos or "wild potato" (Loud 1918:249).

Birdie James, who "was partly of Yurok descent" but helped J.P. Harrington with Wiyot culture (Mills 1985:3), indicated that the big rocks on the beach at Little River was "as far as they [the Yurok] came" (Harrington 1983). Birdie James was familiar with a wild strawberry patch at the Worth property (north of the McKinleyville airport); it was called "gwxs bxgadxlim". The two closest named Wiyot locations were Strawberry Creek, to the north, and Widow White Creek, to the south.

3.5.2.5 General Post-Contact History of the Project Area

While the first Europeans arrived by boat along the coast starting as early as the late 1700s in the fur trade, the explosion of Euro-American settlers started with the discovery of gold in 1849

and the invasion of gold miners starting in 1850. Gold miners made their way into the Project area in the early 1850s.

The early settlers of Orleans had a complicated relationship with the local Karuk population. As miners and other settlers moved into the region, the riverine ecology that the Karuk depended on became impacted by over-hunting, build-up of sediments in the water, and marked increase of human population. Early settlers like William Reece, John Pearch, Grant Hillman, and Alma Allen took Native American wives. Their children were prominent members of the community of Orleans that grew around these early miners and farmers; their descendants became prominent members of the Karuk Tribe in the area. Local Karuk are often listed on the early census sheets as laborers, miners, and fishermen (North State Resources 2013).

Yurok did not experience non-Indian exploration until much later than other tribal groups in California and the United States. One of the first documented visits in the local area was by the Spanish in the 1500s. When Spanish explorers Don Bruno de Heceta and Juan Francisco de la Bodega y Cuadra arrived in the early 1700s, they intruded upon the people of *Chue-rey village*, which is now considered the City of Trinidad. This visit resulted in Bodega laying claim by mounting a cross at Trinidad Head.

In the early 1800s, the first American ship visited the area of Trinidad and Big Lagoon. Initially, the Americans traded for sea otter fur with the coastal people. However, for unknown reasons, tensions grew and the American expedition was cut short. The expeditions increased over the next few years and resulted in a dramatic decrease of otters in the area.

By 1828, the area was gaining attention because of the reports back from the American expeditions, despite the news that the local terrain was rough. The most well-known trapping expedition of this era was led by Jedediah Smith. Smith guided a team of trappers through the local area, coming down through the Yurok village of *Kep'-el*, crossing over Bald Hills and eventually making their way to the villages of *O men* and *O men hee-puer* on the coast. Smith's expedition, though brief, was influential to all other trappers and explorers. The reports from Smith's expedition resulted in more trappers exploring the area and eventually leading to an increase in non-Indian settlement.

By 1849, settlers were quickly moving into Northern California because of the discovery of gold at Gold Bluffs near present day Orick and Orleans on the Klamath River. Yurok and settlers traded goods and Yurok assisted with transporting items via dugout canoe. However, this relationship quickly changed as more settlers moved into the area and demonstrated hostility toward Indian people. With the surge of settlers moving in, the government was pressured to change laws to better protect the Yurok from loss of land and assault. The rough terrain of the local area did not deter settlers in their pursuit of gold. They moved through the area and

encountered camps of Indian people. Hostility from both sides caused much bloodshed and loss of life.

The gold mining expeditions resulted in the destruction of villages, loss of life, and a culture severely fragmented. By the end of the gold rush era, at least 75 percent of the Yurok people died due to massacres and disease, while other tribes in California saw a 95 percent loss of life. While miners established camps along the Klamath and Trinity Rivers, the federal government worked toward finding a solution to the conflicts, which dramatically increased as each new settlement was established.

The government sent Indian agent Redick McKee to initiate treaty negotiations. Initially, local tribes were resistant to come together; some outright opposed meeting with the agent. The treaties negotiated by McKee were sent to Congress, which was inundated with complaints from settlers claiming the Indians were receiving an excess of valuable land and resources. The Congress rejected the treaties and failed to notify the Tribes of this decision. In 1855, a group of "vigilante" Indians (who were known as Red Cap Indians) initiated a revolt against settlers.

The federal government established the Yurok Reservation in 1855, and immediately, Yurok people were confined to the area. The Reservation was considerably smaller than the Yurok original ancestral territory. This presented a hardship for Yurok families who traditionally lived in villages along the Klamath River and northern Pacific coastline. When Fort Terwer was established, many Yurok families were relocated and forced to learn farming and the English language.

In January 1862, the Fort was washed away by flood waters, along with the Indian agency at *Wau-kell flat*. Several Yurok people were relocated to the newly established Reservation in Smith River that same year. However, the Smith River Reservation was closed in July 1867. Once the Hoopa Valley Reservation was established, many Yurok people were sent to live there, as were the Mad River, Eel River, and Tolowa Indians.

In the years following the opening of the Hoopa Valley Reservation, several squatters on the Yurok Reservation continued to farm and fish in the Klamath River. The government's response was to use military force in order to try to evict squatters. Many squatters did not vacate and waited for military intervention, which was slow to come. In the interim, the squatters pursued other avenues to acquire land.

The Fort Terwer and the Agency Office at *Wauk-ell* were built from redwood, which was an abundant resource and culturally significant to Yurok. Non-Indians pursued the timber industry and hired local Indian men to work in the up-and-coming mills on the Reservation. This industry went through cycles of success, and was largely dependent on the needs of the nation. At the time, logging practices were unregulated and resulted in the contamination of the Klamath River, depletion of the salmon population, and destruction of Yurok village sites and sacred areas.

Western education was imposed on Yurok children beginning in the late 1850s at the Fort and Agency. This form of education continued until the 1860s when the Fort and Agency were washed away. Yurok children, sent to live at the Hoopa Valley Reservation, continued to be taught by missionaries. The goal of the missionary style of teaching was to eliminate the continued use of cultural and religious teachings that Indian children's families taught. Children were abused by missionaries for using the Yurok language and observing cultural and ceremonial traditions.

In the late 1800s, children were removed from the Reservation to Chemawa in Oregon and Sherman Institute in Riverside, California. Today, many elders look back on this period in time as a horrifying experience because they lost their connection to their families and their culture.

Many were not able to learn the Yurok language and did not participate in ceremonies for fear of violence being brought against them by non-Indians. Some elders went to great lengths to escape from the schools, traveling hundreds of miles to return home to their families. They lived with the constant fear of being caught and returned to the school. Families often hid their children when they saw government officials.

Humboldt Bay, with its adjacent resources and travel line to San Francisco, attracted seafarers and large populations of Euro-American settlers in the mid-to-late-nineteenth century. Because the Wiyot territory was located outside of the Franciscan Mission sphere of influence that extended as far north as Sonoma County, displacement of the Wiyot occurred much later than the group's native counterparts to the south. Effective displacement did not begin until the mid-1850s and continued through the 1860s when whole populations were removed to the Mendocino Coast, Klamath, Smith River, and Hoopa reservations (Loud 1918). Before this period, numerous Wiyot people had been killed during skirmishes with Euro-American settlers and from diseases brought by the new-comers (Bledsoe 1885; Norton 1979).

On February 25, 1860, medicine people and others had gathered offshore of Eureka on Indian Island, the largest island on Humboldt Bay, for annual ceremonies. During the night, while everyone was sleeping, Euro-American settlers paddled silently across Humboldt Bay to the island village and murdered up to 250 people. As described on the Wiyot Tribe's internet website,

> Indian Island was home to two ancient villages; Tuluwat ("Toulouwat") and Etpidolh ("Etpidalh Watpuroulh"). At Tuluwat, Wiyot held the annual "world renewal ceremony", a dance lasting seven to ten days.
>
> The ground beneath Tuluwat, the Wiyot village, is an enormous clamshell mound (or midden). This mound, measuring over six acres in size and estimated to be over 1,000 years old, is an irreplaceable physical history of the Wiyot way of life. Contained within it are remnants of meals, tools, and ceremonies, as well as many burial sites.

> At the end of the 19th century, settlers built dikes and channels on the island. These modifications changed tidal action along the shore, resulting in erosion of the edge of the mound. Between 1913 and 1985, an estimated 2000 cubic yards of the shell mound were lost to erosion, which continues and seems to even be accelerating. In addition, the shell mound was the site of uncontrolled digging in the early part of the 20th century. One amateur archeologist was said to have looted as many as 500 of our gravesites. In addition, structures of the Tuluwat village that were still visible in 1913 are now gone, having been destroyed or carried away by wind and waves (Wiyot Tribe 2009).

The 1860 massacre at Indian Island has remained fresh in the minds of the Wiyot and other people in the area, and since 1992, the event has been commemorated by local community members by a candlelight vigil on the night of the anniversary (Heffner-McClellan 1994).

In the year 2000, the Wiyot Tribe purchased 1.5 acres of Indian Island in an ongoing effort to reclaim more of their ancestral homeland. Four years later, on May 18, 2004, a unanimous vote by the Eureka City Council allowed for the return to the Wiyot Tribe of 45 acres of the island, and plans to restore parts of the site contaminated by historic and modern industrial activities were initiated. The Tribe intended to "restore the cultural heritage and ecological resources of the site and surrounding salt marsh, to construct a cultural center open to the public, and to restore the site to once again perform Tribal ceremonies there" (Wiyot Tribe 2009). The Tribe proceeded to remove tons of industrial debris and contaminated soils from the site and implement erosion control measures. In the words of the Tribal Chairman Ted Hernandez, the village is "the center of our world" (Greenson 2019a).

In December 2018, the Eureka City Council signaled that the City was ready to transfer the entirety of Indian Island to the Tribe, and on October 21 of the following year, in another unanimous vote by the City Council, the remaining part of the approximately 200-acre island was returned to the Wiyot Tribe (Greenson 2019b). Ted Hernandez and Eureka City Mayor Susan Seaman signed a deed of trust, ensuring the land would again be held and managed by the Wiyot, in what was described a land transfer "simply without precedent" (Greenson 2019a).

Despite being subject to massacres and other depredations aimed expressly at outright extermination of Indian peoples across California's north coast, the Wiyot persevered and today live on the Table Bluff Reservation, the Bear River Band of the Rohnerville Rancheria, the Blue Lake Rancheria, and in other off-reservation communities. The 2010 census revealed a combined population of only 884, up from 674 recorded in the 2000 census (U.S. Census Bureau 2000, 2010).

Humboldt County, organized in 1853, was named after Baron Alexander von Humboldt, scientist and traveler. The community of Orleans is located in a portion of Humboldt County that was a part of the disestablished Klamath County, formed in 1851 and later disbanded in

1874 (Hoover et al 2002:101). Eureka was granted a town charter in 1856 and has been the county seat since then.

Many miners of both Euro-American and Chinese ancestry located and mined in Orleans. Commercial activity promptly developed around the mining activity, including stores, pack trains, restaurants, bars, and at least one hotel in the Project area, principally in Orleans and Weitchpec. The Bald Hills route was used extensively for pack trains as was the route that has become Highway 96 from Willow Creek to Orleans.

As gold mining died out in the early 1900s in the Project area, there was limited commercial extraction of timber outside of the redwood zone, though redwood logging had started in the 1850s in the Eureka area and continues to the present. Redwood logging continues near Segments 3, 4, and R5 and Alternative 5. There was a redwood sawmill and a company town, Crannell, located near Segment R5 and Alternative 5 south of Big Lagoon. Douglas-fir logging became prevalent with the improvement of saws and the invention of plywood during and after WWII. Non-redwood logging, managed by the USFS on NFS lands, was big business in the Project area, including Segments 1 through 3, from 1950s to the mid-1990s. As during the mining boom, commercial businesses supporting the logging industry were established in the Project area, including logging companies, trucking companies, and various sawmills large and small. A veneer mill, producing the veneer needed to make plywood, was active in Orleans from 1955 to 1974.

Logging continues on private lands in and near the Project area, but has been largely curtailed on NFS lands since the 1990s. Beginning in the 1960s in small hidden patches, often on NFS lands, marijuana (cannabis) cultivation and sale became an increasingly large part of the informal economy in the area.

3.5.2.6 Roads and Highway Development

Highway 96 (Segments 1 and 2)

Highway 96, originally designated Highway 46 from Weitchpec to Orleans, was developed following ancient trails that ran up the Klamath River from Weitchpec. The Orleans section of the highway was graded, oiled, and paved in 1933. In the 1950s, the Division of Highways partnered for funds with the USFS and the Department of Interior to improve and straighten roads: the first of these contracts in the state was the straight section of highway to the north of Hoopa. Likewise, the section from Weitchpec to the Fish Lake Road was completed in 1952. Curve corrections were completed in 1954. For the most part, the alignment of Highway 96 today between Weitchpec and Orleans represents this same alignment established in 1954.

Following the 1955 flood, repair work was required. The Aikens Creek, Bluff Creek, and Slate Creek bridges were replaced in 1960-1962 using emergency and partnership funds, and the road was largely widened to two lanes at that time. The 1964 flood event, which caused widespread

devastation across Humboldt County and in particular to Orleans, took out the section of highway north of Slate Creek, past Big Bar to the "gorge" section, damaged a portion of the road from Ullathorne to Camp Creek, and eliminated the bridge over the Klamath River at Weitchpec and at Orleans. Work to replace and improve the highway was completed in 1967.

CalTrans provides a full-time crew and maintenance yard in Orleans and also conducts contract work annually on Highway 96 from Orleans to Weitchpec on upgrading guardrails, replacing culverts, and other ground-disturbing activities. In 2017, for example, segments of guardrail were replaced and several culverts were replaced in the Project area by cutting across the highway, digging up the old culverts, and placing new culverts.

Highway 169 (Segment 2)

Like Highway 96, this highway follows ancient trails along the Klamath River. As means of transportation changed in the 1800s, the trail from Weitchpec to the coast gradually changed to a wagon road and then to an automobile road. Today, the highway officially travels from its intersection with Highway 96 southwest and dead-ends at Wautec (known as Johnsons on the highway map), but it was originally planned to connect to the coast through Klamath Glen, where there is still a stub of Highway 169. The Weitchpec-Wautec stretch of Highway 169 is paved, and one-lane most of the distance with variably spaced turnouts and wider stretches.

Highway 101 (Segments 4 and R5 and Alternative 5)

Highway 101 has followed various alignments, all very near the coast, in the Project area, from its initial construction as a wagon road roughly following ancient Yurok coastal trails in the late 1800s to its current configuration as a two to four-lane paved highway with portions of restricted access (freeway). It is designated as the Redwood Highway from Marin County north to the state line. In the Project area, its alignment was changed from the east side of Freshwater Lagoon (now a county road called Old State Highway) to its current alignment between the lagoon and the Pacific Ocean.

3.5.3 CEQA Checklist Criteria for Potential Impacts

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
CULTURAL RESOURCES: Would the Project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
CULTURAL RESOURCES: Would the Project: **TRIBAL CULTURAL RESOURCES:** Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☒
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

3.5.4 Analysis of Potential Impact

Further Section 106 compliance efforts, including evaluation, assessment of Project effects, and incorporation of mitigation, will be undertaken concurrently with the review of this document and the completion of the NEPA/CEQA analysis. The Karuk Tribe anticipates that micro-siting and change of Project design can successfully avoid impacts to cultural resources from the construction and operation of the KRRBI Project. The Project will take several measures as part of the Project to avoid impacts to cultural resources, including but not limited to historic properties.

Qualified archeologists will perform all cultural resources work with trained assistants (EPM CR-1).

An Inadvertent Discovery Plan will be prepared. This plan will specify what steps will be taken if a subsurface cultural resource is discovered during construction, including stopping construction in the vicinity of the find, notifying the appropriate land management agency, identifying a qualified archaeologist to conduct an evaluation of the find, and developing an approved data recovery program or other mitigation measures (EPM CR-2).

Avoidance areas will be flagged or otherwise marked prior to construction activities. Flagging or other marking will be removed once construction is completed in an area (EPM CR-3).

To minimize unauthorized collecting of archaeological material or vandalism to known archaeological sites, all workers will attend mandatory training on the significance of cultural resources and the relevant federal regulations intended to protect these resources (EPM CR-4).

If human remains are discovered, construction will be halted, and the coroner will be notified. Measures specified in the Native American Graves Protection and Repatriation Act (NAGPRA) regulations will be followed on federal lands (EPM CR-5).

The Karuk Tribe will supply Native American Monitors in the Karuk Ancestral Territory, and the Yurok Tribe will supply Native American Monitors in the Yurok Ancestral Territory. Where ancestral territories are mapped as overlapping, monitors from both tribes will work in tandem (EPM CR-6). The Wiyot Tribe will be invited to supply Native American Monitors in the Wiyot Ancestral Territory.

Where depth of archaeological resources in highly sensitive areas can be known or assumed, directional drilling may be required by land management agencies to avoid cultural resources. Directional drilling depths should be 2 feet below known maximum depth of cultural resources. If fractured bedrock must be drilled, preventing the inadvertent release of drilling fluids (inert clays and water) cannot be guaranteed (EPM CR-7).

3.6 Geology, Soils, Minerals, and Energy Resources

3.6.1 Regulatory Setting

The Alquist-Priolo Earthquake Fault zoning Act (1972) and the Seismic Hazards Mapping Act (1990) direct the State Geologist to delineate regulatory "Zones of Required Investigation" to reduce the threat to public health and safety and to minimize the loss of life and property posed by earthquake-triggered ground failures. Cities and counties affected by the zones must regulate certain development "Projects" within them.

3.6.2 Environmental Setting

3.6.2.1 Geologic Structure

The Project follows the Klamath River through the Klamath Mountains along Segments 1 and 2, then leaves the Klamath River and crosses over the Coast Range along Segments 3 and 4. Segment R5 proceeds south along the Coastal Plain and into the foothills of the Coast Range before emerging again onto the Coastal Plain north of McKinleyville.

From a geologic perspective, the Project route begins by crossing the Jurassic, largely metamorphic, rock formations of the Western Klamath Terrane in Segment 1 and proceeds westward across the Jurassic and Cretaceous rocks of the Franciscan Complex and related formations of the Coast Ranges province in Segments 2 through R5. Orleans Mountain is located on diorite/granitic diorite, while Antenna Ridge is formed of metamorphosed sedimentary rocks.

3.6.2.2 Seismicity

Humboldt County contains some areas of seismic activity. One Alquist-Priolo-mapped fault is found running roughly northwest to southeast and crossing Murray Road where Segment R5

transitions from underground to overhead installation[28]. Segment R5 crosses 0.32 mile of the McKinleyville Fault Zone in that location.

Earthquakes over magnitude 3.0 on the Richter scale have occurred near the Project from time to time since 1977[29]. The largest earthquake (5.6 magnitude) occurred 1.7 miles southeast of Segment 3 in 2012. No damage to the Bald Hills Road where the fiber optic cable is proposed was noted at that time. Several smaller quakes occurred in that same vicinity. The nearest earthquakes to the Project occurred 0.8 mile from Segment 3 (4.9 magnitude in 1990) and 0.8 mile from Segment 1 (3.2 magnitude in 1993).

3.6.2.3 Soils

Locally, the presence of serpentinite and similar rocks and derived soils are an indication of potential instability. The Project follows existing roads and the existing PG&E ROW for Segment R5 and is constrained in its location to the road or ROW location. In several places, the roads cross serpentinic features and may exhibit instability.

The Project does not cross areas of expansive soils. The roads followed by the Project cross areas that have been subject to landslides in the past, including road base failures due to land movement. These areas are typically associated with serpentinic soils.

There are no soils present on Orleans Mountain and Antenna Ridge—both are listed as "rock outcrop" in the soils maps and reports.

3.6.2.4 Minerals

The Project area was once a major gold-mining area, but the era of large-scale hydraulic gold mining is gone, leaving areas stripped of topsoil and river bar material and large piles of rock as byproducts of that era. The existing Orleans Tower, for example, is located on a bedrock terrace from which more than 100 feet of "overburden" was removed in the early 1900s, leaving the bedrock. There is no active commercial mineral extraction in the Project area with the exception of the existing Mercer Fraser gravel quarry east of Trinidad.

3.6.3 CEQA Checklist Criteria for Potential Impacts

GEOLOGY AND SOILS: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒

[28] Calif Geology. 2020. https://maps.conservation.ca.gov/cgs/EQZApp/app/. Last accessed 3/26/20
[29] USGS. 2020. Earthquake map and database online at http://earthquake.usgs.gov/earthquakes . Last accessed 3/26/20.

GEOLOGY AND SOILS: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
MINERAL RESOURCES: Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

3.6.4 Analysis of Potential Impact

3.6.4.1 Fiber Optic Cable

No geotechnical study was conducted for the fiber optic cable portion of the Project. The Project would not expose people or structures to potential substantial adverse effects from geologic hazards or soil hazards, disturb a unique paleontological resource or site or a unique geologic feature, or interfere with mineral resource availability. Where the fiber optic cable, following existing road alignments, must cross an area that has exhibited instability in the past, a vault will be placed on either side of the instability with additional cable placed in each vault to allow for land movement without a break in the cable, and therefore in the service provided. This will minimize the risk of a loss of service due to land movement.

Given the installation types for this Project, little or no soil erosion is anticipated. Overhead installation has virtually no ground disturbance. If an additional guy wire is needed, it is typically placed on an existing anchor with no ground disturbance. If an additional guy wire anchor is needed, the anchor is typically installed by hand, again with no need to remove vegetation or disturb the soil surface. Underground installation is planned for roadside ditches, with no impacts to adjacent vegetation or soil surfaces. No topsoil disturbance is likely during any aspect of construction.

3.6.4.2 Orick Tower

The Orick Tower will be located on Mad River soil type, very deep, moderately well drained soils on the flat alluvial plain in Orick. There is no risk of erosion or other soil-related failures,

because this is not an expansive soil type. Humboldt County will likely require an R-1 Soils Report (which includes a geotechnical study) and stamped, sealed engineering drawings showing how the foundations will be constructed to safely support the proposed structure given the soils type and earthquake potential.

3.6.4.3 Yurok Signal Connection

The proposed installation at Antenna Ridge will be located on rock. There is no risk of erosion.

3.7 Hazards, Hazardous Materials, and Wildfire

3.7.1 Regulatory Setting

State and local laws and ordinances control the use and disposal of hazardous materials. The California Environmental Protection Agency's Department of Toxic Substances Control requires that a list be compiled and maintained of areas with previous or active hazardous materials problems, called the "Cortese List", under California Government Code Section 65962.5. CDF annually issues or suspends burning permits to help control wildfires in the area.

3.7.2 Environmental Setting

The KRRBI Project is located in a remote rural area and will be located in road shoulders, either overhead on existing poles or underground. These roads traverse forested areas and areas with intermixed residences and forests.

Segment 1 crosses within 0.4 mile of a private airport owned by Thomas Aviation in Orleans. Segment R5 terminates on Railroad Drive and will be installed along Central Avenue on existing poles, at its closest about 0.25 mile to the east of the public Eureka-Arcata airport. The Project does not cross any known active "Cortese list" properties.

Wildland fires are common in the Project area, particularly in Segments 1 and 2. They are started each summer by lightning in "dry" thunderstorms in mid to late summer, and by arson, typically along Highways 96 and 169 but also along county and tribal roads. Table 3.7-1 shows the fire hazard ratings by segment for the entire Project[30].

Table 3.7-1. Fire Danger Rating by Segment

Segment	Miles Crossed by Fire Danger Rating			
	Non-Wildland, Non-Urban	Moderate	High	Very High
1	0.4	0	3.7	11.1
2	0.1	0.1	9.3	14.7
3	0	0	10.7	11.2
4	0	3.4	7.3	1.1
R5	0.2	15.7	15.2	0

[30] California Department of Forestry and Fire Protection. 2007. Humboldt County Fire Hazard Severity Zone Map. Available online at http://www.fire.ca.gov/fire_prevention/fhsz_maps_humboldt. Last accessed 1/27/2020.

The results were obtained by overlaying the segment map on the GIS data supplied by CDF. The data show that about 80 percent of the Project area is in high or very high fire danger zones and that virtually all of the moderate rating is found on or near the coast along Segments 4 and R5. Fire danger zones are not mapped for NFS lands, where the Yurok Signal Connection is located, but adjacent forests are similar to those mapped as very high fire severity.

3.7.3 CEQA Checklist Criteria for Potential Impacts

HAZARDS AND HAZARDOUS MATERIALS: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒
f) For a Project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒
WILDFIRE: If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:	☐	☐	☐	☒
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

3.7.4 Analysis of Potential Impact

3.7.4.1 Hazardous Materials

During construction, gasoline and diesel fuels and hydraulic fluid used in construction equipment will be present in the construction activity area. No other hazardous materials will be used or present in the construction activity area. EPM WATER-1 specifies that BMPs will be used to prevent and contain spills. Therefore, there will be no adverse impact from the use of fuels and hydraulic fluid in the Project area during construction.

There is a low possibility, in the remote rural areas of the Project, that pre-existing hazardous materials may be present underground where trenching or directional drilling is proposed. If, in the process of underground installation, a suspicious material is exposed, construction will be stopped in that area and a specialist trained in detection and management of existing hazardous materials will be called to manage the situation. Material would be tested, removed from the Project area, and disposed of in accordance with California law depending on the contaminant found. EPM HAZ-1 specifies that the contractor will provide a Hazardous Substance Control and Emergency Response Plan for review and approval prior to construction.

The KRRBI Project, when operating, will not routinely transport, use, or dispose of hazardous materials nor emit hazardous materials. The generator for emergency power backup at the Orick Tower will use propane, but will not operate routinely. Propane will be delivered by a commercial entity responsible for determining the safety of the tank at each fill.

3.7.4.2 Airports

The fiber optic cable will be installed underground or beneath existing distribution and/or communications lines on existing overhead poles and will not provide any new hazard to either the private or the public airport in the vicinity. The Orick Tower is not in the vicinity of any airports.

3.7.4.3 Emergency Evacuation Plan

The Project will be installed underground or beneath existing distribution and/or communications lines on existing overhead poles and will not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

3.7.4.4 Wildfire Hazard

The KRRBI Project will be located in road shoulders, either overhead on existing poles or underground, and will not expose people or structures to a significant risk of loss, injury or death involving wildland fires. High-speed broadband can be used for telephone service and will increase communication capabilities in these remote rural areas, allowing residents better

knowledge of possible wildfire hazards. This may improve and will not impair adopted emergency response or evacuation plans.

The KRRBI Project is to be located underground along existing roads or on existing overhead utility poles. The increased focus on reducing wildfire hazard along roads and powerline rights of way, undertaken by local Fire Safe Councils, the Cultural Fire Management Council on the Yurok Reservation, CalTrans, PG&E, and CalFire, will not be impaired in any way by the presence of the KRRBI Project. Again, improved communications, particularly along Segment 2, may improve wildfire reporting and suppression. The Project will not install any infrastructure that will substantially contribute to wildfire risk. The Project will not expose the public to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes, since there will be no changes on steep slopes to runoff, drainage, or slope stability due to the Project.

EPMs FIRE-1 and FIRE-2 specify worker training and the availability of basic firefighting equipment, respectively, to reduce the chance that construction activities would provide an ignition source for wildfires. Also, the availability of tools and training means that if the construction crew comes upon a wildfire, they could help to control or extinguish it.

3.8 Hydrology and Water Quality

3.8.1 Regulatory Setting

3.8.1.1 Water Quality

Section 303(d) of the federal Clean Water Act and 40 CFR §130.7 require states to identify waterbodies that do not meet water quality standards and are not supporting their beneficial uses. These waters are placed on the Section 303(d) List of Water Quality Limited Segments (List), also known as the 303(d) List of Impaired Waterbodies. The List identifies the pollutant or stressor causing impairment and establishes a schedule for developing a control plan to address the impairment. Placement on this list generally triggers development of a pollution control plan called a Total Maximum Daily Load for each waterbody and associated pollutant/stressor on the list[31].

The State of California has listed the middle reaches of the Klamath River (from the confluence with the Scott River to the confluence with the Trinity River, covering Segment 1 of the KRRBI Project) as a 303(d) listed water for cyanobacteria hepatotoxic microcystins, nutrients, organic enrichment, sediment, and water temperature. Total Maximum Daily Loads have been established for the last two and were published in a plan in 2010[32]. The lower reaches of the Klamath River, from the confluence of the Trinity to the mouth (including Segment 2 and a

[31] From http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/index.shtml accessed 3/6/16
[32] http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/klamath_river/100927/03_BasinPlanLanugage_Klamath_Lost.pdf

portion of Segment 3), are also listed for nutrients, organic enrichment, sediment, and water temperature.

3.8.1.2 Wetlands

USACE has the responsibility for regulating the placement of dredged or fill materials in waters of the United States as part of Section 404 of the federal Clean Water Act. We anticipate that if waters of the United States were determined to be impacted by this Project, the USACE would allow Project activities under a Nationwide Permit for utility installation, likely a Nationwide 12 Permit. There is a Joint Aquatic Resources Permit Application (JARPA) that covers the requirements for the USACE and for the various State of California agencies, certifications, and permits as detailed below. Though the JARPA was originally designed for the Bay Area counties, it can be used anywhere in California with minor adjustments.

The State of California has reserved to its State Water Resources Control Board the authority to grant or withhold a Clean Water Act Section 401 certification based on the USACE proposed allowance of the use of the Nationwide 12 permit for utility installation. The Project will apply for a 401 certification from California if a Nationwide 12 permit is necessary as part of the JARPA process.

3.8.1.3 1600 Program

The State of California regulates any changes in the bed and bank of a State waterbody through the 1600 Program administered by the California Department of Fish and Wildlife. The JARPA process also covers this permit.

3.8.1.4 Construction Stormwater

The State of California also regulates construction stormwater discharge through its Clean Water Act Section 402 permit system called the National Pollutant Discharge Elimination System. The North Coast Regional Water Quality Control Board will be responsible for reviewing the application and issuing the permit. Linear Projects disturbing 1 or more acres of land must apply for a Construction General Permit.[33] The construction contractor will be responsible for applying for, obtaining, and abiding by the conditions of the Construction General Permit.

3.8.1.5 Flood and Tsunami Hazard

The Federal Emergency Management Administration provides maps of areas subject to flooding as a basis for local planning and zoning as well as in support of the National Flood Insurance Program. California Office of Emergency Services and the California Geological Survey produce tsunami hazard maps for use by the counties in planning and zoning.

[33] http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml

3.8.2 Environmental Setting

3.8.2.1 Watersheds

The Project parallels the Klamath River from Orleans to Weitchpec in Segment 1 and from Weitchpec to Wautec in a portion of Segment 2. It runs along the watershed divide between Redwood Creek to the south and west and the Klamath River and Prairie Creek to the east and north in Segments 3 and 4, and it parallels the Pacific Coast in Segment R5. Table 3.8-1 summarizes the number of miles the Project crosses a series of watersheds as specified by the U.S. Geologic Survey.[34] The U.S. Geologic Survey uses the "Hydrologic Unit Code" (HUC) system to provide a unique identifier for each watershed in the United States. The system starts with the region, then the sub-region, accounting unit, and cataloging unit. The Project is entirely within Region 18, which covers most of California as well as the Klamath Basin in Oregon and within Subregion 01 (Klamath Northern California Coastal). A length of 55.5 miles of the Project are within the Accounting Unit Lower Klamath, while 48.5 miles are within the Mad-Redwood.

Table 3.8-1. HUC 8 and HUC 12 Watersheds Crossed

Segment	HUC 8	HUC 12	Miles Crossed
1	Lower Klamath	Slate Creek-Klamath River	11.4
		Boise Creek-Klamath River	3.3
		Camp Creek	0.4
		Bluff Creek	0.1
2	Lower Klamath	Tully Creek-Klamath River	13.4
		Pecwan Creek	0.1
		Ah Pah Creek-Klamath River	1.6
		Mettah Creek_Klamath River	8.1
		Slate Creek-Klamath River	0.9
3	Lower Klamath	Tully Creek-Klamath River	7.3
		Roach Creek	2.8
		Pine Creek	6.1
	Mad-Redwood	McArthur Creek-Redwood Creek	0.6
		Bridge Creek-Redwood Creek	5.1
4	Mad-Redwood	McArthur Creek-Redwood Creek	7.8
		Prairie Creek	2.4
		Tectah Creek	1.6
R5	Mad-Redwood	Lindsay Creek	2.6
		Little River	4.6
		Luffenholtz Creek-Frontal Pacific Ocean	20.7
		Maple Creek	1.6
		McArthur Creek-Redwood Creek	1.4
		Mill Creek-Mad River	0.1

[34] Seaber, Paul R., Kapinos, F.P., and Knapp, G.L. 1987. Hydrologic Unit Maps. USGS Water Supply Paper 2294. Data from USGS Watersheds Dataset, found online at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/watersheds/dataset/

All waterbodies crossed in Segment 1 are tributary to the Klamath River. Segment 1 will cross over the Klamath River in the spur to DNR in an overhead installation. It will cross over Camp and Crawford creeks, both perennial, in an overhead installation. It will cross Ullathorne Creek, Little Red Cap Gulch, and Red Cap Gulch (all perennial) either by installation over the culvert (trenching or saw cutting) or by directional drilling beneath the culvert. It will cross Slate Creek, Bluff Creek, and Aikens Creek by hanging a single conduit from the existing bridge structure. It will then cross the intermittent creeks Joe Marine, Cavenaugh, Saints Rest, and Muddy Creeks by directional drilling beneath the culvert.

All waterbodies crossed in Segment 2 are tributary to the Klamath River, and Segment 2 itself crosses the Klamath River at Martins Ferry in an overhead crossing, immediately adjacent to the existing copper telephone line overhead crossing (now Frontier Communications). Segment 2 will cross over many perennial and intermittent streams in overhead installation, and will cross Pecwan Creek in an existing culvert on the bridge.

Segment 3 will cross fewer creeks than Segment 2 because much of the installation is on or near ridgelines. Where creeks are crossed, they are in culverts, and the Project will use directional drilling to cross beneath those culverts.

Segment 4 parallels, then crosses, Redwood Creek in the town of Orick using an overhead crossing just west of the Highway 101 crossing.

Segment R5 crosses many perennial and intermittent streams along the existing PG&E ROW where it crosses GDR lands, including one that is the municipal water supply for the town of Trinidad, Luffenholtz Creek. Most streams in Segment R5 will be crossed overhead on the existing PG&E poles or on existing joint-use poles along Murray and Central Avenues in McKinleyville. Along Murray Road, where two small streams are contained in culverts, the Project will use directional drilling to install the fiber optic cable beneath the culverts.

The Orick Tower is located in a flat area away from perennial or intermittent streams. Antenna Ridge (Yurok Signal Connection) is located on a ridge between watersheds and away from perennial or intermittent streams.

3.8.2.2 Flood Hazard

Much of the Project area is mapped as "D", or "possible but undetermined flood hazards." All of Segments 1, 2, and 3 have been mapped as "D" or as ANI (area not included because lands are federally managed and not permanently occupied). The only place the Federal Emergency Management Administration has conducted flood mapping is along the Pacific Coast. Table 3.8-2 shows the number of miles the Project would cross the "A" or high-risk flood zone in the town of Orick, across Big Lagoon, and along Crannell Road across the Little River floodplain.

Table 3.8-2. Miles Crossing Flood Zone A

Installation Method	Segment 4	Segment R5
Overhead Distribution or Transmission	0.1	2.5
Directional Drill	0.0	0.0
Trench	0.3	0.1
TOTAL	0.4	2.6

The Orick Tower would not be located in a flood zone.

3.8.2.3 Tsunami Hazard

Humboldt County provides mapping of the tsunami risk along the Pacific Coast. Table 3.8-3 shows the miles the Project would cross the tsunami hazard zone, mostly in the vicinity of the town of Orick but also a small amount at the crossing of Big Lagoon.

Table 3.8-3. Miles Crossing Tsunami Hazard Zone

Installation Method	Segment 4	Segment R5
Overhead	1.1	1.5
Directional Drill	0.0	0.0
Trench	0.2	0.0
TOTAL	1.3	1.5

The Orick Tower would be located in a tsunami hazard zone.

3.8.3 CEQA Checklist Criteria for Potential Impacts

HYDROLOGY AND WATER QUALITY: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☐	☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner which would:	☐	☐	☐	☒
(i) result in substantial erosion or siltation on- or off-site?				
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☐	☒
(iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
(iv) impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

3.8.4 Analysis of Potential Impact

3.8.4.1 Water Quality

The Project will not violate any water quality standards. The construction contractor will be required to develop a SWPPP as part of the application for a permit under Section 402 of the Clean Water Act. The construction process will adhere to the SWPPP and will have BMPs in place to avoid any violation of water quality standards.

The EPM WATER-1 specifies that the construction contractor will be required to develop and file a SWPPP and to comply with the permit conditions as issued by the State Water Resources Control Board, Region 1. The EPM WATER-2 specifies that construction industry standard practices and BMPs will be used for spill prevention and containment.

The SWPPP will specify measures needed to control erosion and limit sedimentation outside the construction footprint. One of the best sources for industry-standard practices, particularly for a project like this that is located along roads, is the CalTrans BMP manual.[35] While the SWPPP is the responsibility of the construction contractor, the Karuk Tribe will review the SWPPP prior to allowing the construction contractor to apply for the Section 402 permit from the State Water Resources Control Board. Further, the Karuk Tribe will employ an inspector during construction to be sure that the construction contractor is complying with the terms of the SWPPP.

The Project will not use groundwater during operation. The only water use will be during construction and will be used for dust control where needed. Water will be obtained from allowable drafting locations. See Section 2.4.8.5 for estimated total water use.

3.8.4.2 Watersheds

The Project will not alter the drainage pattern anywhere. The existing roads have drainage ditches and the Project may be installed in those ditches. The construction contractor is responsible for restoring the ditches to full function after the fiber optic cable is installed. The Project will not create or contribute runoff water different from the roads themselves where the fiber optic cable will be installed.

3.8.4.3 Flood Hazard

The fiber optic cable will be installed within the 100-year flood zone for 0.4 mile (0.3 mile underground) in Segment 4 (along Highway 101 just south of the Bald Hills Road intersection) and 2.5 miles overhead on existing distribution and transmission poles and 0.1 mile underground along Murray Road in Segment R5. Much of the remaining area of the Project has not been mapped for flood hazard, but flood hazard may exist. The fiber optic cable, where installed underground in known flood hazard areas, will be specifically engineered to resist

[35] California Department of Transportation. 2017. Construction Site Best Management Practices (BMP) Manual. Available online at http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm

periodic flooding and remain buried in its trench. Engineering will likely include encapsulating concrete anchors at set distances that ensure the conduits will remain buried in flood conditions. Final engineering, including distances and sizes of concrete anchors, will be completed prior to construction based on soil types and agency requirements.

3.8.4.4 Tsunami Hazard

Most of the fiber optic cable installation within the tsunami zone (90 percent) is planned for attachment to existing poles. The poles are the property of PG&E or the incumbent landline provider (Frontier Communications), but the KRRBI Project will provide additional guy wires where indicated to accommodate the additional load from the fiber optic cable. Engineering for the small underground portion will likely include encapsulating concrete anchors at set distances that ensure the conduits will remain buried in tsunami conditions. Final engineering, including distances and sizes of concrete anchors, will be completed prior to construction based on soil types and agency requirements.

The Orick Tower will be located within the tsunami zone, though not in a mapped flood zone. The tower foundations will be designed to resist a tsunami run-up. Those practices will likely include providing oversized foundations; reinforced structure components; and higher rated and possibly additional hardware, anchors, and mounts to withstand extreme catastrophic conditions. Antenna mounting heights will be designed to be above the inundation height of a reasonably foreseeable tsunami wave. The Humboldt County building permit will specify standards to be met and will not be issued until the engineering drawings reflect those standards.

3.9 Land Use, Recreation, Planning, and Energy

3.9.1 Regulatory Setting

Each of the three federal agencies with land management responsibility (NPS, USFS, and BLM) has developed a land management plan for their lands. Lands within the Yurok Reservation are managed by the Yurok Land Use Plan. Private lands outside the Yurok Reservation are regulated by Humboldt County's General Plan[36], currently under revision, that regulates land use within the county on private lands. GDR has several important agreements with state and federal agencies regarding its timber harvest and road maintenance programs.

3.9.1.1 Redwood National Park

The RNP was designated in 1968 and expanded in 1978. RNP was established "to preserve significant examples of the primeval coastal redwood (*Sequoia sempervirens*) forests and the streams and seashores with which they are associated, for purposes of public inspiration,

[36] Humboldt County. 1984. Humboldt County General Plan. Available online at http://www.humboldtgov.org/205/Plans last accessed 6/26/16.

enjoyment, and scientific study, there is hereby established a Redwood National Park in Del Norte and Humboldt Counties, California." (Public Law 90-545, October 2, 1968.)

> [I]n order to protect existing irreplaceable Redwood National Park resources from damaging upslope and upstream land uses, to provide a land base sufficient to insure preservation of significant examples of the coastal redwood in accordance with the original intent of Congress, and to establish a more meaningful Redwood National Park for the use and enjoyment of visitors (PL 95-250, March 27, 1978).

CFR 36 §14.2 provides for the issuance of ROWs for linear facilities and is the guidance for the NPS in consideration of the application from the Karuk Tribe.

3.9.1.2 USFS Six Rivers National Forest

The KRRBI Project will pass through 12 miles of NFS land managed by the USFS as part of the Six Rivers National Forest along Highway 96. USFS published the Six Rivers National Forest Land and Resource Management Plan in 1995. It specified the management of the Klamath River as a Wild and Scenic River, recreational designation, in the area of the Project. Of the 9.3 miles within NFS lands, 7.8 miles are within the Wild and Scenic River corridor, all within the CalTrans Highway 96 road prism. The Yurok Signal Connection facilities will be located on NFS lands.

The section of the 1995 plan dealing with special uses, including projects such as KRRBI, states, "15-2 Special uses should be allowed on National Forest System land when these uses will not conflict with National Forest programs or objectives, cannot be reasonably developed on private land, and are in the public's interest (p IV-122, in Lands section)."

3.9.1.3 Bureau of Land Management

The KRRBI Project will pass through two "scattered tracts" managed by the BLM on Highway 96.

BLM Arcata Resource Area Resource Management Plan (1992) provides general guidance for areas of BLM lands, including a management area called "scattered tracts" to which the parcels crossed by the KRRBI Project pertain. The plan states "Rights-of-way determinations cannot be made at this planning level with any degree of credibility. Federal tracts do not control rights-of-way such as highways or utility corridors. Proposals will be addressed on a site-specific basis (page 9)."

3.9.1.4 California Department of Parks and Recreation

Humboldt Lagoons State Park's Preliminary General Plan (1983) is the most recent planning document available (Shannon Dempsey, pers. comm., March 11, 2020). It makes no mention of the existing PG&E transmission line crossing of State Park lands, probably because the lands were acquired after the transmission line was built and came with the lands already encumbered with a permanent easement. Indications from state-level staff are that the existing

easement may be sufficient, or the CDPR may be willing to issue a separate easement (Eeden Lee, pers. comm, January 23, 2020).

3.9.1.5 Humboldt County

Humboldt County's General Plan's intent is to be "a long range statement of public policy for the use of public and private lands within the unincorporated areas of Humboldt County. These public policies establish a generalized pattern of land use for a twenty year period which is the foundation of more detailed implementation. The pattern of land use as represented in this General Plan attempts to balance economic and social needs of the public with inherent characteristics of the land, plant and animal life, and air and water conditions (General Plan, Section 1200)." The General Plan is complemented by the North Coast Coastal Plan and the Orick Community Plan in the Project area[37]. These plans are largely implemented through the zoning ordinances, most recently amended in 2009. These plans include planning for the coastal zone, which is also regulated in California by the California Coastal Commission and the California Coastal Act (Public Resources Code Section 30000, and following).

3.9.1.6 Green Diamond Resource Company

GDR lands are managed through a Forest Management Plan, a series of Timber Harvest Plans, regulated by the California Department of Forestry, and through a series of agreements with federal and state wildlife management agencies called Habitat Conservation Plans[38]. The THPs and HCPs specify when and where timber harvest, roadbuilding, road maintenance, and other activities may take place and under what conditions. The Aquatic Species Habitat Conservation Plan specified a series of road reconstructions that modified stream crossings and reduced the potential for sediment deposition into those streams.

3.9.2 Environmental Setting

3.9.2.1 Land Use and Management

Table 2.4-3, above, shows the miles crossed by land manager or owner, for the Project.

NFS lands are largely managed for "ecological restoration" and for "sustainable recreation", according to the Six Rivers National Forest website.[39] The Segment 1 route passes the Ullathorne, Big Bar, and Aikens Creek River Access areas and the E-Ne-Nuk campground. During the summer, kayak and raft trips are scheduled for many portions of the river on NFS lands adjacent to the Project area.

BLM scattered tracts are managed to "Enhance natural values and provide opportunities for environmental education.[40]" In particular, any tracts with old-growth timber, including the

[37] All Humboldt county planning documents can be found at http://www.humboldtgov.org/205/Plans
[38] These documents can be found at https://greendiamond.com/responsible-forestry/california/
[39] http://www.fs.usda.gov/land/srnf/landmanagement
[40] BLM. 1992. Arcata Resource Area Resource Management Plan, page 44. Available online at http://www.blm.gov/ca/st/en/fo/arcata/planning.html. Last accessed 6/26/16.

parcel crossed by the Project, are managed for old-growth forest habitat. These parcels in particular have been part of a discussion with the Yurok Tribe for transfer to Trust status for the Tribe. Recreation is also an important part of BLM land management, and the Klamath River crosses these parcels and is used for fishing and water-based recreation.

Segments 3 and 4 cross through RNP. Segments 3 and 4 will be installed in Bald Hills Road, which is an important access road for recreational use and for park activities including restoration and management of the fire-dependent meadows that make up the Bald Hills. Segment R5 will be installed overhead on existing distribution and transmission poles from Orick to the north end of Fieldbrook, then underground along Murray Road, then overhead on existing distribution poles along Murray Road and Central Avenue in McKinleyville to the endpoint on Railroad Drive. While it crosses lands managed by the CDPR, it does not interfere with existing recreational uses of those lands.

GDR lands are managed for timber production, watershed protection, and wildlife habitat conservation. The young redwood and Douglas-fir GDR forest lands crossed by Segments 3 and 4 border the RNP along the Bald Hills Road and are actively managed for timber production. Segment R5 crosses near young redwood stands that are also managed actively for timber. Segment R5 will be installed on existing PG&E poles in an existing ROW (maintained clear of trees) through GDR lands, and its installation will be as required by the GDR easement document.

Other private lands crossed by the roads used by the Project are managed for a wide variety of uses, including residences, schools, farms, working forests, and some light industrial and commercial properties along Highway 101 in Orick.

3.9.2.2 Recreation

Recreation in the Project area is largely water-related in Segment 1, with most visitors coming to fish or float the Klamath River. Use of the road that accesses Orleans Mountain is typically limited to locals. There are no trailheads for hiking along that road. Segment 2 recreational opportunities are limited to those provided by Yurok guide services and those enjoyed by tribal members on the reservation. Segment 3 recreational opportunities include using Bald Hills Road to access hunting areas and to access the RNP. Segment 4 recreational opportunities are focused on the RNP and its hiking, photography, and camping options along Redwood Creek and up on the ridges and within the important stands of old-growth redwoods. Recreational opportunities in Segment R5 include those available in the small town of Orick, where there are stores, motels, cafes, and a gas station that serve RNP and State Park visitors. West of Segment R5, Humboldt Lagoons State Park and the Harry A. Merlo State Recreation Area provide opportunities for boating, fishing, boat-in camping, and hiking.

3.9.2.3 Energy

The Project will not require grid power during construction. Operation will require regional power grid supply at Orleans, Weitchpec, Wautec, and Orick. Recent usage at the Orleans Tower is a good estimate for usage at the other sites (PG&E downloaded data from June 19, 2017 to June 18, 2018). This usage should be included in the KRRBI calculations at 3,218 kilowatt hours per year (268 kilowatt hours per month or just short of 9 kilowatt hours per day). Assuming all four sites use about the same amount of power, that comes to 12,872 kilowatt hours per year for the four sites. Power will likely be purchased from the Redwood Coast Energy Authority, which operates under a plan to maximize renewable energy[41].

3.9.3 CEQA Checklist Criteria for Potential Impacts

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
LAND USE AND PLANNING: Would the Project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation of an agency adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
RECREATION:				
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒
ENERGY: Would the Project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?	☐	☐	☐	☒
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

3.9.4 Analysis of Potential Impact

The KRRBI Project will have no impact on land use in the Project area. It will not divide an established community. It will not conflict with any land use plan, policy, or regulation of the various agencies with jurisdiction over the Project. In order to go to construction, the KRRBI Project will need permits from the various regulating agencies. These permits are only issued to a project that is in conformance with the land use planning and specify conditions under which it may be installed and operated. EPMs G-2, G-3, and G-4 specify compliance with the various management plans to avoid any conflict.

[41] https://redwoodenergy.org/, last accessed 4/10/20

The KRRBI Project will not adversely affect the use and operation of state and county roads. CalTrans will specify the terms under which this broadband Project may be installed underground in the shoulder and also overhead on Highways 96, 101, and 169. The MOA between the Karuk Tribe and Humboldt County specifies the terms and conditions under which the Tribe may install broadband fiber optic cable in county roads.

The KRRBI Project will have no adverse effect on recreation. During construction, there will be minor traffic delays to accommodate equipment on the road shoulder, but they will be no longer than those routinely used by CalTrans and Humboldt County during road maintenance activities. Once the Project is in operation, it will provide additional communication opportunities to subscribers to the KRRBI broadband, including fishing, hunting, and float trip guides. The broadband provided to State Parks facilities will improve additional communication opportunities to visitors to those facilities. This will likely improve the range of recreational opportunities and the availability of up-to-date information.

The Project will not use grid power during construction and will not be wasteful or inefficient in its use of energy during operations. Only the minimum amount of energy needed to run the broadband system will be consumed. The Project will not conflict with any plan for renewable energy or energy efficiency.

3.10 Noise and Radio Frequency

3.10.1 Regulatory Setting

Federal land managing agencies, including NPS, USFS, and BLM, have land management plans that sometimes explicitly address noise levels, particularly with regards to limited operating season for construction equipment. The NPS has specified limited operating seasons within areas it has mapped as old growth, including portions of Segments 3 and 4 where they cross RNP lands. Humboldt County has noise ordinances to protect human health.

3.10.2 Environmental Setting

The Project crosses remote rural areas with low ambient noise levels. The highways and county roads in which the fiber optic cable will be installed are often the primary sources of noise for adjacent residences, businesses, and habitats. Traffic levels are low compared to more urban areas, but road maintenance activities are more frequent due to inherent geologic instability, landslides, and weather-related problems like heavy rainfall, snowfall, blowdown of trees across the road, and vegetation management for safety.

3.10.3 CEQA Checklist Criteria for Potential Impacts

NOISE: Would the Project result in:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.10.4 Analysis of Potential Impact

During construction of the fiber optic cable element, the noise of the bucket truck and other truck-mounted equipment used would be noticeable to adjacent residences, though would last generally an hour or less at any pole and would occur over only 1 day for any given location. Underground installation will have a noise pattern similar to road maintenance activities. For example, pavement cutting is similar to the routine dig-outs conducted by maintenance crews to replace portions of damaged pavement. Installation in road shoulders and ditches is similar in noise and duration to ditch-cleaning activities.

During installation of the Orick Tower, construction noise might be audible from the highway or from the nearest residence. Construction noise for tower installation is estimated to last less than 3 weeks. The Humboldt County building permit will have specific conditions for construction work hours that will limit impacts. Adverse impacts from noise would be negligible.

During operation, the propane-powered generator, used in case of power failure at the Orick Tower, would be operated once a week and also during power failure. Its specifications show its noise level to be 63 dB(A) at 23 feet from the generator. Given atmospheric attenuation and noise buffering from intervening trees and vegetation, no adverse impact from generator noise would occur at the nearest residence.

A study was conducted to meet Humboldt County requirements of the radio frequency emissions from the antennae on the 90-foot tower in Orleans. Radio frequency emissions will be similar at the Orick Tower. Emissions are well below federal and state standards at ground level (see Appendix D, Radio Frequency Study for the Orleans Tower).

3.11 Population, Housing, Utilities, and Public Services

3.11.1 Regulatory Setting

Humboldt County's General Plan regulates housing, utilities, and public services.

3.11.2 Environmental Setting

The KRRBI Project will be installed along roads that for the most part travel through unpopulated or lightly populated areas. The Project intends to serve remote rural individual homes and small villages along Highways 96 and 169 as well as the slightly larger towns of Orleans (population 605), Weitchpec (population 150), and Orick (population 357).

Public electric service, provided by PG&E, is available to some residents along Segment 1 and 5 and in portions of Segments 2, 3, and 4. Landline telephone is provided by Frontier Communications and is available to a portion of residents in Segments 1, 2, and 4, available to residents in Segment R5, and not available in Segment 3.

Humboldt County Sheriff's office and the California State Highway Patrol provide law enforcement. There is a resident sheriff's deputy assigned to the Orleans, Weitchpec, and Wautec areas, but he is often required to provide backup in Hoopa and Willow Creek and is routinely reassigned out of the area to cover vacancies. Response times are often 1 to 2 hours. On the Yurok Reservation, Yurok Tribal Police enforce tribal law and work with the sheriff for state law enforcement.

Federal law enforcement officers are occasionally present on NFS lands, and NPS rangers are charged with enforcing park laws and regulations.

Fire protection for structures is provided by local volunteer fire departments in Orleans and Orick and on the Yurok Reservation. None of the volunteer fire departments is staffed full-time, and volunteers respond to emergencies from home or work. In the McKinleyville area, fire protection for structures is provided by the Arcata Volunteer Fire Department, a partly-professional, partly-volunteer department. Wildland fire protection is provided by the USFS on NFS lands, by NPS on RNP, and by CDF on other lands and by mutual aid agreement on federal lands as well. The Karuk Tribe has developed wildland fire response capability and is available to assist in its ancestral territory from Orleans to Weitchpec in the Project area. The Yurok Tribe maintains a staffed wildland fire station and responds to fires within the reservation as well as providing mutual support for other wildland fire agencies.

There are public elementary schools, part of the Klamath-Trinity Unified School District, in Orleans, Weitchpec, and Wautec, and a public elementary school in Orick. Children who graduate from these schools must travel to Hoopa or to McKinleyville for high school because there are no high schools in the Project area. Schools in McKinleyville include McKinleyville Union Elementary and Morris Elementary Schools (within 0.5 mile of Segment R5 at its southern endpoint), Dows Prairie Elementary (within 0.5 mile of Alternative 5), and McKinleyville High School (0.4 mile from both Segment R5 and Alternative 5). There are active preschool Head Start programs in Orleans, Weitchpec, and Ka'Pel that serve all community members.

3.11.3 CEQA Checklist Criteria for Potential Impacts

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING: Would the Project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
PUBLIC SERVICES: Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒
UTILITIES AND SERVICE SYSTEMS: Would the Project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

3.11.4 Analysis of Potential Impact

The Project will provide a new broadband utility service and will improve delivery of emergency services, including police, fire, and emergency medical response, by increasing access to Internet services including Voice Over Internet Protocol service.

The Project will not increase population in the Project area by providing this new infrastructure. Population in the Project area is limited by lack of private land available for development and the lack of water, sewer, and electric power in much of the area. One of the goals of the Project is to give existing residents new business opportunities in their home communities to reduce

the exodus of the young people and help to support the traditions of the communities. No housing or people will be displaced by this Project. The Project will not require or adversely affect utilities and service systems such as wastewater treatment or water facilities.

3.12 Socioeconomics and Environmental Justice

The section analyzes the potential impacts the Project's activities could have on population, economic conditions, housing, property values, education, public services, and tax revenue. It also determines if there are minority and/or low-income communities, and if there are, if there is the potential for Project activities to have disproportionately high or adverse human health or environmental effects on minority and/or low-income populations in accordance with Executive Order 12898.

3.12.1 Regulatory Setting

Executive Order 12898 of 1994 required the federal government to analyze its actions to determine if they have the potential to have disproportionately high or adverse human health or environmental effects on minority and/or low-income populations.

3.12.2 Environmental Setting

The Project crosses and is within northeastern Humboldt County, California. Humboldt County (population 134,623) represents 0.4 percent of the population of California (2010 Census). Median income in Humboldt County, at $42,153, is 68.6 percent that of California as a whole. Humboldt County population is concentrated in and around Humboldt Bay in central Humboldt County and in and around Garberville in Southern Humboldt County. The population of the census block groups crossed by the Project is 4.3 percent of the population of Humboldt County as a whole.

This remote rural region is characterized by large tracts of public land (RNP, managed by the NPS, and Six Rivers National Forest, managed by the USFS), two large Reservations (Hoopa Valley and Yurok), and large tracts of forested land owned by GDR and a few other large landowners. Population is scattered into remote homesteads and small villages, with slightly larger population areas along the rivers and near the coast.

Full-time employment is limited to tribal, federal, state, and local government jobs and a very few service jobs. Most employment is part-time and related to forestry, fishing, agriculture, or transportation of products.[42] Unemployment and poverty rates are high. Median income in the Yurok Reservation, for example, is 22 percent of the median income for Humboldt County[43].

The Project serves two census tracts (101.02 and 102.00) and its interconnection with high-speed, high-bandwidth Internet briefly crosses Tracts 103.00 and 104.00 and follows Central Avenue, which serves as the divider for Tracts 105.01 and 105.02. Eight percent of the Project (the southernmost portion of Segment R5) crosses Tracts 103.00, 104.00, 105.01, and 105.02, which

[42] American FactFinder 2016. 2010 Census.
[43] Table B19013, data.census.gov, Block Group 2, Census Tract 101.02, Humboldt County, CA

cover the northern part of the McKinleyville populated area. About 37 percent of the Project crosses Tract 102.00, which covers the area from Bald Hills road to the southwest and out to the coast, including the town of Orick (population 357) including the western portion of Segment 4 and Segment R5. The remaining 55 percent of the Project crosses Tract 101.02, which roughly covers the area to the northeast of the Bald Hills Road, north of the Hoopa Reservation, and includes Orleans (population 605), Weitchpec (population 150), Wautec, and Segments 1 and 2. Segment 3 is mostly within Tract 101.02, but follows the boundary between that tract and Tract 102 through a largely unpopulated area. Segment 4 likewise follows the dividing line between Tracts 101.02 and 102.00 until it descends off the ridge through the RNP to Highway 101 and into Orick, entirely within Tract 102.00.

The population of portions of these three census tracts, together with median income information, is shown in Table 3.12-1.

Table 3.12-1. Census Tract Information for Blocks Crossed by KRRBI

Census Tract	Block Group	Total Population[44]	Median Household Income (2018)	Percent Native American	General Location
101.02	1	1,178	$48,843	23.2%	Northeast of Bald Hills
	2	149	$13,500	73.8%	Yurok Reservation downriver of Weitchpec
	3	706	$39,300	48.4%	Orleans-Weitchpec
102.00	1	1,099	$35,600	8.8%	Orick and Big Lagoon
	2	607	$66,161	20.4%	Trinidad/Westhaven[a]
	3	905	$63,966	0.0%	Crannell[a]
103.00	1	891	$71,339	1.6%	Top end Fieldbrook[a]
104.00	2	1,851	$63,313	3.0%	North of Murray Rd[a]
105.01	2	2,325	$48,618	9.2%	West of Central Ave[a]
105.02	1	2,653	$50,071	3.4%	East of Central Ave[a]
Subtotal, Project Block Groups		3,132			
Humboldt County		136,373	$61,937	9.1%	
California		39,557,045	$71,228	2.0%	

[a] Not in service area but connects portion of Project to larger fiber optic grid

Table 3.12-2 shows the unemployment rate for the general population and for the Native American segment of the population for the tracts the Project serves.

Table 3.12-2. Unemployment Statistics, 2018[45]

Census Tract	101.02	102
Population 16+	1,858	2,225
Labor Force Participation Rate	50.2%	50.5%
Unemployment Rate, 16+	2.5%	4.3%
Unemployment Rate, 16+ American Indian	13.0%	2.1%
Percent of Population 16+ both unemployed and below poverty level	91.3%	20.8%

[44] Data.Census.Gov. Population is ACS 2018 estimates; % Native American is ACS 2018 estimates for Native American and includes Natives answering two races); median income is from ACS 2018 estimates. https://data.census.gov last accessed 3/7/2020

[45] American Community Survey 5-year estimates. 2020. Employment Status (S2301). 2014-2018 http://data.census.gov/, last accessed 3/25/2020

Table 3.12-3 shows number of housing units and occupancy rates for the tracts the Project serves.

Table 3.12-3. Housing and Occupancy Characteristics[46]

Census Tract	101.02	102
Total Housing Units	1,685	1,647
Occupied Housing Units	1,035	1,169
Homeowner Vacancy Rate	0.0%	1.2%
Rental Vacancy Rate	1.0%	1.6%

3.12.3 Analysis of Potential Impact

The purpose of this Project is to bring high-speed broadband Internet service to people living in the ancestral territories of the Karuk and Yurok Tribes, including tribal and non-tribal community members, who are presently unserved or underserved by current broadband providers. The Project will contribute to better education, health care, and business opportunities available through access to broadband Internet facilities, thereby developing economic opportunities in the communities themselves.

During construction of the Project, there will be short-term adverse impacts, including traffic delays and increased noise levels during the weeks of construction in any given area. These impacts will be greater where underground construction is needed, and much less where the only impacts are related to placing fiber optic cable on existing joint-use poles overhead.

The Project will have no permanent adverse effect on the minority and low-income populations in the area, and will have a permanent positive impact on these same populations. The Project will have no impact on the number or availability of housing units. Non-local Project construction workers will be housed in nearby motels and will not affect the availability of rental housing. The impact of the Project on income in the Project area is unknown at this time but is expected to be positive.

3.13 Traffic and Transportation

3.13.1 Regulatory Setting

CalTrans and Humboldt County Public Works control access to and use of public roads in their respective networks. They both require encroachment permits for installation, operation, and maintenance of the fiber optic cable, whether overhead or underground. Key requirements of their regulations include notification, conformance with the Manual of Uniform Traffic Control Devices, and as-built drawing submittal. The RNSP plan states that the parks will "depend on Del Norte and Humboldt Counties to manage and maintain county roads within the parks that provide access to nonpark lands that serve the general public in addition to RNSP visitors.[47]"

[46] American Community Survey 5-year estimates. 2020. Selected Housing Characteristics (DP04). 2014-2018. http://data.cencus.gov last accessed 3/25/2020

[47] National Park Service. 2000. General Management Plan/General Plan. Redwood National and State Parks.

3.13.2 Environmental Setting

The KRRBI Project will make use of State Highway and Humboldt County road easements, and will request easements from the NPS and from GDR for the use of roads managed by those two entities.

Highway 96, Highway 101, Dredge Road, Crannell Road, Murray Road, Central Avenue, and Railroad Drive are two-lane paved roads in the Project area, while Highway 169, Tulley Creek Road, Weitchpec Road, parts of Bald Hills Road, and Old Railroad Grade Road are paved or surfaced one-lane roads with wider portions allowing for passing. Upper and Lower Capell Roads, the middle 7 miles of Bald Hills Road, McKinnon Hill Road, the NPS West Side Access Road, and all GDR roads are graveled one-lane roads with periodic wider areas for passing. The access roads to Antenna Ridge and Orleans Mountain are Forest Service unpaved one-lane roads with occasional turnouts. The last 0.75 mile of the road to Orleans Mountain requires four-wheel-drive vehicles and is generally accessible during the summer months only. In winter, specialized off-road snow equipment is required for access.

Current traffic levels (2017 data[48]) on state highways in the Project area are light, ranging from an annual average daily traffic of 200 vehicles per day at Wautec at the end of Highway 169 to 3,900 vehicles per day at the south limit of Orick on Highway 101. As a comparison, the average annual daily traffic for Highway 101 at Indianola near Eureka is 37,000 and for Interstate 5 in Sacramento at P/Q Street is 192,000. There are no data for Humboldt County road traffic counts.

3.13.3 CEQA Checklist Criteria for Potential Impacts

TRANSPORTATION: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☐	☒
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

3.13.4 Analysis of Potential Impact

The installation of the fiber optic cable, either overhead or underground, will have no impact on traffic or transportation except during construction, when there may be brief periods of one-way controlled traffic, as is the case for all routine maintenance on any of these roads. The construction contractor will be required to follow the regulations found in the Manual of

[48] CalTrans Data https://dot.ca.gov/programs/traffic-operations/census, last accessed 4/11/2020

Uniform Traffic Control Devices and provide standard signage, flaggers, and pilot cars where indicated on state and county roadways. On GDR roads, which are needed to access the PG&E ROW, the GDR standards will be followed and the normal course of GDR business will not be adversely affected by construction. This will be accomplished by timing construction to avoid traffic problems. In all cases, emergency vehicles will be given priority to cross the construction area. EPMs TRANS-1 and TRANS-2 specify compliance with permit conditions for traffic control. If roads are damaged due to KRRBI construction, they will be restored as specified in EPM TRANS-3.

During operation and routine maintenance, there will be no impact. If there is damage to a stretch of fiber optic cable, emergency repairs may be managed as for construction with one-way controlled traffic.

The KRRBI will not conflict with a program, plan, ordinance, or policy addressing the circulation system. It is not inconsistent with CEQA guidelines section 15064.3, where subdivision (b) proposes general criteria for analyzing transportation impacts. The light amount of KRRBI construction traffic will have a minor and temporary impact on transportation on lightly traveled roads. The KRRBI will not increase traffic hazards because it includes no changes to existing roads.

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4 Analysis of Alternatives

4.1 Fiber Optic Cable Routes

No alternatives were considered for Segments 1, 2, and 4, because there were no reasonable alternative routes that could still connect the segments and provide the required service in Orleans, Weitchpec, Wautec, and Elk Camp. Segment 3 could technically connect with Segment 2 at either of its ends, provided it also connects with Segment 4 at Elk Camp and an alternative for this is examined. When initial review of the originally-proposed coastal route for Segment 5 revealed substantial environmental issues, an alternative was proposed that became the Proponent's proposed action. Further review and discussion with PG&E resulted in a revised route, Segment R5, that is now the KRRBI proposed alignment. See Figure 4.1-1, below, for a map of the alternatives considered.

4.1.1 Segment 3

An alternative was considered for Segment 3 but was removed from full consideration due to potential cultural resource impacts. Initially, the Project had considered connecting Segment 2 to Segment 4 by running a fiber optic cable overhead across the Klamath River in the vicinity of Wautec and then underground in Johnsons Road to Elk Camp and joining there with Segment 4. This alternative would have avoided the Lyons Ranch area in the RNP along the Bald Hills Road. However, after discussion with the Yurok Tribe cultural resources staff, this alternative was dropped because there were no locations near the west end of Segment 2 where an overhead crossing could be allowed, as there are multiple sensitive cultural areas along the river in that vicinity.

4.1.2 Segment R5

When the KRRBI Project was first proposed, the "meet-me" point with Suddenlink was located at the base of the southbound off-ramp from Highway 101 to Patrick's Point Drive north of the town of Trinidad. Based on concerns for maintenance and reliability of that point, Suddenlink suggested that the Project consider an alternative "meet-me" point on Dows Prairie Road. This alternative added 20 miles to the fiber optic installation portion of the Project, but did not add service area. Subsequent investigation in 2018 revealed that Suddenlink did not have the bandwidth available to support the KRRBI Project at that location. Also in 2019, AT&T stated that they could provide the needed level of service connection from their central office in McKinleyville.

The Project had originally planned to travel from Orick to the "meet-me" point off Highway 101 by installing underground along Highway 101. When a reconnaissance review of that route revealed a number of problems, the Karuk Tribe attempted to identify a route with fewer environmental impacts and fewer conflicts with existing utilities. A route crossing RNP and GDR lands was developed and fully analyzed in the 2017 PEA. At the time of developing that

route, GDR staff assisted the Karuk Tribe in gaining access to PG&E management who agreed that, at least in theory, the KRRBI Project could attach to its existing 60-kV transmission poles from Orick to Fieldbrook. The Karuk Tribe followed up, with the assistance of the CPUC, and completed the first steps of a pole attachment agreement with PG&E for this route in 2019.

In order to fairly compare the Segment 5 route analyzed in the PEA with the new Segment R5 route following the PG&E transmission line, the PEA route was extended along existing distribution lines to the same AT&T "meet-me" point from the Dows Prairie Suddenlink "meet-me".

The Karuk Tribe has selected Segment R5 as its proposed route. Although NPS staff dropped their requirement that an alternative be considered, the Karuk Tribe has maintained the extended PEA route as Alternative 5 for the purposes of comparison. What follows is an analysis of the important differences between Segment R5 and Alternative 5 in terms of environmental impact. Figure 4.1-2 shows the proposed and alternative routes now considered for this segment.

Table 4.1-1 shows a comparison of installation methods for the two routes.

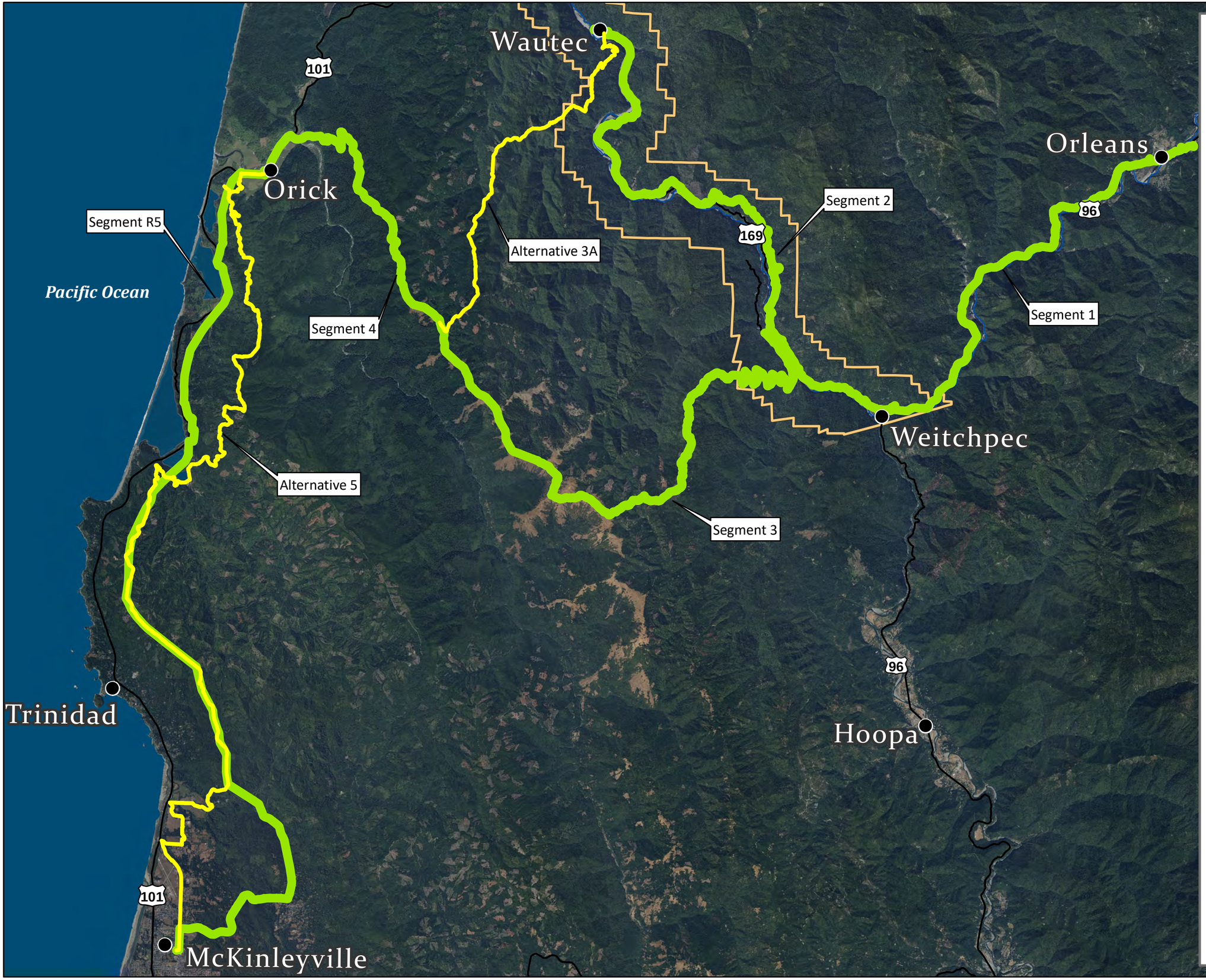
Table 4.1-1. Installation Method Comparison of Segment R5 and Alternative 5

Installation Method	Segment R5	Alternative 5
Trenching	3.5	26.2
Directional Drill	0.2	5.1
Overhead Distribution	1.9	9.9
Overhead Transmission	25.4	
Overhead New	0	0.3
Total	31	41.6

Klamath River Rural Broadband Project

Figure 4.1-1

Alternative Routes



Legend

- Alternative
- Proposed
- Yurok Reservation

0 1 2 4 Miles

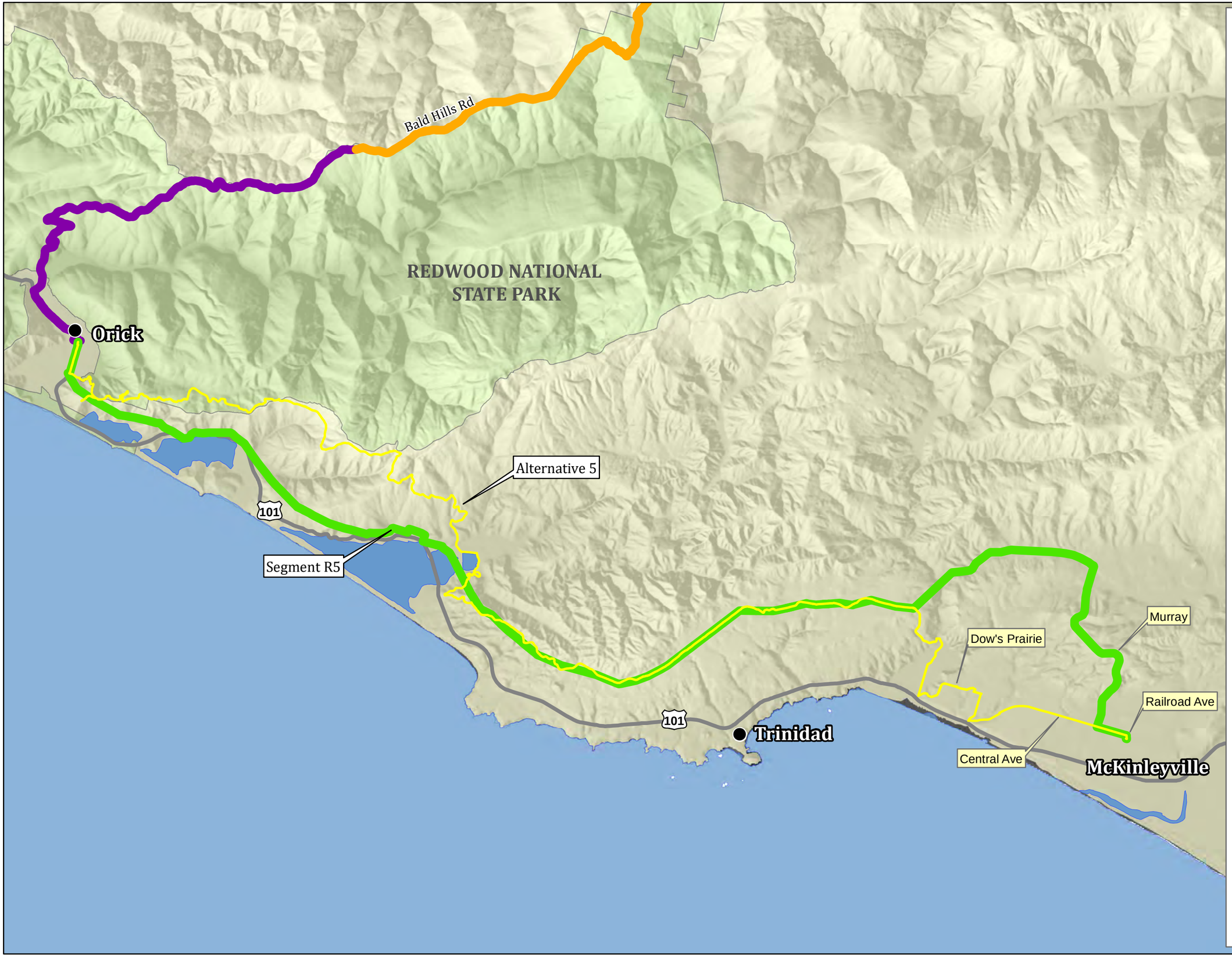
N W E S

Yurok Tribe GIS Program
April 15, 2020

Klamath River Rural Broadband Initiative

Figure 4.1-2

Segment R5 and Alternative 5



Legend

Fiber Install Route

Segment

- 3
- 4
- R5
- Alternative 5

N E S W

0 2 4 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
April 15, 2020

Segment R5 and Alternative 5 both start at the Orick Tower and continue down Highway 101 for a short distance to Hiltons Road. Segment R5 transitions there from overhead distribution to overhead transmission, then is attached to overhead transmission poles from that point to a point near Murray Road on Old Railroad Grade Road at the north end of Fieldbrook. Segment R5 is then installed underground along Murray Road for about 3.7 miles until overhead distribution is again available, and follows Murray Road, Central Avenue, and Railroad Drive to the "meet-me" point at the AT&T central office.

Alternative 5 turns north and follows Hiltons Road on existing distribution poles, then underground, to the gate for the NPS West Side Access Road. The route then follows the NPS West Side Access Road about 5 miles to the BL-1300 Road on GDR land, then follows the BL-1300, BL-1000, and BL-3000 roads to the Green Diamond road CR-1000 (also known as the A-Line or Hammond Truck Road). It then follows the CR-1000 road to the Humboldt County Crannell Road. From the NPS gate to near Crannell Road, Alternative 5 would be installed underground or on bridges where there are live creek crossings not contained in culverts. It then transitions to overhead installation on existing distribution poles or communications poles and follows Crannell Road to Dows Prairie Road, then continues south on Dows Prairie Road to Clam Beach Road. It follows Clam Beach Road west to Central Avenue, then follows Central Avenue south to Railroad Drive to the "meet-me" point at the AT&T central office for a total of 41.6 miles.

Table 4.1-2 shows a comparison across several important environmental resource variables for Segment R5 and Alternative 5.

Table 4.1-2. Summary Comparison of Segment R5 and Alternative 5

Environmental Element	Segment R5	Alternative 5
Total Length	31.0	41.6
Prime Agricultural Land	1.1	4.7
TPZ Lands	20.0	26.0
Redwood National Park	0.0	6.1
State Parks	3.9	0.0
Coastal Zone, total	11.1	16.9
Coastal Zone, state jurisdiction	0.4	0.1
100-year Flood (A) Zone	2.6	3.3
Tsunami Zone	1.5	3.6
Alquist-Priolo Hazard Zone	0.3	0.3

The proposed route is 10.6 miles shorter and has only 3.8 miles of underground installation compared with 29 miles of underground installation for Alternative 5, translating to substantially less ground disturbance. Segment R5 also crosses less TPZ zoned land than Alternative 5, and crosses no lands within the RNP as compared with 6.1 miles for Alternative 5. Alternative 5 crosses 3.6 more miles in prime agricultural land, 5.8 more miles in the coastal zone, 0.7 more mile in the 100-year flood zone, and 2.1 miles more in the tsunami hazard zone,

than does Segment R5. Segment R5 and Alternative 5 both cross 0.3 mile of an Alquist-Priolo zone in McKinleyville.

In summary, Segment R5 avoids or minimizes impacts to important resources by utilizing existing poles and minimizing underground installation. The Karuk Tribe, therefore, proposes that Segment R5 be the only route considered in the NEPA/CEQA document.

4.2 Orick Tower

The KRRBI Project includes the installation of a 90-foot tall tower in the town of Orick to provide robust wireless broadband service to the residences and businesses in Orick. The tower needs to be located near the intersection of Lundblade Road and Highway 101 to best serve all the residences and businesses from one location.

Original analysis provided a possible location in one of three properties, including the unstaffed CalTrans maintenance storage yard. One of the private properties is an old gas station with complications of prior contamination and was eliminated from consideration. The landowner of the second private property indicated an initial willingness to discuss sale of all or a portion of their property to the Karuk Tribe for the KRRBI Project, or to consider an easement on their property. The Karuk Tribe has initiated conversations with CalTrans for the use of the maintenance storage yard through an easement agreement, though has not pursued this option. The Karuk Tribe does not consider these alternatives, but options to be pursued. When a final arrangement is negotiated, the Karuk Tribe will modify its Project description to specify the tower location.

4.3 Yurok Signal Connection

No alternatives were considered for the Yurok Signal Connection. The extremely steep and rugged terrain necessarily limits the connection facilities to isolated high points in the mountains. When looking for a suitable location for the Yurok Signal Connection, the Karuk Tribe limited its consideration to non-wilderness locations having a line of sight to the Yurok Wiregrass Tower and to the Orleans Tower and not having tribal spiritual or traditional cultural significance. These conditions limited the potential location to the Orleans Mountain area. The Karuk Tribe also wanted to take advantage of the existing infrastructure on Orleans Mountain and the previously disturbed nature of Antenna Ridge to minimize new impacts in sensitive areas.

5 Applicant Proposed Measures

Measures are typically proposed to avoid, minimize, rectify, or compensate for unavoidable adverse impacts to the environment. The first step of any effort to mitigate for a project is to avoid impacts.

5.1 Avoidance

The KRRBI Project has been designed to avoid environmental impact to the greatest extent feasible. Initial routing for the Project was designed to follow previously disturbed areas, including state highways, county roads, previous logging haul roads now part of the NPS road system, and active logging roads. The Project proposes installation on existing utility poles where they can be used to avoid ground-disturbing activities. Any overhead installation carries a higher maintenance cost in the future due to weather-related hazards, vehicle crashes into poles, and trees and limbs falling on the lines and bringing them to the ground. But the installation is of negligible impact, since the poles are already in place and the additional impact to the aesthetics is virtually unnoticeable. Overhead installation on existing poles generally carries the least environmental impact.

Where existing overhead poles are not available or are already overloaded, the KRRBI Project proposes to install on new poles or within the road prism or in the road ditch where the road manager will allow. This keeps the disturbance from the Project to areas already disturbed (road ditches, road shoulders, etc.). Directional drilling has been proposed to avoid damage to paved road surfaces and to install the fiber optic cable beneath conduits and other infrastructure, and will be used also to avoid small wetlands that have formed in roadside ditches where permissible.

5.2 Minimization

Where the KRRBI Project could not entirely avoid impacts to the environment through design, it provides EPMs (listed in Table 5-1) to minimize impact. For example, the management of fugitive dust reduces air quality problems during construction, while the imposition of BMPs to manage construction stormwater runoff minimizes the chances for erosion or sedimentation. The Karuk Tribe has also committed to limiting adverse effects on wildlife species within the mapped old-growth areas of the RNP by obeying the limited operating season restrictions imposed by the NPS for installation in those areas. These measures further reduce the small impact of the Project.

At this time, the Karuk Tribe believes that residual impacts from the KRRBI Project are not likely to require compensatory mitigation measures. The Tribe has proposed monitoring and reporting measures (EPM G-1) to ensure that the proposed Project, including Applicant-proposed measures, does not have a substantial adverse effect on the environment while

providing a much-needed service to remote rural lands, serving tribal and non-tribal community members with high-speed broadband.

5.3 Proponent-Proposed Environmental Protection Measures

This section lists common-sense environmental protection measures and best management practices that the Karuk Tribe includes as part of the Project. Other measures may be developed during the NEPA/CEQA analysis, including mitigation measures imposed by various agencies, and may be included in this section in later editions.

Table 5-1. Environmental Protection Measures

EPM	Measure Description
G-1	Environmental Compliance Monitors hired by the Tribe will monitor construction activities and will report to the Tribe and to the agencies regarding construction compliance with permit terms and conditions. Monitoring activities will be structured in accordance with an Environmental Compliance Management Plan, developed by the Tribe and approved by the lead state and federal agencies prior to construction.
G-2	Forest Plan Standards and Guidelines (as amended) will apply on NFS lands. Ground-disturbing activities will comply with all Agency-wide, regional, and state BMPs.
G-3	RNP policies and regulations will apply within the RNP. Ground-disturbing activities will comply with listed seasonal constraints and other requirements.
G-4	As part of the Karuk Tribe's environmental compliance commitment, the Construction Contractor(s) will be contractually bound to comply with all laws, regulations, and permit requirements, including the mitigation measures and other specific stipulations and methods that are developed as part of the NEPA/CEQA process.
G-5	Directional drilling will be used where needed and approved to avoid impacts to water, biological, and cultural resources.
G-6	Workers will be encouraged to carpool from housing to the work site each day.
G-7	A list and map of available and analyzed laydown and staging areas was provided in this document. If the construction contractor wishes to utilize other laydown areas or staging areas, it is up to the contractor to show to the satisfaction of agencies with jurisdiction prior to their use during construction that those areas provide similar or less disturbance than those shown in this document.
G-8	The Construction Contractor will be required to develop and implement a Health and Safety Plan.
G-9	The Construction Contractor will be required to develop and implement a Worker Environmental Awareness Program (WEAP).
G-10	At least one portable toilet and hand-washing station will be provided per crew.
SOIL-1	Disturbance of soils and vegetation removal will be limited to the minimum area necessary for access and construction.
WEED-1	Project personnel and their contractors will be trained on noxious and invasive weed identification to facilitate avoidance of infestations where possible or identification of new infestations.
WEED-2	Gravel and other materials used during fiber optic cable installation on federally managed lands will come from certified weed-free sources.
WEED-3	Project vehicles will arrive at the job site clean of all soil and herbaceous material. The Construction Contractor will ensure vehicles and equipment are free of soil and debris capable of transporting noxious weed seeds, roots, or rhizomes before the vehicles and equipment access the Project.
REC-1	Final Cleanup: Final cleanup will ensure that all construction areas are free of any construction debris including, but not limited to: assembly scrap metals, oil or other petroleum-based liquids, construction wood debris, and worker-generated litter. Permanent erosion control devices will be left in place.

Table 5-1. Environmental Protection Measures

EPM	Measure Description
WET-1	Wetland delineations will be performed prior to construction to support CWA Section 404 permitting and to minimize Project impacts. The delineation will identify both wetland and non-wetland waters of the United States that would be affected by the Project. The delineation will also provide sufficient information to support California permitting and will include delineation of wetland and non-wetland waters of the State of California.
WET-2	Where impacts on wetlands are not avoidable, site-specific crossing plans and measures to mitigate impacts will be submitted to the appropriate regulatory agency, as well as the land managing agency. The Karuk Tribe will obtain all necessary permits prior to discharging dredged or fill material to waters of the United States and state.
WET-3	If trench dewatering is needed, it will be completed per the CalTrans BMP NS-2 specifications and Field Guide to Construction Site Dewatering
BIO-1	If construction will occur during nesting season for migratory birds (typically March – July each year), a qualified biologist will conduct a preconstruction survey for nesting birds where vegetation removal is planned (e.g., plowing, trenching, establishment of directional drilling entry and exit pits, and new pole installation). If no nests are encountered, vegetation removal may proceed. If a nest is found, that vegetation may not be removed until a biologist has determined that the nest is unoccupied, has failed, or the young have fledged.
BIO-2	Seasonal restrictions for construction in old-growth forests in RNP, as specified by NPS regulations and policy, will be followed. Seasonal restrictions for construction in GDR lands will follow GDR policies and agreements.
BIO-3	2015 data show that there are no active NSO nests within 0.5 mile of the Project centerline. Data from the breeding season prior to construction will be reviewed to ensure that there are no new NSO nests within 0.25 mile of the Project centerline. If a new NSO nest is found within 0.25 mile of the Project centerline, no construction will be allowed within 0.25 mile until August 1, or until a qualified biologist has determined that the young are fledged, the nest abandoned, or the nest failed.
BIO-4	Directional drilling will be used in areas of old-growth redwood roots (Segment 4, Bald Hills Road) to avoid impacts to the trees.
BIO-5	Where bridge hangs are planned, a preconstruction survey for listed species of bats will occur. If a maternal colony of a listed bat is found, construction will be deferred until the young have been weaned.
CR-1	Qualified archeologists will perform all cultural resources work with trained assistants.
CR-2	An Inadvertent Discovery Plan will be prepared. This plan will specify what steps will be taken if a subsurface cultural resource is discovered during construction, including stopping construction in the vicinity of the find, notification of the appropriate land management agency, identification of a qualified archaeologist to conduct an evaluation of the find, and the development of an approved data recovery program or other mitigation measures.
CR-3	Avoidance areas will be flagged or otherwise marked prior to construction activities. Flagging or other marking will be removed once construction is completed in an area.
CR-4	To minimize unauthorized collecting of archaeological material or vandalism to known archaeological sites, all workers will attend mandatory training on the significance of cultural resources and the relevant federal regulations intended to protect these resources.
CR-5	If human remains are discovered, construction will be halted, and the coroner will be notified. Measures specified in NAGPRA regulations will be followed on federal lands.
CR-6	The Karuk Tribe will supply Native American Monitors in the Karuk Ancestral Territory, and the Yurok Tribe will supply Native American Monitors in the Yurok Ancestral Territory. Where ancestral territories are mapped as overlapping, monitors from both tribes will work in tandem.
CR-7	Where depth of archaeological resources in highly sensitive areas can be known or assumed, directional drilling may be required by land managing agencies to avoid cultural resources.

Table 5-1. Environmental Protection Measures

EPM	Measure Description
	Directional drilling depths should be two feet below known maximum depth of cultural resources. If fractured bedrock must be drilled, preventing the inadvertent release of drilling fluids (inert clays and water) cannot be guaranteed.
AIR-1	Fugitive dust produced during construction will be controlled with watering as needed. Watering will only settle the dust and will not create runoff.
AIR-2	Trucks and heavy equipment used during construction of this Project will meet California Air Resources Board standards for air pollution control for their model year.
WATER-1	The construction contractor will be required to develop and file a SWPPP and to comply with the permit conditions as issued by the State Water Resources Control Board, Region 1.
WATER-2	Construction industry standard practices and BMPs will be used for spill prevention and containment.
VIS-1	In areas with high scenic sensitivity, such as RNP, markers indicating underground fiber optic cable will be 2 feet tall 4 x 4 inches treated wooden posts with attached dulled metal signs that are legible but not visually intrusive, or as specified by the land managing agency.
VIS-2	Where required by the land managing agency or landowner, safety markers indicating the presence of underground utilities can be omitted. Additional detection systems will be installed in the vaults and along the fiber optic cable lines.
TRANS-1	Traffic control measures such as traffic control personnel, warning signs, lights, and barriers will be used during construction as specified in the encroachment permits from road managers to ensure safety and to minimize traffic congestion.
TRANS-2	Emergency vehicle access to private property will be maintained during construction.
TRANS-3	Roads negatively affected by construction and as identified by the agencies will be returned to preconstruction condition.
FIRE-1	Construction Contractor will provide a Fire Plan. This plan will include a training program for all personnel about the measures to take in the event of a fire including; fire dangers, locations of extinguishers and equipment, emergency response, and individual responsibilities for fire prevention and suppression. The plan will also require all motor vehicles and equipment to carry, and individuals using handheld power equipment to have, specified fire prevention equipment. Carry shovels, water, and fire extinguishers on all equipment and vehicles.
HAZ-1	Construction Contractor will provide a Hazardous Substance Control and Emergency Response Plan for review and approval prior to construction
OM-1	Before beginning an operations or maintenance project, KRRBI contractors or their subcontractors will clean all equipment that will operate off-road or disturb the ground. The entire vehicle or equipment will be cleaned at an off-site location.
OM-2	The Tribe will provide crews and contractors with maps showing environmentally sensitive areas; these maps will include work zones as well as ROW areas where ground disturbance will be avoided.

6 List of Preparers

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Appendix A
Air Quality Report

Appendix B
Biology Report

Appendix C
Cultural Reports

Table C-1 Results of Site Search Summary (Public)

Table C-2 Results of Study Search (Public)

Karuk Results (Confidential)

Yurok Results (Confidential)

Table C-1 Results of Site Search Summary (Public)

Table C-2 Results of Study Search (Public)

Karuk Results (Confidential)

Yurok Results (Confidential)

Appendix D
Radio Frequency Study for Orleans Tower