

**WHITEWATER BOATING TAKE-OUT
IMPROVEMENT FEASIBILITY
STUDY REPORT
DON PEDRO PROJECT
FERC NO. 2299**



Prepared for:
Turlock Irrigation District – Turlock, California
Modesto Irrigation District – Modesto, California

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Whitewater Boating Take-Out Improvement Feasibility Study Report

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List of Acronyms

ac	acres
ACEC	Area of Critical Environmental Concern
AF	acre-feet
ACOE	U.S. Army Corps of Engineers
ADA	Americans with Disabilities Act
ALJ	Administrative Law Judge
APE	Area of Potential Effect
ARMR	Archaeological Resource Management Report
BA	Biological Assessment
BDCP	Bay-Delta Conservation Plan
BLM	U.S. Department of the Interior, Bureau of Land Management
BLM-S	Bureau of Land Management – Sensitive Species
BMI	Benthic macroinvertebrates
BMP	Best Management Practices
BO	Biological Opinion
CalEPPC	California Exotic Pest Plant Council
CalSPA	California Sports Fisherman Association
CAS	California Academy of Sciences
CCC	Criterion Continuous Concentrations
CCIC	Central California Information Center
CCSF	City and County of San Francisco
CCVHJV	California Central Valley Habitat Joint Venture
CD	Compact Disc
CDBW	California Department of Boating and Waterways
CDEC	California Data Exchange Center
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game (as of January 2013, Department of Fish and Wildlife)
CDMG	California Division of Mines and Geology
CDOF	California Department of Finance
CDPH	California Department of Public Health

CDPR	California Department of Parks and Recreation
CDSOD	California Division of Safety of Dams
CDWR.....	California Department of Water Resources
CE	California Endangered Species
CEII.....	Critical Energy Infrastructure Information
CEQA.....	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CMAP	California Monitoring and Assessment Program
CMC.....	Criterion Maximum Concentrations
CNDDB.....	California Natural Diversity Database
CNPS.....	California Native Plant Society
CORP	California Outdoor Recreation Plan
CPUE	Catch Per Unit Effort
CRAM.....	California Rapid Assessment Method
CRLF.....	California Red-Legged Frog
CRRF	California Rivers Restoration Fund
CSAS.....	Central Sierra Audubon Society
CSBP.....	California Stream Bioassessment Procedure
CT	California Threatened Species
CTR.....	California Toxics Rule
CTS	California Tiger Salamander
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
CWHR.....	California Wildlife Habitat Relationship
Districts	Turlock Irrigation District and Modesto Irrigation District
DLA	Draft License Application
DPRA.....	Don Pedro Recreation Agency
DPS	Distinct Population Segment
EA	Environmental Assessment
EC	Electrical Conductivity

EFH.....	Essential Fish Habitat
EIR	Environmental Impact Report
EIS.....	Environmental Impact Statement
EPA.....	U.S. Environmental Protection Agency
ESA.....	Federal Endangered Species Act
ESRCD.....	East Stanislaus Resource Conservation District
ESU	Evolutionary Significant Unit
EWUA.....	Effective Weighted Useable Area
FERC.....	Federal Energy Regulatory Commission
FFS	Foothills Fault System
FL.....	Fork length
FMU	Fire Management Unit
FOT	Friends of the Tuolumne
FPC	Federal Power Commission
ft/mi.....	feet per mile
FWCA.....	Fish and Wildlife Coordination Act
FYLF.....	Foothill Yellow-Legged Frog
g.....	grams
GIS	Geographic Information System
GLO	General Land Office
GPS	Global Positioning System
HCP.....	Habitat Conservation Plan
HHWP.....	Hetch Hetchy Water and Power
HORB	Head of Old River Barrier
HPMP.....	Historic Properties Management Plan
ILP.....	Integrated Licensing Process
ISR	Initial Study Report
ITA.....	Indian Trust Assets
kV.....	kilovolt
m	meters
M&I.....	Municipal and Industrial
MCL.....	Maximum Contaminant Level
mg/kg	milligrams/kilogram

mg/L	.....	milligrams per liter
mgd	.....	million gallons per day
mi	.....	miles
mi ²	.....	square miles
MID	.....	Modesto Irrigation District
MOU	.....	Memorandum of Understanding
MSCS	.....	Multi-Species Conservation Strategy
MSE	.....	Mechanically Stabilized Earthmsl mean sea level
MVA	.....	Megavolt Ampere
MW	.....	megawatt
MWh	.....	megawatt hour
mya	.....	million years ago
NAE	.....	National Academy of Engineering
NAHC	.....	Native American Heritage Commission
NAS	.....	National Academy of Sciences
NAVD 88	.....	North American Vertical Datum of 1988
NAWQA	.....	National Water Quality Assessment
NCCP	.....	Natural Community Conservation Plan
NEPA	.....	National Environmental Policy Act
ng/g	.....	nanograms per gram
NGOs	.....	Non-Governmental Organizations
NHI	.....	Natural Heritage Institute
NHPA	.....	National Historic Preservation Act
NISC	.....	National Invasive Species Council
NMFS	.....	National Marine Fisheries Service
NOAA	.....	National Oceanic and Atmospheric Administration
NOI	.....	Notice of Intent
NPS	.....	U.S. Department of the Interior, National Park Service
NRCS	.....	National Resource Conservation Service
NRHP	.....	National Register of Historic Places
NRI	.....	Nationwide Rivers Inventory
NTU	.....	Nephelometric Turbidity Unit
NWI	.....	National Wetland Inventory

NWIS	National Water Information System
NWR	National Wildlife Refuge
NGVD 29	National Geodetic Vertical Datum of 1929
O&M	operation and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
ORV	Outstanding Remarkable Value
PAD	Pre-Application Document
PDO	Pacific Decadal Oscillation
PEIR	Program Environmental Impact Report
PGA	Peak Ground Acceleration
PHG	Public Health Goal
PM&E	Protection, Mitigation and Enhancement
PMF	Probable Maximum Flood
POAOR	Public Opinions and Attitudes in Outdoor Recreation
ppb	parts per billion
ppm	parts per million
PSP	Proposed Study Plan
QA	Quality Assurance
QC	Quality Control
RA	Recreation Area
RBP	Rapid Bioassessment Protocol
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RM	River Mile
RMP	Resource Management Plan
RP	Relicensing Participant
RSP	Revised Study Plan
RST	Rotary Screw Trap
RWF	Resource-Specific Work Groups
RWG	Resource Work Group
RWQCB	Regional Water Quality Control Board
SC	State candidate for listing under CESA
SCD	State candidate for delisting under CESA
SCE	State candidate for listing as endangered under CESA

SCT	State candidate for listing as threatened under CESA
SD1	Scoping Document 1
SD2	Scoping Document 2
SE	State Endangered Species under the CESA
SFP	State Fully Protected Species under CESA
SFPUC	San Francisco Public Utilities Commission
SHPO	State Historic Preservation Office
SJRA	San Joaquin River Agreement
SJRG	San Joaquin River Group Authority
SJTA	San Joaquin River Tributaries Authority
SPD	Study Plan Determination
SRA	State Recreation Area
SRMA	Special Recreation Management Area or Sierra Resource Management Area (as per use)
SRMP	Sierra Resource Management Plan
SRP	Special Run Pools
SSC	State species of special concern
ST	California Threatened Species under the CESA
STORET	Storage and Retrieval
SWAMP	Surface Water Ambient Monitoring Program
SWE	Snow-Water Equivalent
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TAF	thousand acre-feet
TCP	Traditional Cultural Properties
TDS	Total Dissolved Solids
TID	Turlock Irrigation District
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRT	Tuolumne River Trust
TRTAC	Tuolumne River Technical Advisory Committee
UC	University of California
USDA	U.S. Department of Agriculture

USDOC	U.S. Department of Commerce
USDOI	U.S. Department of the Interior
USFS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Department of the Interior, Fish and Wildlife Service
USGS	U.S. Department of the Interior, Geological Survey
USR.....	Updated Study Report
UTM.....	Universal Transverse Mercator
VAMP	Vernalis Adaptive Management Plan
VELB	Valley Elderberry Longhorn Beetle
VRM	Visual Resource Management
WPT	Western Pond Turtle
WSA.....	Wilderness Study Area
WSIP	Water System Improvement Program
WWTP	Wastewater Treatment Plant
WY	water year
µS/cm	microSeimens per centimeter

1.0 INTRODUCTION

1.1 General Description of the Don Pedro Project

Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts) are the co-licensees of the 168-megawatt (MW) Don Pedro Project (Project) located on the Tuolumne River in western Tuolumne County in the Central Valley region of California. The Don Pedro Dam is located at river mile (RM) 54.8 and the Don Pedro Reservoir formed by the dam extends 24-miles upstream at the normal maximum water surface elevation of 830 ft above mean sea level (msl; NGVD 29). At elevation 830 ft, the reservoir stores over 2,000,000 acre-feet (AF) of water and has a surface area slightly less than 13,000 acres (ac). The watershed above Don Pedro Dam is approximately 1,533 square miles (mi²).

Both TID and MID are local public agencies authorized under the laws of the State of California to provide water supply for irrigation and municipal and industrial (M&I) uses and to provide retail electric service. The Project serves many purposes including providing water storage for the beneficial use of irrigation of over 200,000 ac of prime Central Valley farmland and for the use of M&I customers in the City of Modesto (population 210,000). Consistent with the requirements of the Raker Act passed by Congress in 1913 and agreements between the Districts and City and County of San Francisco (CCSF), the Project reservoir also includes a “water bank” of up to 570,000 AF of storage. CCSF may use the water bank to more efficiently manage the water supply from its Hetch Hetchy water system while meeting the senior water rights of the Districts. CCSF’s “water bank” within Don Pedro Reservoir provides significant benefits for its 2.6 million customers in the San Francisco Bay Area.

The Project also provides storage for flood management purposes in the Tuolumne and San Joaquin rivers in coordination with the U.S. Army Corps of Engineers (ACOE). Other important uses supported by the Project are recreation, protection of the anadromous fisheries in the lower Tuolumne River, and hydropower generation.

The Project Boundary extends from approximately one mile downstream of the dam to approximately RM 79 upstream of the dam. Upstream of the dam, the Project Boundary runs generally along the 855 ft contour interval which corresponds to the top of the Don Pedro Dam. The Project Boundary encompasses approximately 18,370 ac with 78 percent of the lands owned jointly by the Districts and the remaining 22 percent (approximately 4,000 ac) is owned by the United States and managed as a part of the U.S. Bureau of Land Management (BLM) Sierra Resource Management Area.

The primary Project facilities include the 580-foot-high Don Pedro Dam and Reservoir completed in 1971; a four-unit powerhouse situated at the base of the dam; related facilities including the Project spillway, outlet works, and switchyard; four dikes (Gasburg Creek Dike and Dikes A, B, and C); and three developed recreational facilities (Fleming Meadows, Blue Oaks, and Moccasin Point Recreation Areas). The location of the Project and its primary facilities is shown in Figure 1.1-1.

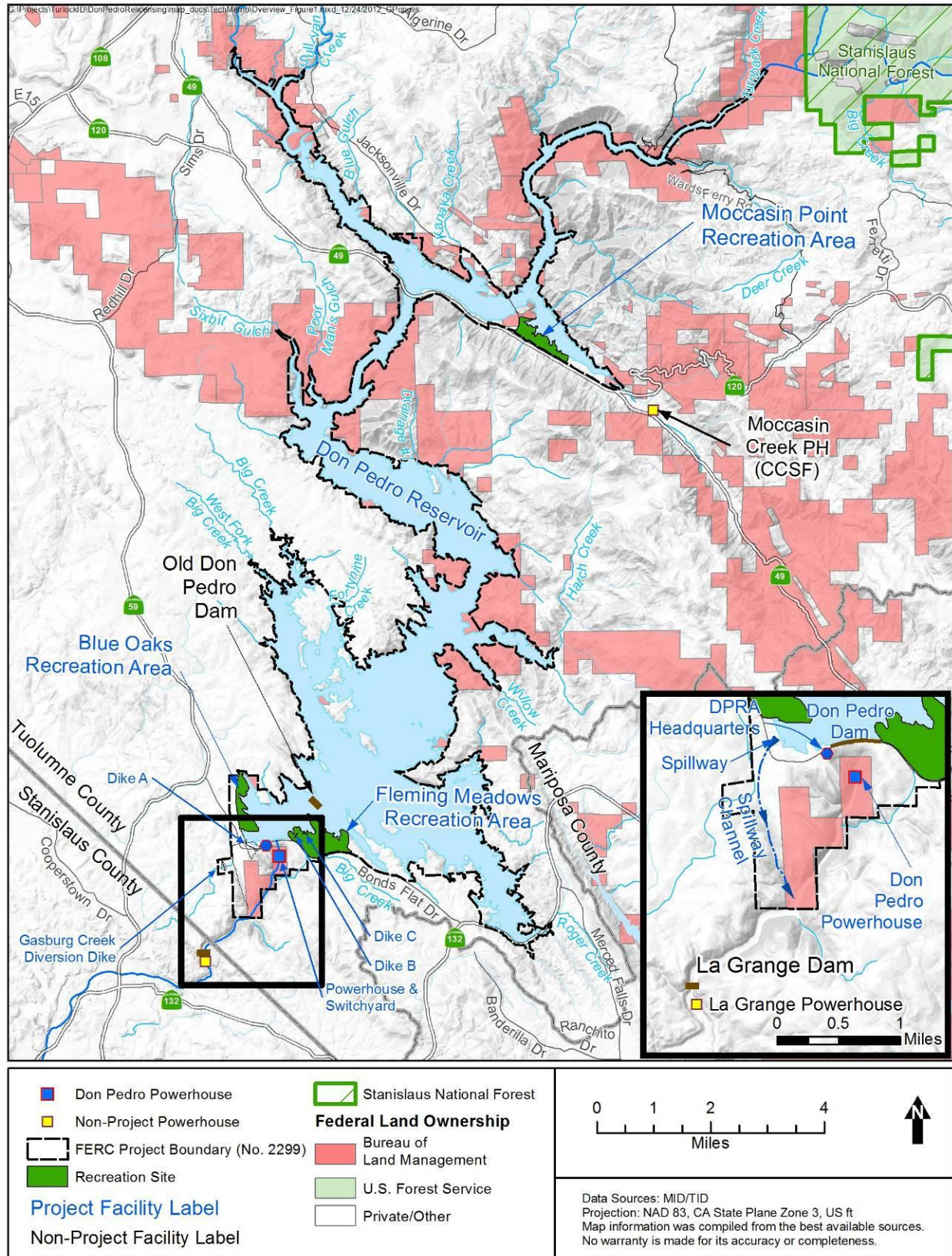


Figure 1.1-1. Don Pedro Project location.

1.2 Relicensing Process

The current FERC license for the Project expires on April 30, 2016, and the Districts will apply for a new license no later than April 30, 2014. The Districts began the relicensing process by filing a Notice of Intent and Pre-Application Document (PAD) with FERC on February 10, 2011, following the regulations governing the Integrated Licensing Process (ILP). The Districts' PAD included descriptions of the Project facilities, operations, license requirements, and Project lands as well as a summary of the extensive existing information available on Project area resources. The PAD also included ten draft study plans describing a subset of the Districts' proposed relicensing studies. The Districts then convened a series of Resource Work Group meetings, engaging agencies and other relicensing participants in a collaborative study plan development process culminating in the Districts' Proposed Study Plan (PSP) and Revised Study Plan (RSP) filings to FERC on July 25, 2011 and November 22, 2011, respectively.

On December 22, 2011, FERC issued its Study Plan Determination (SPD) for the Project, approving, or approving with modifications, 34 studies proposed in the RSP that addressed Cultural and Historical Resources, Recreational Resources, Terrestrial Resources, and Water and Aquatic Resources. In addition, as required by the SPD, the Districts filed three new study plans (W&AR-18, W&AR-19, and W&AR-20) on February 28, 2012 and one modified study plan (W&AR-12) on April 6, 2012. Prior to filing these plans with FERC, the Districts consulted with relicensing participants on drafts of the plans. FERC approved or approved with modifications these four studies on July 25, 2012.

Following the SPD, a total of seven studies (and associated study elements) that were either not adopted in the SPD, or were adopted with modifications, formed the basis of Study Dispute proceedings. In accordance with the ILP, FERC convened a Dispute Resolution Panel on April 17, 2012 and the Panel issued its findings on May 4, 2012. On May 24, 2012, the Director of FERC issued his Formal Study Dispute Determination, with additional clarifications related to the Formal Study Dispute Determination issued on August 17, 2012.

This study report describes the objectives, methods, and results of the Whitewater Boating Take-Out Improvement Feasibility Study (RR-02) as implemented by the Districts in accordance with FERC's SPD and subsequent study modifications and clarifications. Documents relating to the Project relicensing are publicly available on the Districts' relicensing website at www.donpedro-relicensing.com.

1.3 Study Plan

The Ward's Ferry Bridge site at approximately River Mile (RM) 78.5 on the upstream end of the Don Pedro reservoir is used as a take-out location by whitewater boaters who run the whitewater reach of the Wild and Scenic Tuolumne River above the Don Pedro Project. Land ownership at this location is federal, administered by the U.S. Department of the Interior, Bureau of Land Management (BLM). The Don Pedro Recreation Agency (DPRA) occasionally clears this reach of the reservoir of woody debris after periods of high flow and maintains a restroom at this location on the shoulder of Ward's Ferry Road above the reservoir to avoid improper waste disposal at this area of the reservoir.

The upper Tuolumne River watershed, the subbasin above about RM 80, covers approximately 1,300 square miles of drainage area and contains all the major tributaries of the Tuolumne River, including the North Fork, South Fork, Middle Tuolumne, Clavey River, Cherry Creek, and Eleanor Creek. The upper Tuolumne River extends from the confluence of the Dana and Lyell Forks to just below the confluence of the North Fork at approximate elevation 850 feet. The average gradient of the river is roughly 110 feet/mile, but local gradients vary greatly. The upper Tuolumne watershed is dominated by federal land ownership, primarily the Stanislaus National Forest and Yosemite National Park. From upstream of the Tuolumne River headwaters in Tuolumne Meadows in Yosemite National Park to about RM 80, a total of 83 miles of the Tuolumne River is designated as a National Wild and Scenic River (an 8-mile stretch at Hetch Hetchy Reservoir is excluded). Flows in the upper Tuolumne River are regulated and controlled by the City and County of San Francisco's (CCSF) Hetch Hetchy Water and Power system, including Hetch Hetchy Reservoir, Lake Eleanor and Cherry Lake, and CCSF's extensive infrastructure of water transmission and water power facilities. Portions of the upper Tuolumne River corridor are managed by federal agencies as administered under the agencies' resource management plans, including the 2011 Tuolumne Wild and Scenic River Comprehensive Management Plan Draft Environmental Impact Statement prepared by the U.S. Department of the Interior, National Park Service (NPS 2011) and related planning documents still under development; the Stanislaus National Forest: Forest Plan Direction (USFS 2010); the Tuolumne Wild and Scenic River Management Plan (USFS 1988); and the BLM's Sierra Resource Management Plan (SRMP) (BLM 2008).

This reach of the Tuolumne River is also a popular whitewater boating resource, with boater access managed by the U.S. Forest Service (USFS). Under current management guidelines, up to 52 boaters traveling as commercial fares and 96 private boaters are permitted on the upper Tuolumne River each day. The Ward's Ferry Bridge take-out site, located within the Don Pedro Project Boundary is an established take-out location for commercial and private individual whitewater boaters. Commercial outfitters guide over 3,000 whitewater boaters on Tuolumne River trips to take-out at the Ward's Ferry Bridge location annually. An estimated equal number of private boaters use the Ward's Ferry Bridge take-out site each year (Steve Welch, personal communication, August 24, 2011). Most of this use occurs April through September.

Currently, the Ward's Ferry Bridge take-out location presents challenges to safe and efficient take-out due to topography, condition of the access trails, and the frequency of vandalism at the site. BLM, National Park Service, and other relicensing participants requested that the Districts research and identify potential improvements to whitewater boating take-out opportunities to enhance the boating experience.

2.0 STUDY GOALS AND OBJECTIVES

The primary goal of the Whitewater Boating Take-Out Improvement Feasibility Study was to assess the feasibility of improving the existing take-out location at the Ward's Ferry Bridge on the upstream end of the Don Pedro Project for continued use by whitewater boaters. The feasibility of physical improvements to the Ward's Ferry Bridge location was evaluated and the feasibility of alternative take-out locations was assessed.

3.0 STUDY AREA

The study area encompasses the upstream reaches of the Don Pedro Reservoir in the Tuolumne River and Moccasin Creek arms, and the Tuolumne River mainstem up to approximately RM 80 (Figure 3.0-1). The study area includes the existing Ward's Ferry Bridge take-out site as well as potential alternative take-out locations considered in this feasibility study.

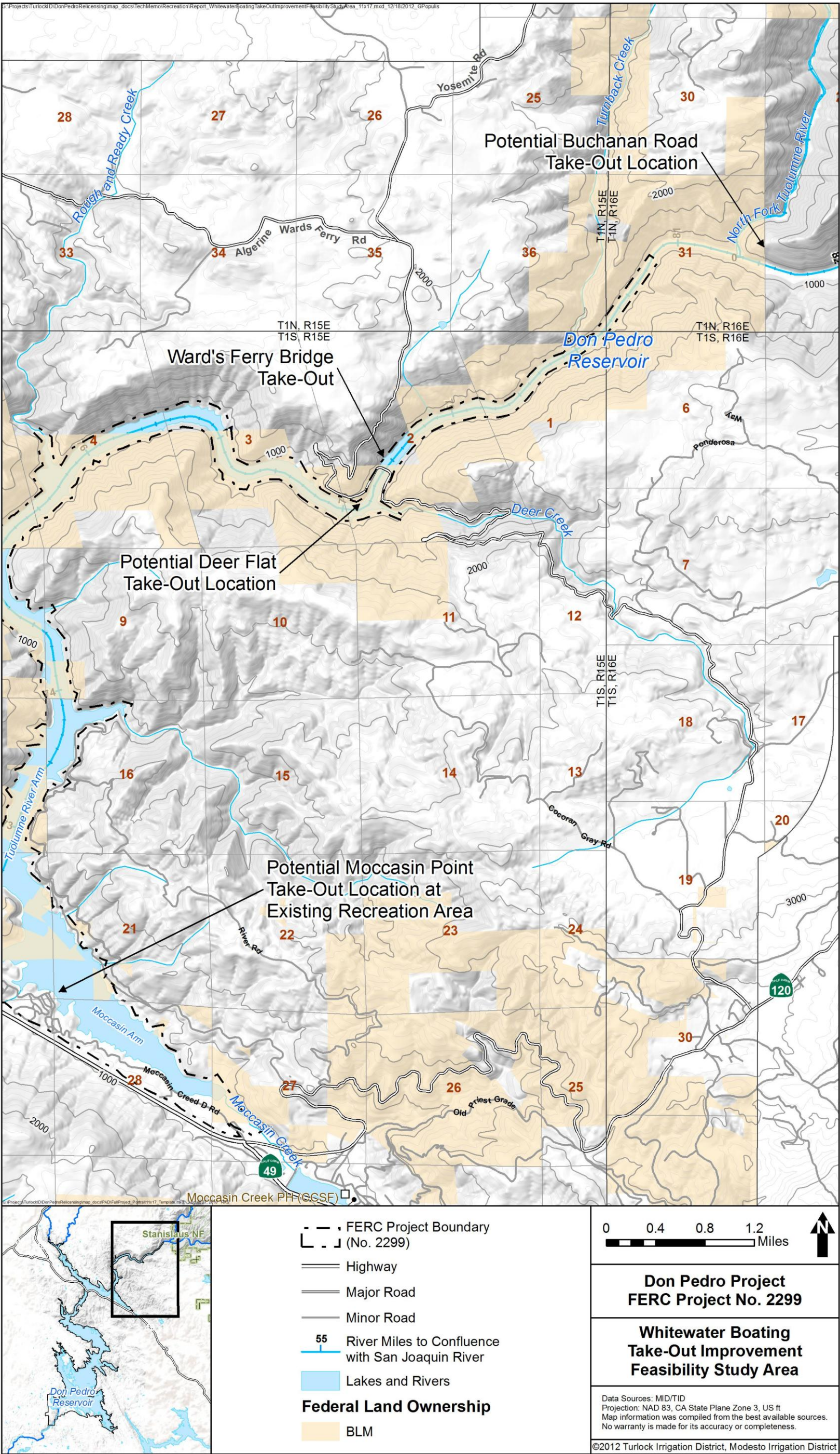


Figure 3.0-1. Whitewater Boating Take-Out Improvement Feasibility Study Area.

4.0 METHODOLOGY

Site characteristics at the existing take-out and alternative locations, including proximity to the terminus of the whitewater run, proximity to improved roads, site topography and bank slope, and presence of sensitive resources, were assessed. Assessment results are presented in this report quantitatively, narratively, and with photographs.

A focus group meeting was organized, announced, and conducted with guides and boaters familiar with the Tuolumne River and the Ward's Ferry Bridge take-out to elicit knowledge on use of the existing site, potential improvements, and alternative sites. Volunteers for the study team were identified through information provided by relicensing participants knowledgeable about Tuolumne River whitewater boating, agencies responsible for managing the Tuolumne River, professional guides, and other outfitter employees. Professional outfitters and recreational whitewater boaters were invited and participated.

Information from the site assessments and focus group meeting was used to examine proposed alternative take-out locations and assess the technical feasibility of potential improvements. The results of this study may be used in relicensing to develop a preferred alternative for a whitewater boating take-out site at the upstream end of the Don Pedro Project.

5.0 RESULTS

Site characteristics at the existing take-out and alternative locations, including proximity to the terminus of the whitewater run, proximity to improved roads, site topography and bank slope, and presence of sensitive resources, were assessed. A focus group was convened on April 17, 2012 to collect input from guides and boaters familiar with the Tuolumne River and the Ward's Ferry Bridge take-out about use of the existing site, potential improvements, and alternative sites.

5.1 Ward's Ferry Bridge Take-Out

The existing whitewater boating take-out is located just upstream of the Ward's Ferry Bridge at approximately RM 78.5 (Figure 3.0-1). Remnant abutments from an old bridge are located at this site (Attachment A, Photo 1) and the area was used as a laydown and construction access site during construction of the existing bridge in the early 1970s (Bechtel 1970). Under the terms of the current license, DPRA maintains a restroom on the shoulder of Ward's Ferry Road near the south end of the existing bridge, on river left (Attachment A, Photo 2).

Commercial and private whitewater boaters use this site as a take-out at the end of trips on the Upper Tuolumne River. Its location is favorable due in part to proximity to the terminus of the whitewater run, downstream of all rapids and upstream of significant slackwater at most water levels and river flows. As a general matter, the Project is operated to capture spring snowmelt and rain runoff, to provide water downstream for the remainder of the year, to carry over storage for future water years, and to guard against water shortages in dry years and successive dry years. In a typical year, Don Pedro Reservoir storage peaks in mid-summer around early July after the end of the snowmelt season. Annual reservoir level fluctuations are typically in the range of 30 to 80 vertical feet between 750 ft and 830 ft msl. For perspective on this water elevation range, the tops of the remnant bridge abutments in Photo 1 are approximately elevation 810 ft. msl. Low reservoir elevations are up to 40 feet below the tops of the bridge abutments (Attachment 1, Photo 1) and high reservoir elevations are approximately 20 feet above the tops of the abutments (Attachment 1, Photo 3).

The site is located on BLM-administered land and Districts-owned land immediately off Ward's Ferry Road, a public road which is paved and maintained by Tuolumne County. Access to the shoreline is available at all river flows and water levels, although low water levels present some challenges due to the steepness of the banks between approximately elevations 740 ft and 810 ft msl (Attachment A, Photo 4).

Challenges at this site include steep banks in a narrow canyon with unconsolidated surface below elevation 810 ft msl, and lack of vehicle access to the shoreline. Currently, vehicles are physically blocked from driving off the Ward's Ferry Road. The vault toilet blocks vehicle passage on river left and concrete bollards have been placed on river right to prevent vehicle travel off Ward's Ferry Road. Conflicts with other user groups are created at this site when anglers and other shoreline recreationists occupy the shoreline where whitewater boaters are attempting to remove boats and gear from the river. Faced with these challenges, some whitewater boaters, especially commercial rafters, position a truck with winch or hoist on the roadway on the bridge to lift rafts and equipment from the water (Attachment A, Photo 5).

5.2 Potential Alternative Take-Out Locations

In addition to the existing Ward's Ferry Bridge take-out site, consideration was given to alternative locations that could potentially serve as a take-out for the Upper Tuolumne River whitewater boaters. Ideal sites would be:

- located near the terminus of the whitewater runs, i.e., far enough downstream to include all of the whitewater upstream of the Don Pedro Reservoir and far enough upstream to minimize or eliminate flatwater paddling or towing on the reservoir;
- accessible via existing roads;
- usable at a range of river flows and reservoir levels; and
- located in a previously disturbed area or otherwise free of sensitive resources.

Three alternative sites were identified based on focus group input and desktop review of topography maps and aerial photography (Figure 3.0-1) : Deer Flats at RM 82, Buchanan Road Access just upstream of the confluence of the North Fork Tuolumne River at RM 80, and Moccasin Point Recreation Area on the Moccasin Creek Arm of the Don Pedro Reservoir.

5.2.1 Deer Flats

Deer Flats is located on BLM-administered land on river right at approximately RM 78, one half-mile downstream from the Ward's Ferry Bridge (Figure 3.0-1). This site has similar topography and shoreline access as the Ward's Ferry Bridge site. There is currently no established path or roadway to the shoreline. Use of this location by whitewater boaters would require an additional half-mile paddle on flatwater under most reservoir level and river flow conditions. Due to the lack of existing access to the shoreline at this location, topography, and the increase in flatwater paddling that would be necessary when compared to the Ward's Ferry Bridge take-out, the Deer Flats is not considered a desirable take-out location.

No sensitive resource information is reported for Deer Flats because it did not emerge as a potential alternative based on other criteria.

5.2.2 Buchanan Road Access

Where the North Fork Tuolumne flows into the Tuolumne River (approximately RM 80), Forest Service Road 1N02 terminates approximately one mile from the river (Figure 5.2-1). An extremely rough road has been cut from FS Road 1N02 to the river's edge. Access to this site which is located on BLM and USFS-administered lands is remote with travel over approximately 10 miles of dirt road required (Figure 5.2-1 Potential Buchanan Road Access Vicinity). Take-out at this location would eliminate approximately 2 miles of the whitewater run. Due to the lack of existing access and elimination of whitewater run, Buchanan Road access is not considered a viable take-out location.

Buchanan Road access is located outside the study area for Don Pedro Project relicensing studies, so no information is available on sensitive resources at the Buchanan Road access

location. Buchanan Rose did not emerge as a potential alternative whitewater take-out location based on other criteria, however; an assessment of potential impacts to sensitive resources would have to be completed prior to ground disturbance in this area.

5.2.3 Moccasin Point Recreation Area

DPRA maintains the Moccasin Point Recreation Area on the Moccasin Creek Arm of the Don Pedro Reservoir approximately six miles by water from the Ward's Ferry Bridge (Figure 3.0-1) on lands owned by the Districts. Moccasin Point Recreation Area, located off California Highway 49 on Jacksonville Road, is a highly developed existing recreation area with paved roads; water, electric, and wastewater utilities; a marina; concrete boat launch; and numerous other amenities. Some whitewater boaters tow their boats from the terminus of the Upper Tuolumne River whitewater runs to the Moccasin Point Recreation Area. While the site has well developed and maintained access, whitewater boaters do not hold this take-out option in high regard due to the additional logistics of using a motorboat tow, the incongruity of towing over flatwater with the whitewater river experience, and the additional cost of user fees at the Moccasin Point Recreation Area.

Whitewater take-out use at Moccasin Point Recreation Area would occur at existing developed recreation facilities, including hardened parking lots and boat ramps. Therefore, no sensitive resource impacts would result from use of Moccasin Point Recreation Area as a whitewater take-out.

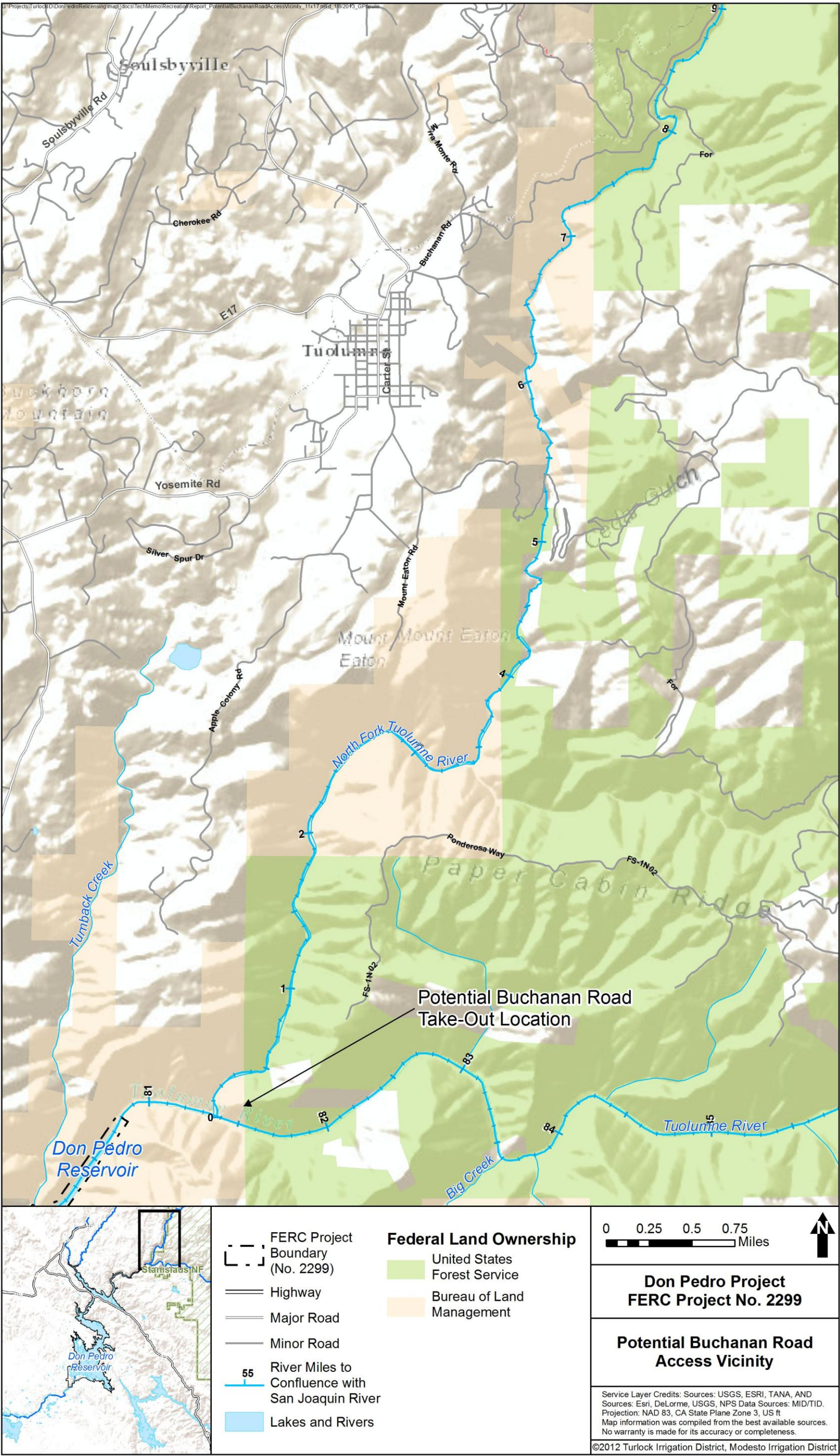


Figure 5.2-1. Potential Buchanan road access vicinity.

5.3 Focus Group

A focus group meeting facilitated by the Districts' consultant was conducted on April 17, 2012 at the Hetch-Hetchy Water and Power Facility in Moccasin, California to elicit knowledge on use of the Ward's Ferry Bridge take-out site, potential improvements, and alternative sites. Seventeen people attended the meeting, representing federal agencies, professional guides, individuals, and DPRA. The meeting summary is provided as Attachment B.

After discussion, focus group participants were asked to rank the improvements to the existing site that had been discussed by the group. The preferred improvement was a gated concrete ramp for access at all water levels, with access for multiple user types on both sides of the river identified as ideal. The next preferred improvement substituted the highly developed concrete material for more basic/rudimentary improvements to the existing road (grading/reinforcing the canyon walls) combined with the other access improvements (restroom relocation and parking expansion).

Regardless of the option chosen for improving direct access to low water, participants expressed support for the following improvements: 1) relocating the restroom, 2) providing additional parking opportunities; and 3) trail improvements to the river. Finally, participants emphasized the need for increased law enforcement presence at this location to protect and preserve any improved facilities and provide a safe environment, especially after investments are made in site improvements.

6.0 DISCUSSION AND FINDINGS

Based on the study results, improving access for whitewater boating take-out at the existing Ward's Ferry take-out location appears to be technically feasible and towing to Moccasin Point Recreation Area is a technically viable option.

Advantages of the Ward's Ferry Bridge location over other sites considered include:

- Maximizes the whitewater run and minimizes or eliminates necessity of any flatwater paddling or towing.
- Contains the footprint of site improvements to an existing disturbed area to avoid impacts at alternative sites that are not already disturbed.
- Minimizes maintenance and potential for damage due to vandalism by avoiding built facilities below high pool elevations, such as cable hoists or rails. Improvements below the high pool elevation are limited to native materials, reinforced-earth retaining walls, and rock revetments.
- Avoids need for land acquisition or exchange.

Two basic options appear to be feasible based on site assessment and preliminary engineering:

- River Right Option: Improvements on the right bank to facilitate vehicle and pedestrian access to the shoreline at a range of water levels.
- River Left Option: Improvements on the left bank to facilitate vehicle access to the shoreline at a range of water levels, combined with improvements on the right bank to facilitate pedestrian access.

For both options, the Districts examined the feasibility of a turnaround at some point along the improved or new access roads, with the location of the old bridge abutments offering the most promise. While both alternatives include a ten-foot wide access road, the steep and narrow configuration of the site restricts turn-around for vehicles, as discussed further in this section. Both alternatives would eliminate the need to winch and hoist rafts from the bridge deck.

Ward's Ferry River Right Option

The river right option consists of upgrades to the existing trail from Ward's Ferry Road on river right to approximately the old bridge abutment to a 15-foot wide road to accommodate vehicles and pedestrians (Figures 6.0-1 and 6.0-2). From the old bridge abutment, a new 10-foot wide access road could be constructed to descend from the old bridge abutment in an upstream direction. This new road would provide vehicle access to the shoreline at low reservoir elevation conditions. The new road would be designed and constructed to withstand inundation and high river flows that periodically occur at this location.

The existing user-defined pedestrian trail that descends in a downstream direction from the old bridge abutment could be upgraded to provide improved pedestrian access to the shoreline at low flow and low reservoir elevation conditions. As with the road described above, the trail would be constructed to withstand inundation and river flows that periodically occur at this location.

Under the river right option, rock cut or mechanically stabilized earth (MSE) wall construction may be used for road upgrade and construction. Wall construction is the preferred alternative to eliminate or minimize the need for blasting, considering the apparent instability of the existing slopes. As detailed in Attachment C, the preliminary estimated cost for final design and construction of the river right option is \$696,000 - \$749,000. This estimate does not include cost of construction permitting or any historic properties surveys that might be required.

Advantages of the river right option include:

- Vehicles (without trailers only) should be able to turn around in the area of the old abutment before backing down or after backing up the constructed road. However, the condition of the old abutment has not been fully assessed. Further assessment during final design will be necessary to confirm the feasibility of fortifying and modifying the old abutment.
- Pedestrian and vehicle access to the shoreline on river right would be accommodated with a 15-ft wide access way and separated at the old bridge abutment to reduce conflicts among users. Pedestrians could also continue to use the existing trails on river left to avoid conflicts with whitewater boaters.
- The existing toilet facility would remain in place, avoiding cost of relocation.

Ward's Ferry River Left Option

The river left option consists of upgrades to the existing trail from Ward's Ferry Road along river left to approximately the old bridge abutment to a 10-foot wide road (Figure 6.0-3 and 6.0-4). The road would be upgraded solely to provide vehicle access for rafting take-out (i.e., no dedicated pedestrian access on river left). From the old bridge abutment, a new 10-foot wide access road could be constructed to descend from the old bridge abutment in an upstream direction. This new road would provide vehicle access to the shoreline at low flow and low reservoir elevation conditions. The new road would be designed and constructed to withstand inundation and river flows that periodically occur at this location. There is no area for vehicle turn-around with the river left option; drivers would be required to back either down or up the entire length of the upgraded and newly constructed road from Ward's Ferry Road.

The river left option would include upgrades to the existing user-defined pedestrian trail that descends in a downstream direction from the old bridge abutment *on river right* to provide improved pedestrian access to the shoreline at low flow and low reservoir elevation conditions.

Under the river left option, rock cut or MSE wall construction may be used for road upgrade and construction. Wall construction is preferred to eliminate or minimize the need for blasting, considering the apparent instability of the existing slopes.

The river left option would require the relocation of the existing toilet facility to allow for vehicle access off of Ward's Ferry Road. Alternate placements of the relocated toilet are depicted in Figure 6.0-5. While relocating the toilet has the advantage of improving access to river left, the re-located toilet will necessarily be situated in an area that would otherwise be available for parking. This will reduce the available roadside parking at Ward's Ferry Bridge.

As detailed in Attachment C, the preliminary estimated cost for final design and construction of the river left option is \$739,000 - \$760,000. This estimate does not include cost of construction permitting or any historic properties surveys that might be required.

Advantages for the river left option include:

- Separation of rafting take-out and other uses of the site with vehicle access for rafting take-out on river left and upgraded pedestrian access on river right.

Moccasin Point Recreation Area

The Moccasin Point Recreation Area take-out option is viable, especially in the event that more detailed engineering analysis demonstrates barriers to improvements at Ward's Ferry Bridge. While it necessitates flatwater towing at the end of the whitewater trip, use of Moccasin Point Recreation Area as a whitewater take-out has the following advantages:

- Contains the footprint of site improvements to an existing disturbed area to avoid impacts at alternative sites that are not already disturbed.
- Eliminates safety concerns associated with winching and hoisting rafts from the bridge deck.
- Avoids need for maintenance and security at Ward's Ferry Bridge.
- Avoids need for land acquisition or exchange.

Conclusions

Whitewater take-out improvements at Ward's Ferry Bridge appear to be technically feasible based on preliminary engineering. No currently undeveloped sites were found to be desirable locations for Tuolumne River whitewater boating take-out based on siting criteria. The Moccasin Point Recreation Area take-out option is viable.

If any capital construction or maintenance of a whitewater boating take-out site are included as requirements in the new license for the Don Pedro Project, the Districts will seek to partner with state and federal agencies and private groups to share the cost of capital construction through grants, matching funds, or other mechanisms that are available. The Districts will also seek to share or recover any capital costs and any increased annual O&M costs through user fees as described in FERC's regulations at 18 CFR 2.7 which state:

- The Commission will not object to licensees and operators of recreational facilities within the boundaries of a project charging reasonable fees to users of such facilities in order to help defray the cost of constructing, operating, and maintaining such facilities.
- The Commission expects licensees to assume the following responsibilities...(d) Encourage governmental agencies and private interests, such as operators of user-fee facilities, to assist in carrying out plans for recreation, including operation and adequate maintenance of recreational areas and facilities. (e) To cooperate with local, State, and Federal Government agencies in planning, providing, operating, and maintaining facilities for recreational use of public lands administered by those agencies adjacent to the project area.

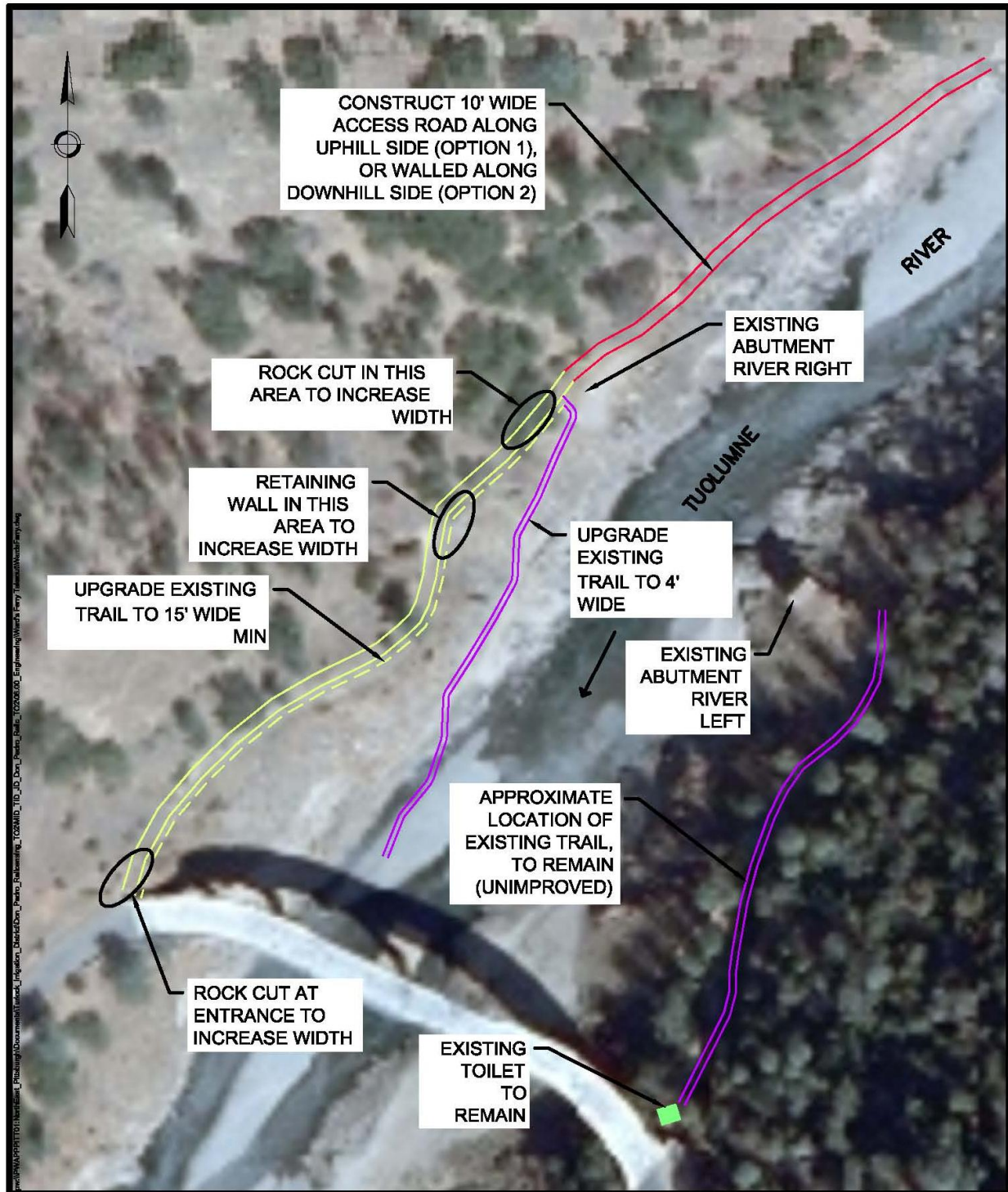
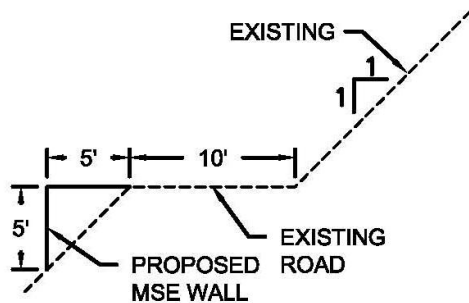


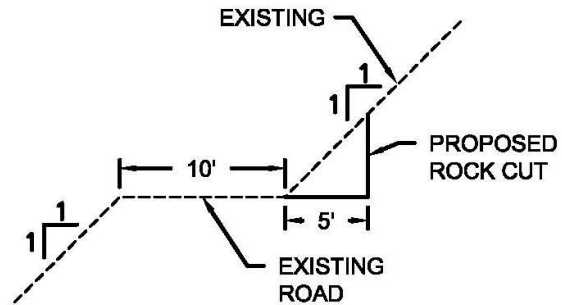
Figure 6.0-1. Ward's Ferry Bridge Whitewater Boating Take-out Improvements Conceptual Design, River Right Options.

NOTE:

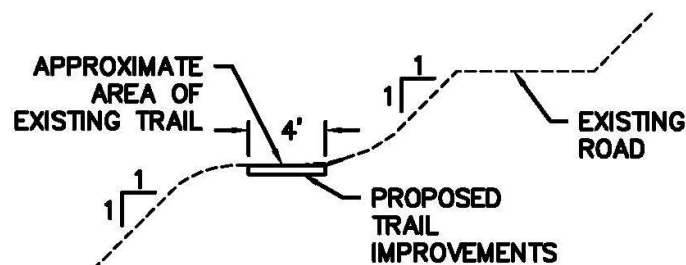
1. FOR RIVER RIGHT OPTIONS A 10' VEHICLE LANE AND 4' PEDESTRIAN LANE WITH A 1' BUFFER ARE PROPOSED FROM WARDS FERRY BRIDGE TO OLD ABUTMENTS.



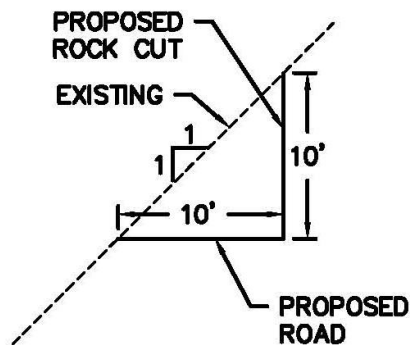
**UPGRADED ACCESS ROAD WALL
SECTION - RIVER RIGHT**



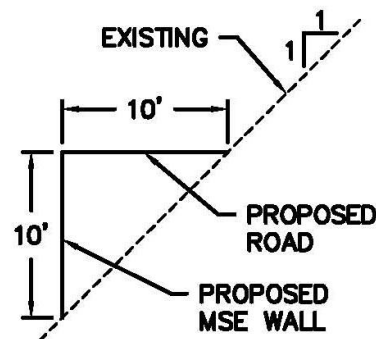
**UPGRADED ACCESS ROAD ROCK
CUT SECTION - RIVER RIGHT**



UPGRADED EXISTING TRAIL - RIVER RIGHT



**CONSTRUCTED ACCESS ROAD ROCK CUT
SECTION (OPTION 1) - RIVER RIGHT**



**CONSTRUCTED ACCESS ROAD WALL
SECTION (OPTION 2) - RIVER RIGHT**

Figure 6.0-2. Ward's Ferry Bridge Whitewater Boating Take-out Improvements Conceptual Design, River Right Options - Typical Sections.



Figure 6.0-3. Ward's Ferry Bridge Whitewater Boating Take-out Improvements Conceptual Design, River Left Options.

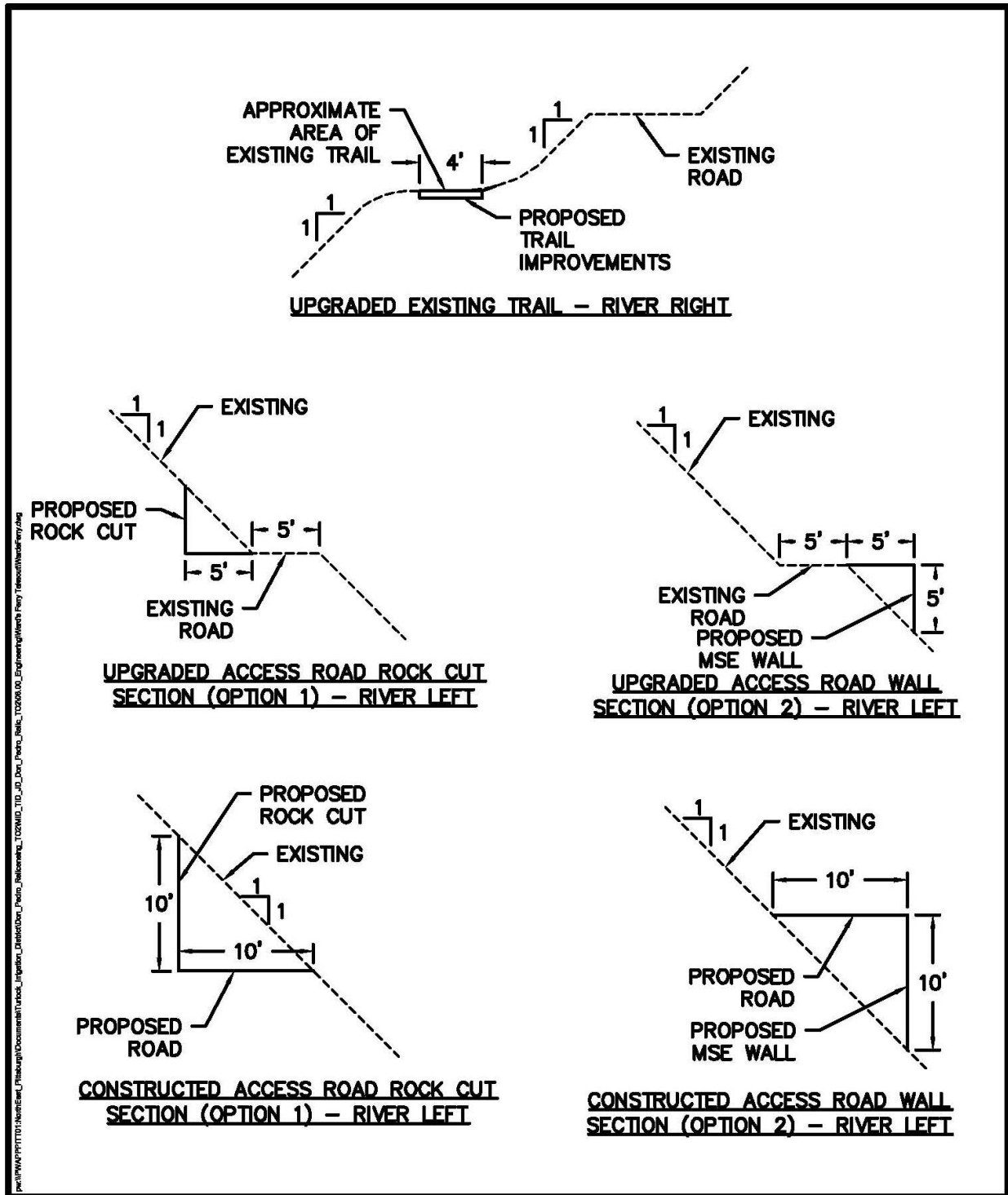


Figure 6.0-4. Ward's Ferry Bridge Whitewater Boating Take-out Improvements Conceptual Design, River Left Options - Typical Sections.



Figure 6.0-5. Ward's Ferry Bridge Whitewater Boating Take-out Improvements Conceptual Design, River Left Options – Alternative Toilet Locations.

7.0 STUDY VARIANCES AND MODIFICATIONS

The study area was expanded approximately two miles upstream along the Tuolumne River to accommodate a feasibility assessment of the potential Buchanan Road access take-out location identified near the confluence of the North Fork Tuolumne River (Figure 3.0-1).

The whitewater boating take-out improvement feasibility study is complete and the study goals have been achieved.

8.0 REFERENCES

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