

Technical Memorandum

To: Klamath River Renewal Corporation	Project: Lower Klamath Project
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Date: June 24, 2022	
Subject: Fire Access Boat Ramp and Dry Hydrant Design Memo	

1.0 Introduction

1.1 Purpose

The purpose of the Fire Access Boat Ramp and Dry Hydrant Design Memorandum is to describe the details of the design and intent of the fire access boat ramps and dry hydrants during the construction of the Lower Klamath Project, FERC Project No. 14803.

1.2 Background

The Lower Klamath Project (FERC No. 14803) consists of four hydroelectric developments on the Klamath River: J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate (Figure 1-1). Specifically, the reach between J.C. Boyle Dam and Iron Gate Dam is known as the Hydroelectric Reach. In September of 2016, the Klamath River Renewal Corporation (Renewal Corporation) filed an Application for Surrender of License for Major Project and Removal of Project Works, FERC Project Nos. 2082-063 and 14803-001 (License Surrender). The Renewal Corporation filed the License Surrender Application as the dam removal entity for the purpose of implementing the Klamath River Hydroelectric Settlement (KHSA). In November of 2020, the Renewal Corporation filed its Definite Decommissioning Plan (DDP) as Exhibits A-1 and A-2 to its Amended License Surrender Application (ALSA). The DDP is the Renewal Corporation’s comprehensive plan to physically remove the Lower Klamath Project and achieve a free-flowing condition and volitional fish passage, site remediation and restoration, and avoidance of adverse downstream impacts (Proposed Action). The Limits of Work is a geographic area that encompasses dam removal and restoration related activities associated with the Proposed Action. The Limits of Work may extend beyond the Federal Energy Regulatory Commission (Commission) boundary associated with the Lower Klamath Project where specifically noted.

The Proposed Action includes the deconstruction of the J.C. Boyle Dam and Powerhouse, Copco No. 1 Dam and Powerhouse, Copco No. 2 Dam and Powerhouse, and Iron Gate Dam and Powerhouse, as well

as associated features. Associated features vary by development, but generally include powerhouse intake structures, embankments and sidewalls, penstocks and supports, decks, piers, gatehouses, fish ladders and holding facilities, pipes and pipe cradles, spillway gates and structures, diversion control structures, aprons, sills, tailrace channels, footbridges, powerhouse equipment, distribution lines, transmission lines, switchyards, original cofferdams, portions of the Iron Gate Fish Hatchery, residential facilities, and warehouses. Facility removal will be completed within an approximately 20-month period.

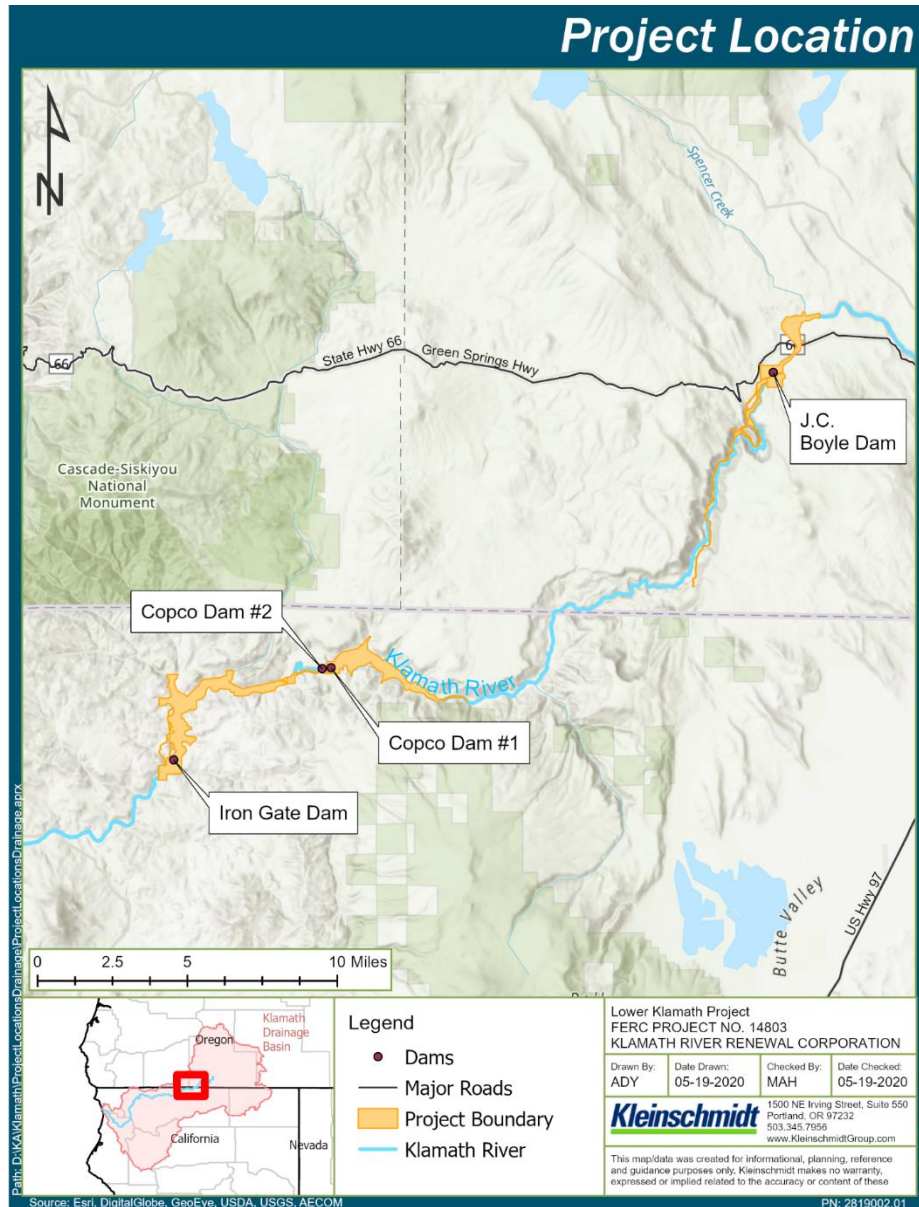


Figure 1-1. Lower Klamath Project Location

1.3 Project Need

As part of the overall Lower Klamath Project (LKP), a Fire Management Plan (KRRC 2021) was developed to address fire risks associated with the physical removal of the Lower Klamath dams. The Fire Management Plan was developed in consultation with CalFire Siskiyou Unit, Oregon Department

of Forestry (ODF) Klamath Lake and Southwest Oregon Districts, and local fire departments. From a short-term perspective, the Fire Management Plan requires the Renewal Corporation to use best management measures and comply with regulations to prevent and control fire risk associated with deconstruction activities. From a long-term perspective, dam removal will result in the loss of three Project reservoirs, which have been used as water supply for firefighting. It will also result in regrowth of vegetation in the reservoir footprints. The Fire Management Plan was developed, therefore, to ensure that these changes do not result in an increase in wildfire risk in the area. To this end, the Renewal Corporation will:

- Install Monitored Detection System cameras in a 570 square-mile area around the Project;
- Purchase dip tanks and maintain aerial river access sites for helicopter crews;
- Purchase equipment to assist the local communities with defensible space and reducing risk of structure fires; and
- Construct ramps for fire trucks to access the river as well as install dry hydrants for ground crews.

This memo focuses on the latter bullet, which includes fire access boat ramps and dry hydrants.

1.4 Fire Access Boat Ramp Design

Per the Fire Management Plan, the Renewal Corporation will construct three fire access boat ramps at the following locations:

- Below Iron Gate Dam at the existing fire access boat ramp
- Below Copco 2 at the existing boat launch near the Fall Creek Confluence
- Above J.C. Boyle at Pioneer Park West

The fire access boat ramps below Iron Gate and above J.C. Boyle will have concrete ramps and access roads in accordance with NFPA standards for width, grade, and turning radius (NFPA, 2017) and will be built using materials that can support the weight of water tenders and fire engines (KRRC, 2021). Design of these fire access boat ramps will follow the guidance provided in Board (2011). In the case of the fire access boat ramp at Fall Creek Confluence, based on stakeholder communication during a site visit in spring of 2022, the existing boat launch will be upgraded with new substrate, but will otherwise not be further developed (i.e., no cast-in-place or precast concrete will be introduced at this site for the fire access boat ramp).

Design criteria for the fire access boat ramps are summarized in Table 1-1.

Table 1-1. Fire Access Boat Ramp Design Criteria

Criterion	Value
Minimum Roadway Width (feet [ft])	12
Minimum Radius of Curvature at Bends (ft)	100
Accessibility	All-Weather

1.5 Dry Hydrant Design

Based on consultation with CalFire that took place after the December 2021 issuance of the Fire Management Plan, the proposed hydrants at Deer Creek and Beaver Creek were removed from the plan, resulting in the following final dry hydrant locations:

- Iron Gate
- Jenny Creek
- Fall Creek Hatchery
- Fall Creek Confluence
- Pioneer Park West

These five permanent dry hydrants will be constructed to provide simple and reliable water supply for ground-based firefighter crews to fill fire engines and water tenders. This measure will be implemented as part of the road and bridge improvements associated with the construction and dam removal. The long-term maintenance of the hydrants will be the responsibility of CalFire and ODF. The dry hydrants will provide water access that is currently not available around the reservoir and will reduce fire suppression response times and allow for more aggressive responses as tanker refill and rotation times are reduced (KRRC, 2021).

The design and construction of the dry hydrants complies with NFPA standards (NFPA, 2017). The location and materials of these dry hydrants follow the standards of NFPA 1142 (NFPA, 2017). The dry hydrants are designed to provide a minimum flow of 1000 gallons per minute (2.2 cubic feet per second) (NFPA, 2017), which is a fraction of the low flow discharges of the perennial tributaries selected for the hydrants. The screened hydrant intakes are located in adjacent tributaries with 1 ft of flow depth below and 2 ft above (NFPA, 2017). The intake locations are placed upstream of the crossings to reduce the vertical height that water must be raised during drafting (lift) to less than 10 ft, unless an alternate maximum lift value is specified by firefighting groups (KRRC, 2021). A slope of at least 2% is suggested for the buried pipe to allow for proper draining and reduce any freeze issues. The hose connection fitting provided at the dry hydrant must be compatible with the local and agency pump equipment and conform to the NFPA 1963 standards (NFPA, 2019).

Design criteria for the dry hydrants are summarized in Table 1-2.

Table 1-2. Dry Hydrant Design Criteria

Criterion	Value
Pipe Material	Schedule 40 PVC
Minimum Flow Rate (gallons per minute)	1,000
Minimum Dry Hydrant Clearance (ft)	3
Accessibility	All-Weather
Minimum Hydrant Distance from Structures (ft)	100
Minimum Depth above Strainer (ft)	2
Minimum Depth below Strainer (ft)	1

2.0 Facility Descriptions

The following section provides a detailed description of the proposed fire access boat ramps and dry hydrants at each location.

2.1 Iron Gate Fire Access Boat Ramp and Dry Hydrant

The existing Iron Gate boat ramp will be improved, and one dry hydrant will be added. Figure 2-1 shows the proposed improvements at the Iron Gate fire access boat ramp.

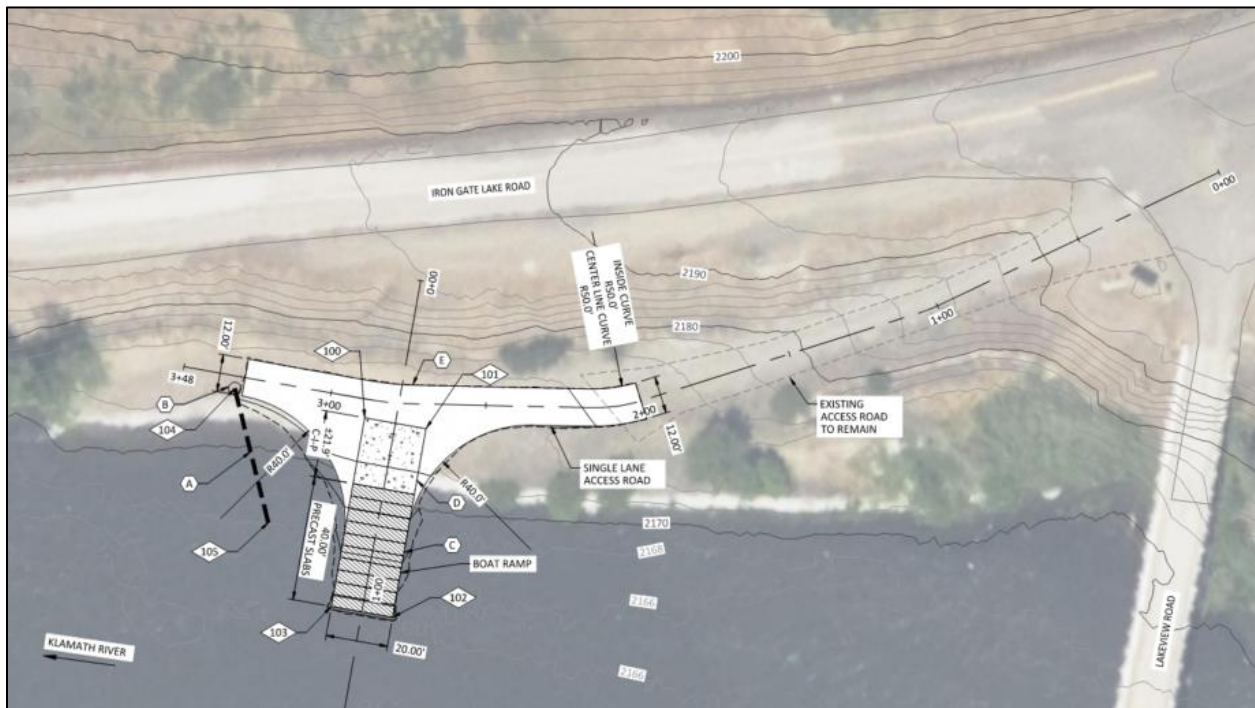


Figure 2-1. Iron Gate Boat Ramp and Dry Hydrant

Improvements to the existing boat ramp below Iron Gate Dam consists of the installation of both pre-cast and cast-in-place segments of boat ramp, in addition to a new dry hydrant. Access improvements will include new gravel surfacing, in addition to access geometry that provides sufficient turning radii and adequate cross slopes for fire access equipment. The dry hydrant will pull water from the Klamath River downstream of the proposed fire access boat ramp location. This location will provide emergency vehicles with enough room to maneuver and use the dry hydrant if necessary. A 20-ft x 20-ft pad of cast-in-place concrete will be poured to transition the gravel road to the fire access boat ramp. Another 40 ft of precast panels will be placed in-river to allow access to the Klamath River. The road grading, ramp profile, and dry hydrant details are included in Appendix A – Design Drawings.

2.2 Jenny Creek Dry Hydrant

One dry hydrant will be added near Jenny Creek. Figure 2-2 shows the proposed improvements at the Jenny Creek dry hydrant.



Figure 2-2. Jenny Creek Dry Hydrant

The proposed dry hydrant location at Jenny Creek is on the north end of an existing gravel parking lot. The intake screen is located upstream of the hydrant at Jenny Creek. This location will provide emergency vehicles with sufficient room to maneuver and use the dry hydrant. Access is provided from Iron Gate Lake Road and the existing gravel parking lot at that location. Refer to Appendix A – Design Drawings for specific design details.

2.3 Fall Creek Hatchery Dry Hydrant

One dry hydrant will be added near Fall Creek Hatchery. Figure 2-3 shows the proposed improvements at the Fall Creek Hatchery dry hydrant.



Figure 2-3. Fall Creek Hatchery Dry Hydrant

The proposed dry hydrant location at Fall Creek Hatchery is at the intersection of an unnamed dirt road and Copco Road's bridge over Fall Creek near the existing adult holding ponds. The intake screen is located downstream of the hydrant location in Fall Creek. This location will provide emergency vehicles with sufficient room to maneuver and use the dry hydrant. The pipe routing path is included in Appendix A – Design Drawings. The construction of this dry hydrant system will be coordinated with the new Fall Creek Hatchery

2.4 Fall Creek Confluence Fire Access Boat Ramp and Dry Hydrant

The existing boat launch at Fall Creek Confluence will be improved, and one dry hydrant will be added, per Figure 2-4. Improvements will include resurfacing the approach access and ensuring adequate radii of curvature are established for fire access equipment. The fire access boat ramp itself will not include any cast-in-place or precast segments. Instead, improvements will be made to the fire access boat ramp surface by applying a course of aggregate material to provide traction for fire access equipment. A dry hydrant will also be installed downstream of the fire access boat ramp and will provide ground crews with

simple access for filling tenders and other purposes. Installation of the dry hydrant will require clearing and grubbing vegetation near the proposed hydrant location and along the proposed pipeline trench.

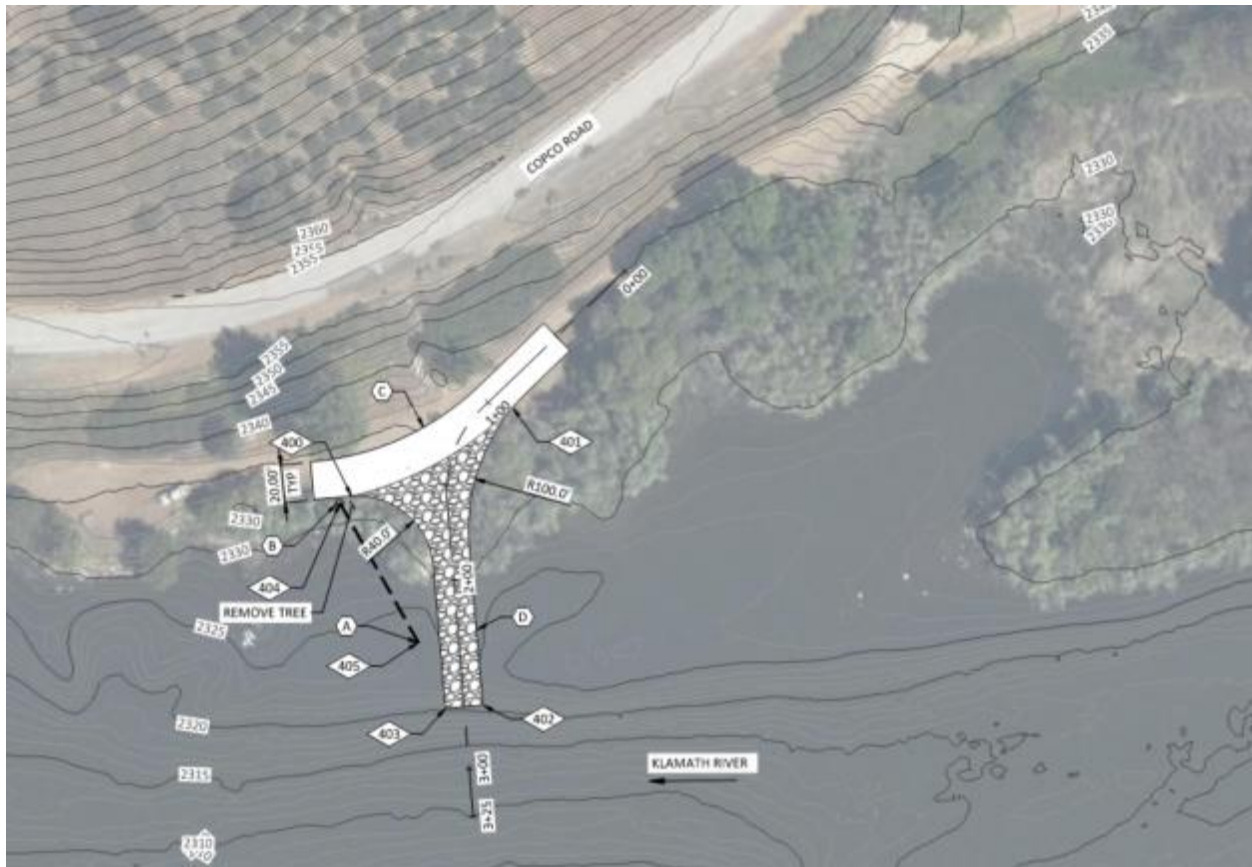


Figure 2-4. Fall Creek Confluence Fire Access Boat Ramp and Dry Hydrant

2.5 Pioneer Park West Fire Access Boat Ramp and Dry Hydrant

The Pioneer Park West fire access boat ramp will be constructed, and one dry hydrant will be added. Figure 2-5 shows the proposed improvements at the Pioneer Park West fire access boat ramp.



Figure 2-5. Pioneer Park West Fire Access Boat Ramp and Dry Hydrant

The Pioneer Park West fire access boat ramp is part of the future recreational facility expansion at the J.C. Boyle Reservoir. A 24-ft-wide gravel road will extend the existing asphalt road around the mature trees to the fire access boat ramp location. The gravel road will end, where 163 ft of precast panels will extend into the Klamath River provided recreation and emergency access to the river. The dry hydrant placed on the east side of the access road at the transition from gravel to precast will pull water from the Klamath River upstream of the proposed fire access boat ramp location. This location will provide emergency vehicles with sufficient room to maneuver and use the dry hydrant. The road grading, ramp profile, and dry hydrant details are included in Appendix A – Design Drawings.

3.0 Construction

The fire access boat ramps and dry hydrants will be constructed by the Renewal Corporation and its contractor, Kiewit Infrastructure West, Inc. These facilities will be constructed in accordance with the details presented on the Construction Drawings, as well as the Technical Specifications provided under separate cover.

4.0 References

- Board, O. S. (2011). *Design Guidelines for Recreational Boating Facilities*. Salem, OR: Oregon State Marine Board.
- KRRC. (2021). *Klamath River Renewal Corporation (KRRC) Fire Management Plan*.

NFPA. (2017). *National Fire Protection Association (NFPA) 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting.*

NFPA. (2019). *National Fire Protection Association (NFPA) 1963 Standard for Fire Hose Connection.*