

APPENDIX A

Modified or New Facility Construction Activities and Concept Designs

CONSTRUCTION ACTIVITIES AND CONCEPT DESIGNS

Under the Proposed Action, several construction projects will be implemented to improve operations and maintenance of the Project, enhance environmental resources, and/or meet the requirements specified in new environmental programs and measures. The construction projects include modifications to existing and construction of new Project facilities and features, including:

- Hell Hole Reservoir Seasonal Storage Increase Improvement;
- Small Diversion Dam Modifications; and
- Outlet Works Modifications.

Detailed information on required construction activities (e.g., access, construction work and staging areas, disposal areas, and equipment); construction schedule and hours of operation; personnel housing; short- and long-term operational changes; facility maintenance changes; acres of habitat loss; and potential permit requirements are provided for each facility, as well as, concept design drawings. Information is organized by construction project as identified on Table A-1.

Table A-2 includes best management practices and avoidance/protection measures to be implemented for modification of existing or construction of new Project facilities. Following completion of site-specific engineering designs for construction projects identified in Appendix A, PCWA will consult with resource agencies and review the measures included in Table A-2, and other applicable resource management plans, for adequacy in protecting resources. If additional site-specific construction measures are necessary, they will be developed in consultation with resource agencies and implemented as part of the project.

Table A-1. Middle Fork American River Construction Projects.

Hell Hole Reservoir Seasonal Storage Increase Improvement	
Table HH-1	Hell Hole Reservoir Seasonal Storage Increase Improvement – Construction, Operation, and Maintenance
Figure HH-1	Hell Hole Reservoir Seasonal Storage Increase Site Plan
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Duncan Creek Diversion Dam Modification	
Table DC-1	Duncan Creek Diversion Dam Modification – Construction, Operation, and Maintenance
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Figure DC-3	Profile View of Intake "A-A"
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Figure SF-3	Profile View of Intake "A-A"
Figure SF-4	Intake Sections "B-B" & "C-C"
Outlet Works Modifications	
French Meadows Reservoir Outlet Works Modification	
Table FMO-1	French Meadows Reservoir Outlet Works Modification – Construction, Operation, and Maintenance
Figure FMO-1	French Meadows Reservoir Outlet Works Modification
Hell Hole Reservoir Outlet Works Modification	
Table HHO-1	Hell Hole Reservoir Outlet Works Modification – Construction, Operation, and Maintenance
Figure HHO-1	Hell Hole Reservoir Outlet Works Modification
Middle Fork Interbay Outlet Works Modification	
Table IBO-1	Middle Fork Interbay Outlet Works Modification – Construction, Operation, and Maintenance
Figure IBO-1	Middle Fork Interbay Outlet Works Modification

Hell Hole Reservoir Seasonal Storage Increase Improvement

Table HH-1. Hell Hole Reservoir Seasonal Storage Increase Improvement – Construction, Operation, and Maintenance.

Activity	Description
<p>Modifications to Existing Project Facilities or New Project Facilities</p>	<p>Modifications to Existing Facilities</p> <ul style="list-style-type: none"> • Modify the existing 350-foot-long Hell Hole Dam ogee spillway to allow for installation of 6-foot-high pneumatically operated steel spillway crest gates (Hell Hole Dam Spillway Crest Gates). This includes concrete cutting the ogee spillway crest to accommodate the anchor and hinge for the crest gates and piping for compressed air to operate the pneumatic gates (control system). If necessary, anchor bolts will be used to secure the gates and enhance stability of the ogee crest. <p>New Facilities</p> <ul style="list-style-type: none"> • Construct a new 20 foot by 20 foot concrete block control building on the east abutment of Hell Hole Dam, between the dam and spillway. The Hell Hole Dam Spillway Crest Gates Control Building (control building) will house a propane powered emergency electric generator with an outdoor propane tank for power and control of the spillway crest gates. • Construct a new powerline from the existing 12 kilovolt (kV) “French Meadows Powerhouse and Switchyard to Hell Hole - Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator Cottages, and Hell Hole Powerhouse Communication Line/Powerline” to the control building. The powerline will run in a conduit attached to the existing bridge over the Hell Hole Dam Spillway and then underground for approximately 60 feet to the new control building. • Construct a new road (Hell Hole Dam Spillway Gates Road) to provide access to the new spillway gates. <p>Refer to Figure HH-1.</p>
<p>FERC Project Boundary Revision</p>	<ul style="list-style-type: none"> • None. All facilities will be constructed within the existing FERC Project boundary.
<p>Construction Access Roads</p>	<ul style="list-style-type: none"> • Construction equipment and materials will arrive at the site via Mosquito Ridge Road (FR 96), Ralston Ridge Road (FR 23 and 25), FR 2, the Hell Hole Dam and Powerline Road, and the existing spillway access road between the dam and spillway. • Access will also be provided by the new Hell Hole Dam Spillway Gates Road that will be constructed as part of this improvement.
<p>Construction Work and Staging Areas</p>	<ul style="list-style-type: none"> • The construction work area includes the crest of Hell Hole Dam, the spillway channel, and the area between the spillway and the dam. • Construction staging will occur between the spillway and the dam and at the adjacent to the existing communication line/powerline near the dam. • The Foresthill Field Office Storage Yard will be used, as necessary, for secure storage of construction equipment.
<p>Disposal Areas</p>	<ul style="list-style-type: none"> • Approximately 10 cubic yards of concrete will be disposed of at an agency-approved disposal area.
<p>Construction Activities and Associated</p>	<p>Construction will occur in two phases. Phase I consists of installation of the spillway crest gates anchor, hinge, and control system; and construction of the</p>

Table HH-1. Hell Hole Reservoir Seasonal Storage Increase Improvement – Construction, Operation, and Maintenance.

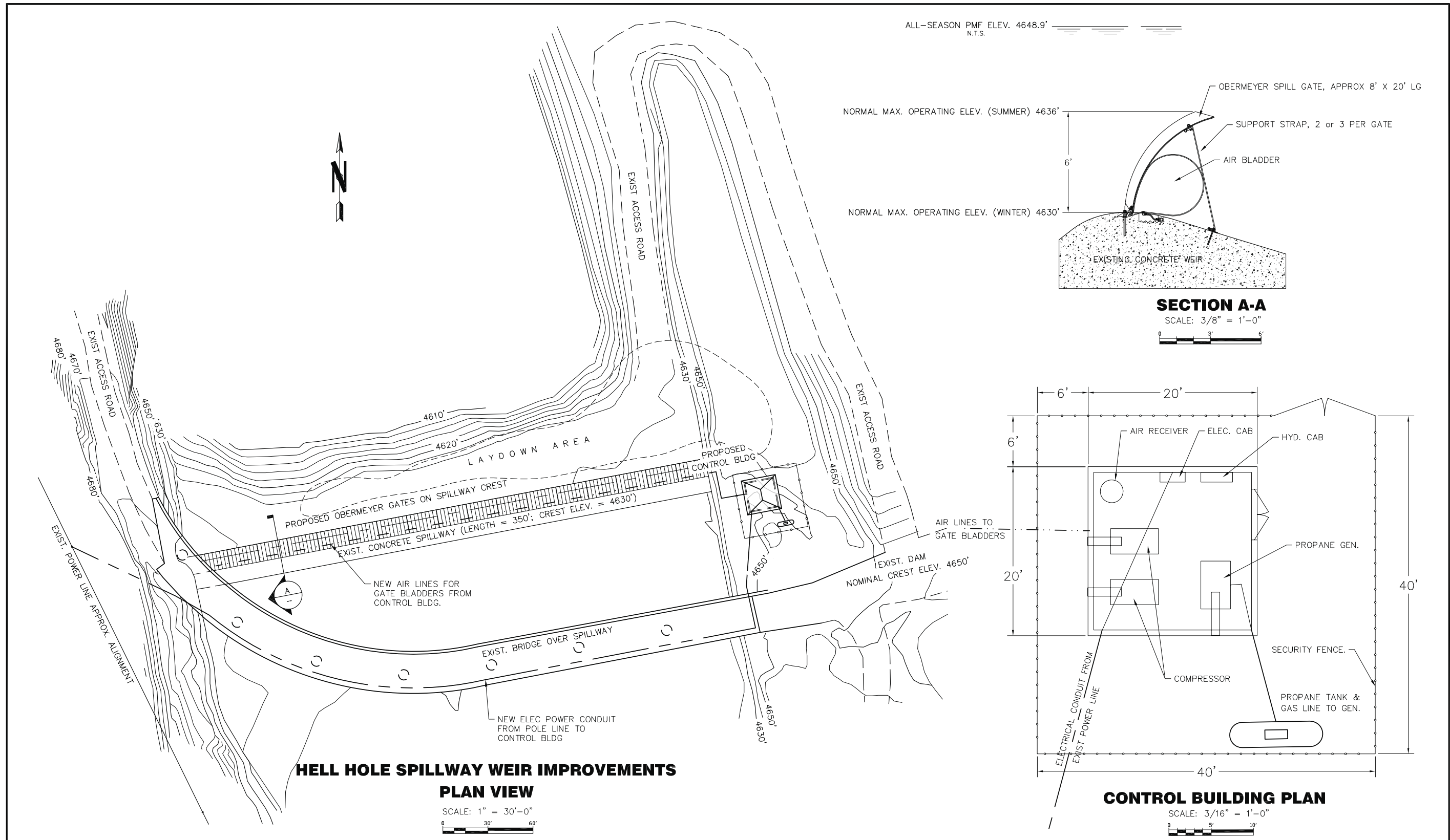
Activity	Description
Equipment	<p>control building and powerline. Phase II includes installation of the spillway crest gates on the Hell Hole Dam ogee spillway.</p> <ul style="list-style-type: none"> • All Phases <ul style="list-style-type: none"> ○ A front-loader, flat-bed trucks, pick-up trucks, and mobile cranes will be used to transport materials and personnel to- and within- the construction site. ○ A 30kW generator will provide power during construction activities. • Phase I <ul style="list-style-type: none"> ○ Expected to take approximately eight weeks to complete. ○ Construct Hell Hole Dam Spillway Gates Road. ○ Use large compressors, jackhammers, and concrete saws to install anchors and control system for the spillway crest gates into the underlying bedrock. ○ Construct the cement control building adjacent to the existing spillway. ○ Transport concrete to the site in concrete trucks with necessary concrete pumpers. ○ Install powerline tap to the existing 12 kV line that serves Hell Hole Powerhouse. ○ Connect powerline from the overhead 12 kV line to the bridge structure. ○ Trench 60 feet and install underground powerline and connect to new control building. ○ Use a small backhoe with “ramhoe” attachment as necessary for earthwork. • Phase II <ul style="list-style-type: none"> ○ Expected to take between six and eight weeks to complete. ○ Install new spillway crest gates and abutment blocks on the existing spillway crest. ○ Use a Lowboy trailers to transport sections of the new spillway crest gates to the construction site. ○ Use a 25-ton or greater, 4-wheel drive off-road hydraulic crane and an electrical boom line truck to install the new spillway crest gates.
Construction Schedule and Hours of Operation	<ul style="list-style-type: none"> • Implement within 3-5 years following license issuance. <ul style="list-style-type: none"> ○ Phase I – Implement in late July through September. ○ Phase II – Implement in September through Mid-October. • Construction personnel will work five, 10-hour days per week with additional weekend hours as needed.

Table HH-1. Hell Hole Reservoir Seasonal Storage Increase Improvement – Construction, Operation, and Maintenance.

Activity	Description
Personnel Housing	<ul style="list-style-type: none"> • Construction will be completed by a crew of approximately 10-20 personnel. The majority of the construction crew will commute to the site from Auburn or Foresthill. • Key personnel may be temporarily housed at the Hell Hole Dormitory Facility.
Short-Term Operational Changes	<ul style="list-style-type: none"> • None. Construction of the control building and powerline and the spillway crest gates during summer and fall when the reservoir is normally drawn down.
Long-term Operational Changes	<ul style="list-style-type: none"> • In years when either French Meadows or Hell Hole reservoirs would have spilled, the spillway crest gates will allow storage of an additional 7,600 acre-feet which can later be used to increase net annual energy generation. • In all but the driest years, this improvement will also allow the MFP to shift the timing of some generation from the spring runoff period to the summer peak energy demand period. • In years when additional storage occurs, the reservoirs maximum operating water surface elevation (WSE) will increase from 4,630 feet to approximately 4,636 feet from April 15 through October 30 and the maximum reservoir inundation may be temporarily increased by up to 36 acres. During the remainder of the year, the spillway crest gates will be lowered and the existing maximum normal operating water level will be maintained.
Project Maintenance Changes	<ul style="list-style-type: none"> • Annually, and prior to seasonal use, the spillway crest gates will be inspected and subject to operational testing for the general condition of the gates and lifting mechanism. • The compressor, control system, and monitoring system associated with the spillway crest gates will undergo annual maintenance and testing. • The emergency generator will be periodically tested. • Vegetation trimming by hand will be implemented at the new control building. Rodents will be managed within the control building by using snap traps and over-the-counter rodenticides (e.g., d-CON®), as needed. • Routine annual and periodic road maintenance will be conducted on the new Hell Hole Dam Spillway Gates Road.
Acres of Habitat Loss	<ul style="list-style-type: none"> • No temporary or permanent habitat loss. • Approximately 36 acres around Hell Hole Reservoir will be temporarily inundated in years when additional storage is captured. The temporary inundation area will occur within the reservoir's existing flood pool (the part of the reservoir volume allotted to the temporary storage of floodwater).
Potential Permit Requirements	<ul style="list-style-type: none"> • The following permits/agreements will be obtained, as necessary, prior to construction: <ul style="list-style-type: none"> ○ USACE Clean Water Act Section 404 Permit for fill of jurisdictional waters of the U.S.

Table HH-1. Hell Hole Reservoir Seasonal Storage Increase Improvement – Construction, Operation, and Maintenance.

Activity	Description
	<ul style="list-style-type: none">○ USDA-FS Road Use Permit for use of forest roads during construction activities.○ SWRCB 401 Certification will be obtained prior to FERC's issuance of the new license. This certification will include implementation of the Proposed Action (including this facility improvement).○ PCWA anticipates that preparation of a project-specific Water Quality Protection Plan (WQPP) will be a condition of the SWRCB 401 Certification. PCWA will develop a WQPP in consultation with SWRCB prior to commencement of any construction activities.○ SWRCB Water Rights Permit to increase the maximum storage permitted at Hell Hole Reservoir.○ CDFG Fish and Game Code Section 1600 Streambed Alteration Agreement for activities within the streambed and bank.



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PCWA
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CHRISTENSEN ASSOCIATES, INC.
21070th Avenue
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MIDDLE FORK AMERICAN RIVER HYDROELECTRIC PROJECT
HELL HOLE SEASONAL STORAGE INCREASE

FIGURE HH-1
HELL HOLE RESERVOIR SEASONAL STORAGE INCREASE SITE PLAN

DATE	JUNE 16, 2010
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Duncan Creek Diversion Dam Modification

Table DC-1. Duncan Creek Diversion Dam Modification – Construction, Operation, and Maintenance.

Activity	Description
Modifications to Existing Project Facilities	<p>Modifications to Existing Facilities</p> <ul style="list-style-type: none"> • Modify the existing Duncan Creek Diversion Dam and intake structure into a self-cleaning, stream-bottom intake. • Construct a wedge-wire screen and collection channel immediately upstream of the existing diversion dam ogee spillway. • Raise the existing dam abutments by 3.5 feet. • Construct a concrete collection chamber on the upstream side of the south dam abutment. • Install a pre-cast diversion culvert to convey water from the collection channel at the dam to the tunnel entrance. • Extend the existing Duncan Creek Diversion Intake Road 150 feet to the south abutment of the dam. <p>Refer to Figures DC-1 through DC-6.</p>
FERC Project Boundary Revision	<ul style="list-style-type: none"> • None. All facilities will be constructed within the existing FERC Project boundary.
Construction Access Roads	<ul style="list-style-type: none"> • Construction equipment and materials will arrive at the site via Mosquito Ridge Road (FR 96). • Access to the north abutment of the dam will be via Duncan Creek Diversion Dam Road. The existing cleared trail (Duncan Creek Diversion Dam North Trail) from the access road to the north abutment of the dam will be used, as necessary. • Access to the south abutment of the dam will be via Duncan Creek Diversion Intake Road.
Construction Work and Staging Areas	<ul style="list-style-type: none"> • The construction work area will include the existing dam, tunnel intake, and surrounding unvegetated areas. • Construction staging will occur on the south side of Duncan Creek at the Duncan Creek Diversion Pool Access Point, near the tunnel intake.
Disposal Areas	<ul style="list-style-type: none"> • Any excess excavated material will be disposed of at an agency-approved disposal area.
Construction Activities and Associated Equipment	<ul style="list-style-type: none"> • Extend the existing Duncan Creek Diversion Intake Road to the Duncan Creek Dam south abutment. • Improve Duncan Creek Diversion Intake Road by re-grading and compacting the surface. • Construct small cofferdam upstream of the construction site and temporarily divert flows from Duncan Creek into a culvert connected to the existing 60-inch-diameter low-level outlet. • Excavate the streambed upstream of the Duncan Creek Diversion Dam and along the south bank of Duncan Creek between the tunnel intake and dam for installation of the new screen, collection channel, collection chamber, and diversion culvert.

Table DC-1. Duncan Creek Diversion Dam Modification – Construction, Operation, and Maintenance.

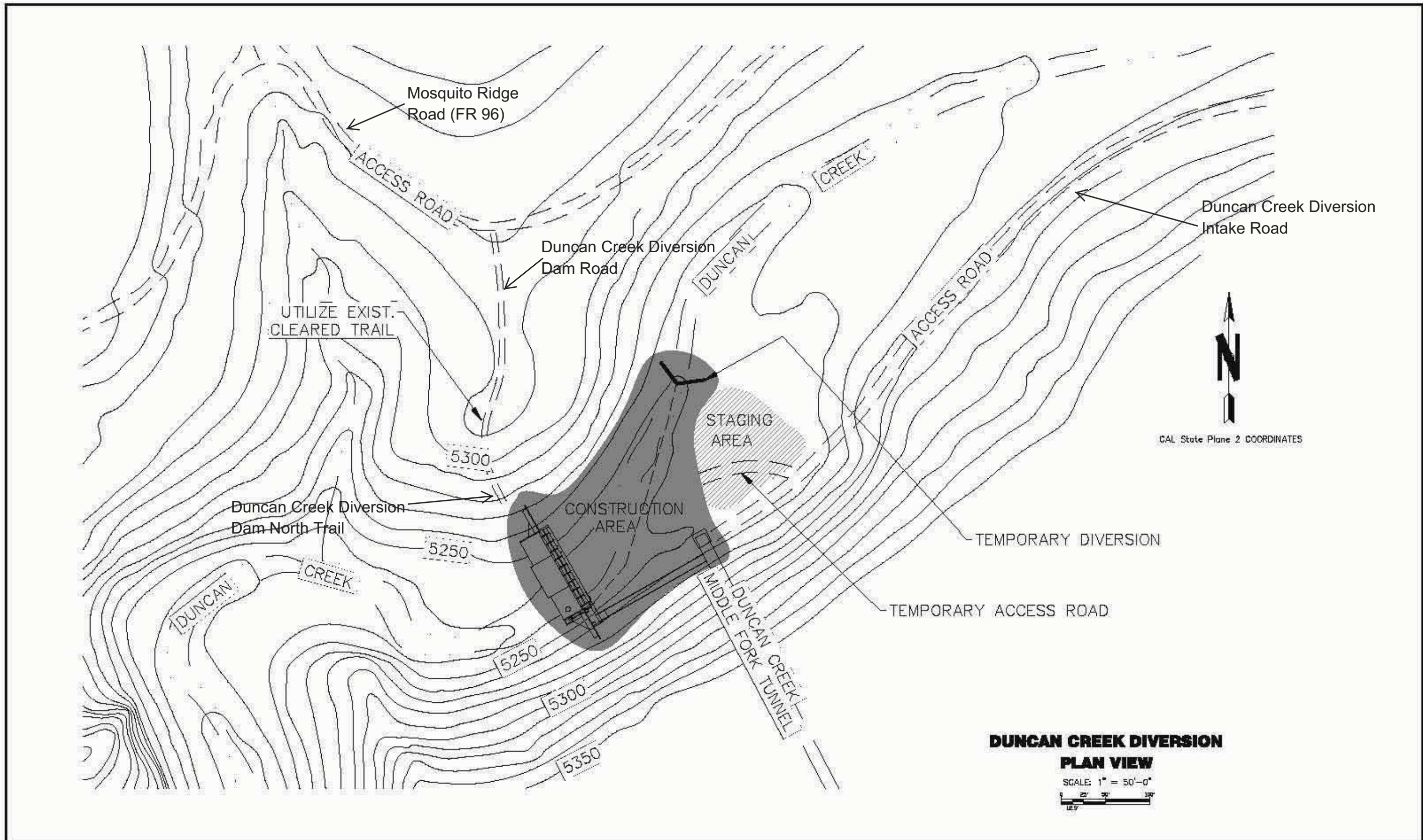
Activity	Description
	<ul style="list-style-type: none"> • Excavated material and rock will be spread over the staging area and compacted. • Modify existing tunnel intake to accommodate new diversion culvert and stoplogs. • Install a precast 8-foot box culvert between the diversion dam and tunnel intake. • Prepare existing diversion dam for new construction including concrete drilling, concrete cutting, and installing steel dowels. • Install reinforcing steel and forms for construction of new screen, collection system, and parapets on dam abutments. • Raise the abutments of the diversion dam by 3.5 feet. • Construct an 96-foot-long, 8-foot-wide concrete collection channel on the upstream side of the existing concrete diversion dam ogee spillway. • Construct a 3-foot-thick concrete overflow weir on the upstream side of the concrete collection channel. • If necessary, install sockets for flashboards on the top of the overflow weir to concentrate inflow to the wedge-wire screen screen. • Install a flat, self-cleaning screen made of 3/16-inch stainless steel wedge-wire with 0.04-inch-wide gaps, at a 15 degree slope in the downstream direction. • Construct a 3-foot-wide bypass channel with stoplogs to be used to bypass low flow during late summer when the intake is turned out. • Modify the instream flow outlet to maintain a bypass flow and that has first priority for water flowing into the intake. • Install an 8-foot-wide, 20-foot-long concrete collection chamber at the south abutment of the Duncan Creek Diversion Dam. • Install a new buried 8-foot pre-cast concrete box culvert connecting the new collection chamber to the existing Middle Fork Tunnel intake structure. • Install new stoplog guides, and stoplogs over the existing tunnel intake to control flows into the tunnel. Stoplogs can be removed to allow for direct flow into the tunnel. • Install a remote controlled slide gate to control inflow to the tunnel. • Replace the existing remote power supply with a self-contained solar/thermal electric power supply system to power flow monitoring and communication. • Install flow equipment to measure instream flow releases, flow diverted to French Meadows Reservoir, and inflow into the diversion pool. • Modify the low-level outlet to allow for dewatering the impoundment including the intake collection channel. • Construction equipment includes flat bed trucks, forklift, excavators, bulldozer, pumps, drills, compressors, 30kW size generators, mobile cranes, concrete transport trucks, concrete pumpers, lowboy trailers, and temporary sanitary facilities.

Table DC-1. Duncan Creek Diversion Dam Modification – Construction, Operation, and Maintenance.

Activity	Description
Construction Schedule and Hours of Operation	<ul style="list-style-type: none"> • Implement July through November within 2-3 years following license issuance. • Removal of riparian vegetation necessary for construction will take place in August through March the year prior to construction. • Construction personnel will work five, 10-hour days per week with additional weekend hours as needed.
Personnel Housing	<ul style="list-style-type: none"> • Construction will be completed by a crew of approximately 6-15 personnel. The majority of the construction crew will commute to the site from Auburn or Foresthill. • Key personnel may be temporarily housed at the Hell Hole Dormitory Facility.
Short-Term Operational Changes	<ul style="list-style-type: none"> • Flows within Duncan Creek will be diverted around the construction site and discharged back to the Creek downstream of the work area.
Long-term Operational Changes	<ul style="list-style-type: none"> • Modifications will provide for meeting new minimum instream flow releases. • The minimum normal operating elevation of the diversion pool will increase from an elevation of 5,265 feet to 5,269 feet. • Debris and sediment diverted into the tunnel and French Meadows Reservoir will be reduced substantially. • Periodic reductions in diverted flows (from blockages in the existing tunnel intake entrance) during storm events will be alleviated. • The wedge-wire screened diversion will typically not be in operation (turned out) between July 1 and September 30 allowing stream flow to bypass the intake. In wetter water years, when stream flow on July 1 exceeds the spawning flow for that year, some diversion may continue beyond July 1.
Project Maintenance Changes	<ul style="list-style-type: none"> • Trash rack cleaning will no longer be necessary. • Interim sediment management will no longer be required. • Sediment management will consist of occasional removal of large stranded debris after major storm events. • Monitoring and visual inspections of the trash rack and intake during winter and spring, to verify proper facility function, will be substantially reduced. • The wedge-wire screen will be cleaned, as needed, to remove algae and other debris. • The remote controlled slide gates and associated control system will be tested annually. • The existing emergency generator will be periodically tested.
Acres of Habitat Loss	<ul style="list-style-type: none"> • Permanent loss of 0.03 acres of willow alder riparian habitat for construction of the modified diversion.
Potential Permit Requirements	<ul style="list-style-type: none"> • The following permits/agreements will be obtained, as necessary, prior to construction: <ul style="list-style-type: none"> ○ USACE Clean Water Act Section 404 Permit for fill of jurisdictional waters of the U.S.

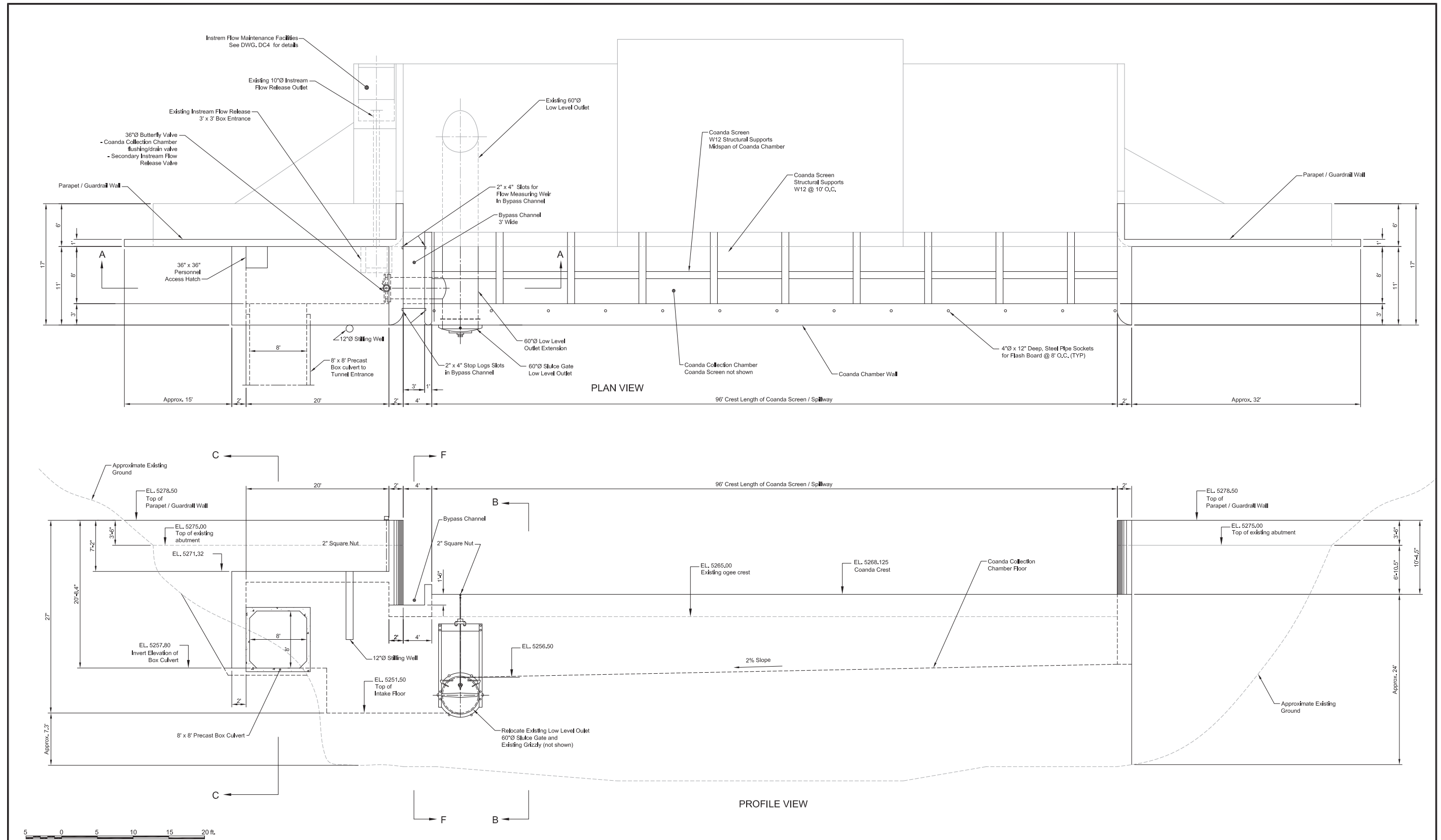
Table DC-1. Duncan Creek Diversion Dam Modification – Construction, Operation, and Maintenance.

Activity	Description
	<ul style="list-style-type: none"><li data-bbox="527 373 1398 430">○ USDA-FS Road Use Permit for use of forest roads during construction activities.<li data-bbox="527 443 1398 537">○ SWRCB 401 Certification will be obtained prior to FERC's issuance of the new license. This certification will include implementation of the Proposed Action (including this facility modification).<li data-bbox="527 550 1398 665">○ PCWA anticipates that preparation of a project-specific Water Quality Protection Plan (WQPP) will be a condition of the SWRCB 401 Certification. PCWA will develop a WQPP in consultation with SWRCB prior to commencement of any construction activities.<li data-bbox="527 678 1398 735">○ CDFG Fish and Game Code Section 1600 Streambed Alteration Agreement for activities within the streambed and bank.

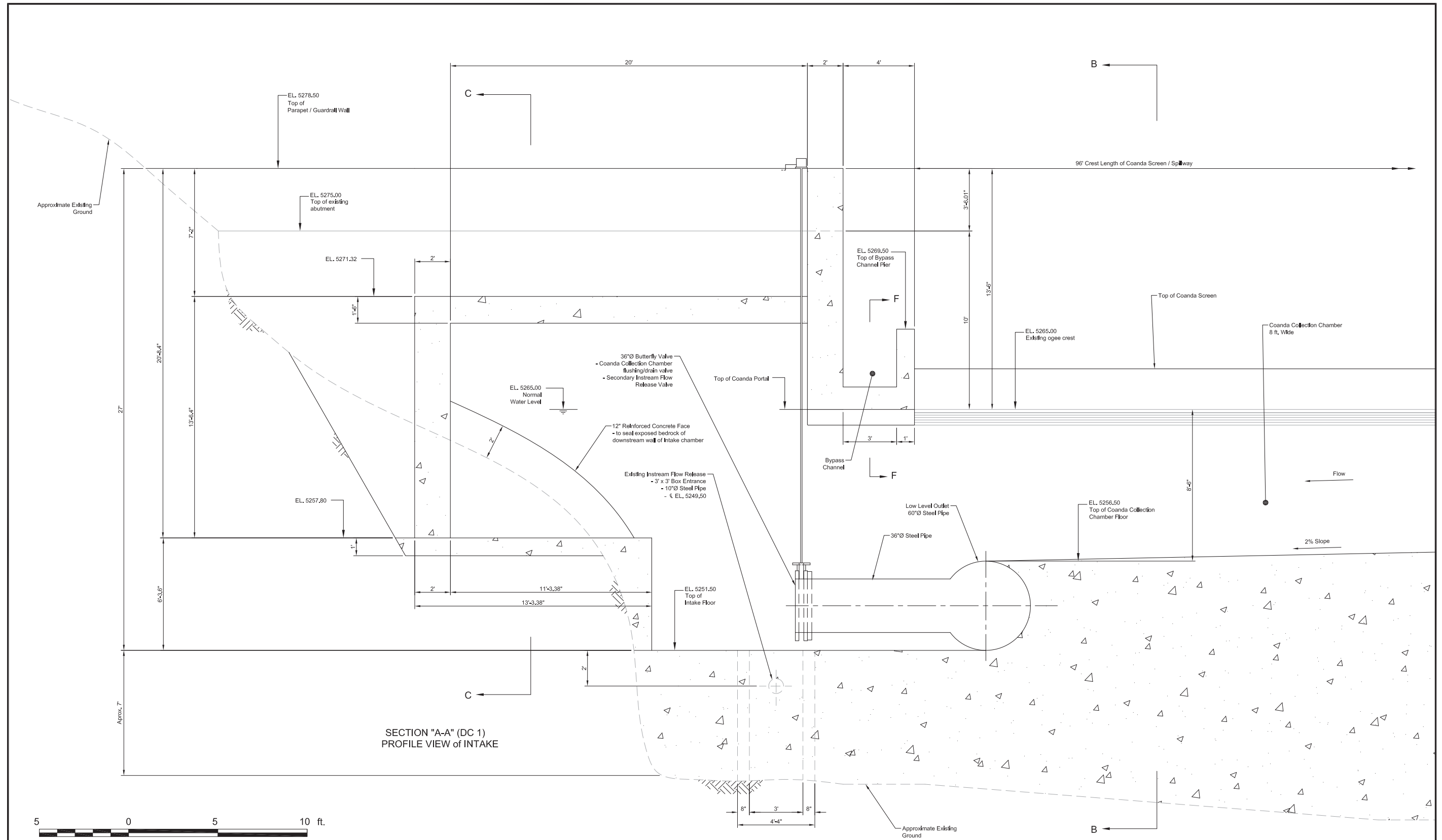


**DUNCAN CREEK DIVERSION
PLAN VIEW**
SCALE: 1" = 50'-0"
125'

	DESIGNED: _____ DRAWN: T. STANDERS	CHECKED: _____ SUBMITTED: _____	 144 Ferguson Street Auburn, CA 95604	 922 2nd Avenue Suite 200 San Rafael, California 94903 U.S.A.	MIDDLE FORK AMERICAN RIVER HYDROELECTRIC PROJECT INTAKE SEDIMENT CONTROL MEASURES	DATE JULY 2010								
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	DESIGNED <u>P.O. Stroman</u> CHECKED <u>J. Christensen</u> DRAWN <u>N.A. Kozobolis</u> SUBMITTED _____	<p>PLACER COUNTY WATER AGENCY 144 Ferguson Road, Auburn, CA 95604</p>	<p>810 Fifth Avenue Suite 210 San Rafael, California 94901 U.S.A.</p>	MIDDLE FORK AMERICAN RIVER PROJECT INTAKE SEDIMENT CONTROL MEASURES	DATE January, 2010															
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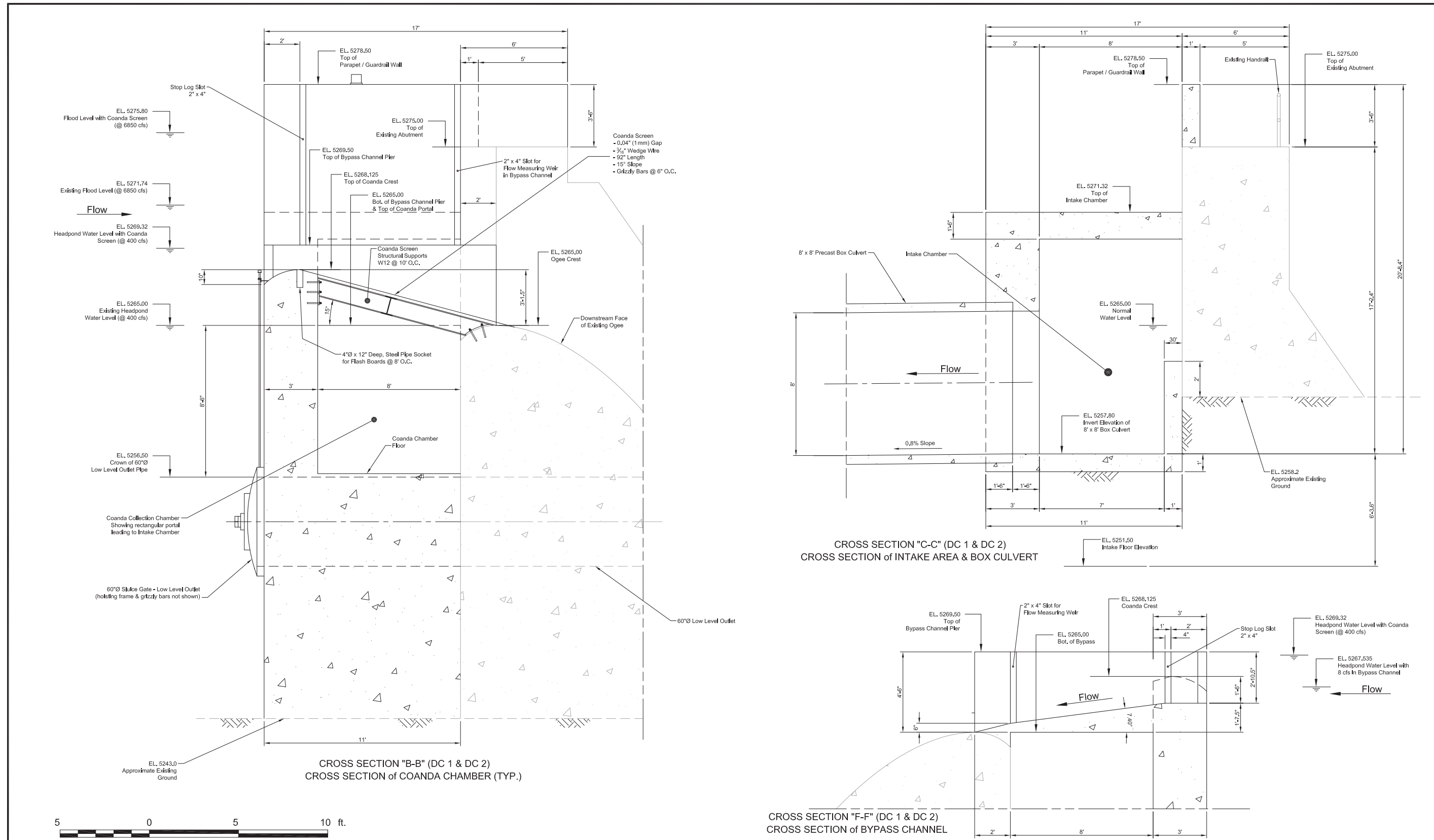
PCWA
PLACER COUNTY WATER AGENCY
144 Ferguson Road, Auburn, CA 95604

CHRISTENSEN ASSOCIATES, INC.
810 Fifth Avenue
Suite 210
San Rafael, California 94901
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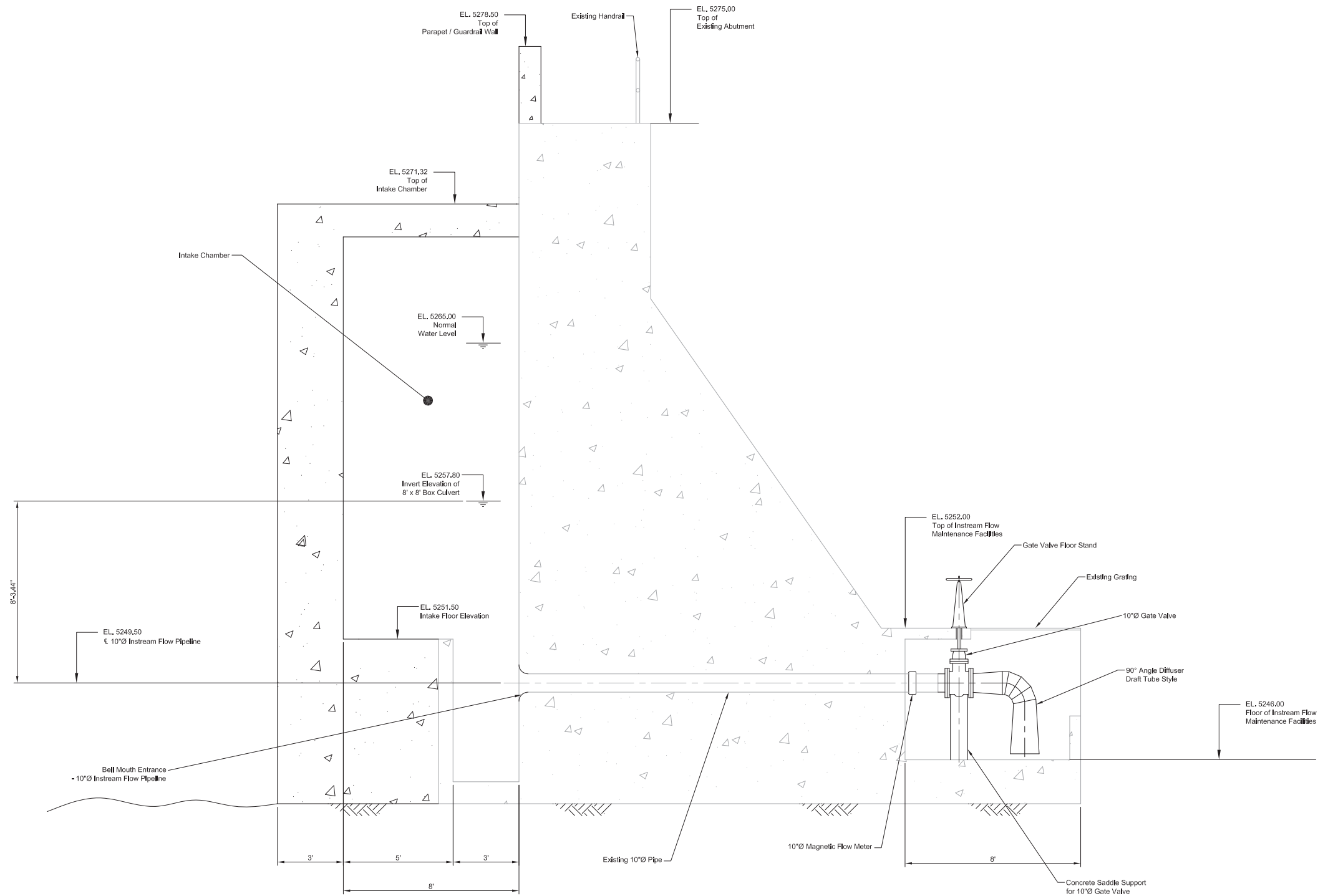
MIDDLE FORK AMERICAN RIVER PROJECT
INTAKE SEDIMENT CONTROL MEASURES

FIGURE DC-3
DUNCAN CREEK DIVERSION SITE PLAN
PROFILE VIEW OF INTAKE "A-A"

DATE	January, 2010
DRAWING NUMBER	



	DESIGNED <u>P.O. Sisman</u> CHECKED <u>J. Christensen</u> DRAWN <u>N.A. Kozobolis</u> SUBMITTED _____	 PLACER COUNTY WATER AGENCY 144 Ferguson Road, Auburn, CA 95604	 810 Fifth Avenue Suite 210 San Rafael, California 94901 U.S.A.	MIDDLE FORK AMERICAN RIVER PROJECT INTAKE SEDIMENT CONTROL MEASURES	DATE January, 2010
	FIGURE DC-4 DUNCAN CREEK DIVERSION SITE PLAN INTAKE SECTIONS "B-B" & "C-C"			DRAWING NUMBER	
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PROFILE VIEW OF PRIMARY INSTREAM FLOW MAINTENANCE FACILITIES



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DRAWN	N.A. Kozobolis	SUBMITTED			
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PLACER COUNTY WATER AGENCY
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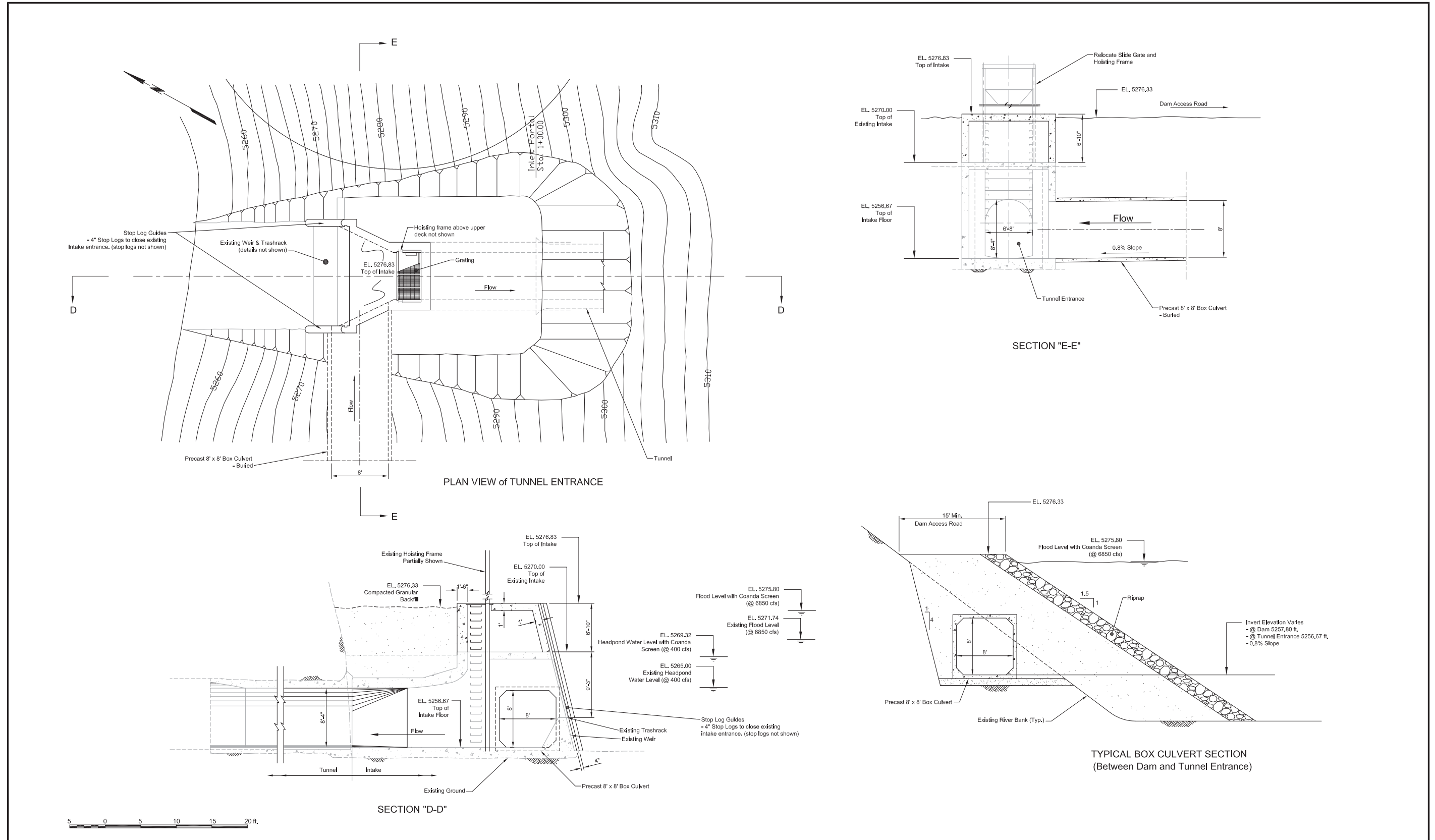
810 Fifth Avenue
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San Rafael, California 94901
U.S.A.

MIDDLE FORK AMERICAN RIVER PROJECT
INTAKE SEDIMENT CONTROL MEASURES

FIGURE DC-5
DUNCAN CREEK DIVERSION SITE PLAN
PRIMARY VIEW OF PRIMARY INSTREAM FLOW MAINTENANCE FACILITY

DATE
January, 2010

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DRAWN	N.A. Kozobolis	SUBMITTED			
REV	DATE	DESCRIPTION	SUB	APP'D	APPROVED

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MIDDLE FORK AMERICAN RIVER PROJECT
 INTAKE SEDIMENT CONTROL MEASURES

FIGURE DC-6
 DUNCAN CREEK DIVERSION SITE PLAN
 TUNNEL ENTRANCE & BOX CULVERT

DATE
 January, 2010

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North Fork Long Canyon Diversion Dam Modification

Table NF-1. North Fork Long Canyon Diversion Dam Modification – Construction, Operation, and Maintenance.

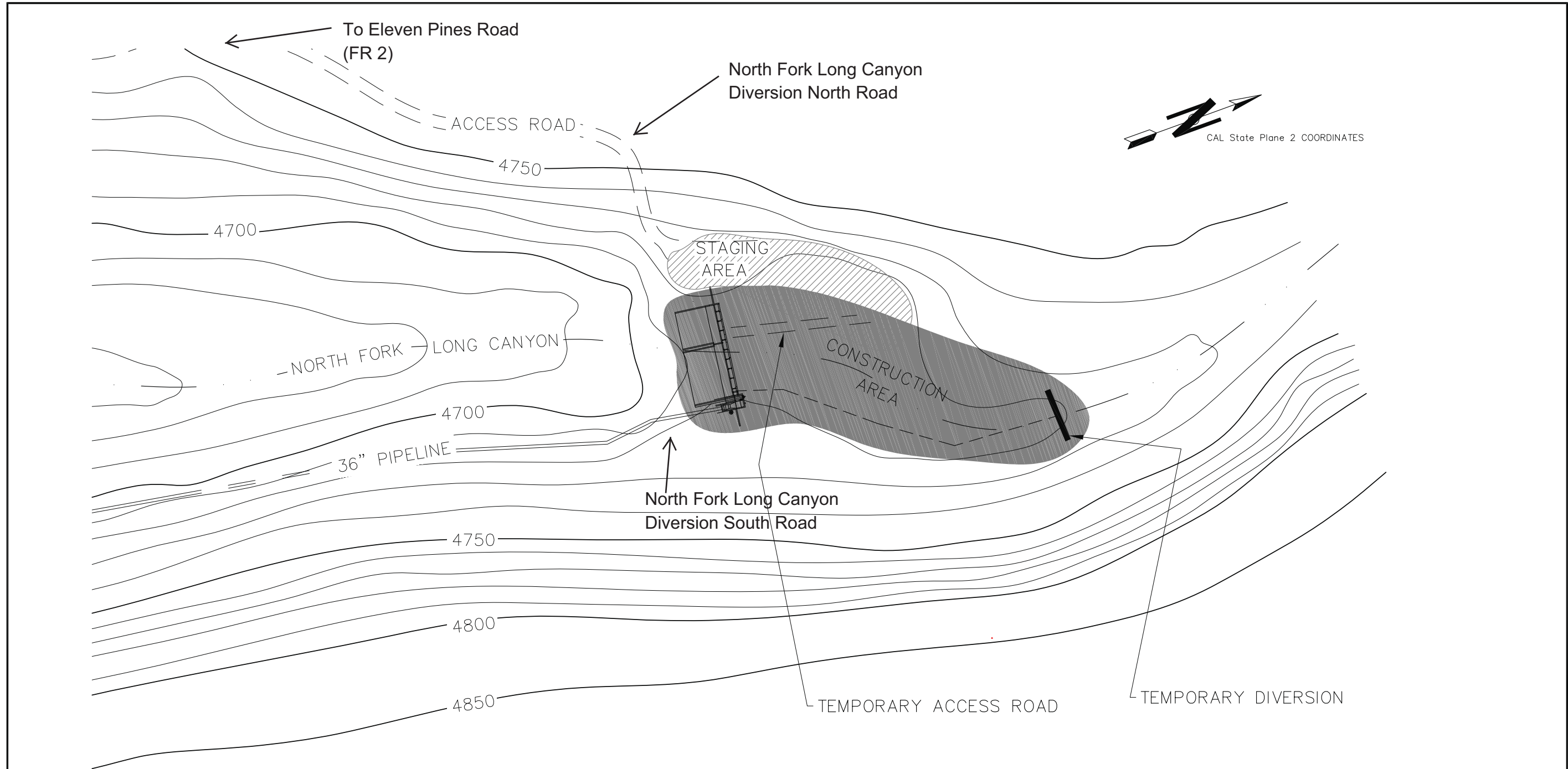
Activity	Description
Modifications to Existing Project Facilities	<p>Modifications to Existing Facilities</p> <ul style="list-style-type: none"> • Modify the existing North Fork Long Canyon Diversion Dam and intake structure into a self-cleaning, stream-bottom intake. • Construct a wedge-wire screen and collection channel immediately upstream of the existing diversion dam ogee spillway. • Raise the existing dam abutments by 3.5 feet. • Construct a concrete collection chamber on the upstream side of the east dam abutment connecting to the existing discharge pipeline. • Construct a temporary access road on the west bank of the existing North Fork Long Canyon Diversion Pool. <p>Refer to Figures NF-1 through NF-4.</p>
FERC Project Boundary Revision	<ul style="list-style-type: none"> • None. All facilities will be constructed within the existing FERC Project boundary.
Construction Access Roads	<ul style="list-style-type: none"> • Construction equipment and materials will arrive at the site via Eleven Pines Road (FR 2) and North Fork Long Canyon Diversion North Road and North Fork Long Canyon Diversion South Road. • A temporary access road will be constructed on the west bank of the existing North Fork Long Canyon Diversion Pool.
Construction Work and Staging Areas	<ul style="list-style-type: none"> • The construction work area will include the existing dam, tunnel intake, and surrounding unvegetated areas. • Construction staging will occur on the north side of Long Canyon Creek adjacent to the dam.
Disposal Areas	<ul style="list-style-type: none"> • Any excess excavated material will be disposed of at an agency-approved disposal area.
Construction Activities and Associated Equipment	<ul style="list-style-type: none"> • Construct a new temporary access road on the west bank of the North Fork Long Canyon Diversion Pool. • Construct small cofferdam upstream of the construction site and temporarily divert flows from North Fork Long Canyon Creek into a culvert connected to the existing 36-inch diameter low-level outlet. • Excavate the streambed upstream of the North Fork Long Canyon Diversion Dam for installation of the new screen, collection channel, and collection chamber. • Excavated material and rock will be spread over the staging area and compacted. • Prepare existing diversion dam for new construction including concrete drilling, concrete cutting, and installing steel dowels. • Install reinforcing steel and forms for construction of new screen, collection system, and parapets on dam abutments. • Raise the abutments of the diversion by 2.7 feet. • Construct a 90-foot-long, 3.7-foot-wide concrete collection channel on the upstream side of the existing concrete diversion dam ogee spillway.

Table NF-1. North Fork Long Canyon Diversion Dam Modification – Construction, Operation, and Maintenance.

Activity	Description
	<ul style="list-style-type: none"> • Construct a 1.4-foot-thick concrete overflow weir on the upstream side of the concrete collection channel. • If necessary, install sockets for flashboards on top of the overflow weir to concentrate inflow to the wedge-wire screen. • Install a flat, self-cleaning screen made of 3/16-inch stainless steel wedge-wire with 0.04-inch-wide gaps, at a 15 degree slope in the downstream direction. • Construct a 3-foot-wide bypass channel with stoplogs to be used to bypass low flow during late summer when the intake is turned out. • Construct a 7.5-foot-wide, 13-foot-long concrete collection chamber at the east abutment of the North Fork Long Canyon Diversion Dam (uses the existing discharge pipeline and gate and connects to the Hell Hole - Middle Fork Tunnel). • Install a remote controlled slide gate to control inflow to the tunnel. • Replace the existing remote power supply with a self-contained solar/thermal electric power supply system to power flow monitoring and communication. • Install flow equipment to measure instream flow releases and flow diverted to Hell Hole - Middle Fork Tunnel. • Modify the low-level outlet to allow for dewatering the impoundment including the intake collection channel and collection chamber. • Construction equipment will include flat bed trucks, forklift, excavators, bulldozer, pumps, drills, compressors, 30kW size generators, mobile cranes, concrete transport trucks, concrete pumpers, lowboy trailers, and temporary sanitary facilities.
Construction Schedule and Hours of Operation	<ul style="list-style-type: none"> • Implement July through November within 3-4 years following license issuance. • Construction personnel will work five, 10-hour days per week with additional weekend hours as needed.
Personnel Housing	<ul style="list-style-type: none"> • Construction will be completed by a crew of approximately 6-10 personnel. The majority of the construction crew will commute to the site from Auburn or Foresthill. • Key personnel may be temporarily housed at the Hell Hole Dormitory Facility.
Short-Term Operational Changes	<ul style="list-style-type: none"> • Flows within North Fork Long Canyon Creek will be diverted around the construction site and discharged back to the creek downstream of the work area.
Long-term Operational Changes	<ul style="list-style-type: none"> • Modifications will provide for meeting new minimum instream flow releases. • The minimum normal operating elevation of the diversion pool will increase from an elevation of 4,716 feet to 4,717 feet. • Debris and sediment diverted into the Hell Hole - Middle Fork Tunnel will be reduced substantially. • Periodic reductions in diverted flows (from blockages in the existing tunnel

Table NF-1. North Fork Long Canyon Diversion Dam Modification – Construction, Operation, and Maintenance.

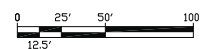
Activity	Description
	<p>intake entrance) during storm events will be alleviated.</p> <ul style="list-style-type: none"> • The wedge-wire screened diversion will typically not be in operation (turned out) between July 1 and September 30 allowing stream flow to bypass the intake. In wetter water years, when stream flow on July 1 exceeds the spawning flow for that year, some diversion may continue beyond July 1.
<p>Project Maintenance Changes</p>	<ul style="list-style-type: none"> • Trash rack cleaning will no longer be necessary. • Interim sediment management will no longer be required. • Sediment management will consist of occasional removal of large stranded debris after major storm events. • Monitoring and visual inspections of the intake during winter and spring, to verify proper facility function, will be substantially reduced. • The wedge-wire screen will be cleaned, as needed, to remove algae and other debris. • The remote controlled slide gates and associated control system will be tested annually. • The remote power supply will be periodically tested.
<p>Acres of Habitat Loss</p>	<ul style="list-style-type: none"> • No temporary or permanent habitat loss.
<p>Potential Permit Requirements</p>	<ul style="list-style-type: none"> • The following permits/agreements will be obtained, as necessary, prior to construction: <ul style="list-style-type: none"> ○ USACE Clean Water Act Section 404 Permit for fill of jurisdictional waters of the U.S. ○ USDA-FS Road Use Permit for use of forest roads during construction activities. ○ SWRCB 401 Certification will be obtained prior to FERC's issuance of the new license. This certification will include implementation of the Proposed Action (including this facility modification). ○ PCWA anticipates that preparation of a project-specific Water Quality Protection Plan (WQPP) will be a condition of the SWRCB 401 Certification. PCWA will develop a WQPP in consultation with SWRCB prior to commencement of any construction activities. ○ CDFG Fish and Game Code Section 1600 Streambed Alteration Agreement for activities within the streambed and bank.



NORTH FORK LONG CANYON CREEK DIVERSION

PLAN VIEW

SCALE: 1" = 50'-0"



DESIGNED _____ CHECKED _____
 DRAWN T. STANDERS SUBMITTED _____

REV	DATE	DESCRIPTION	SUB	APP'D

APPROVED _____



144 Ferguson Street
 Auburn, CA 95604



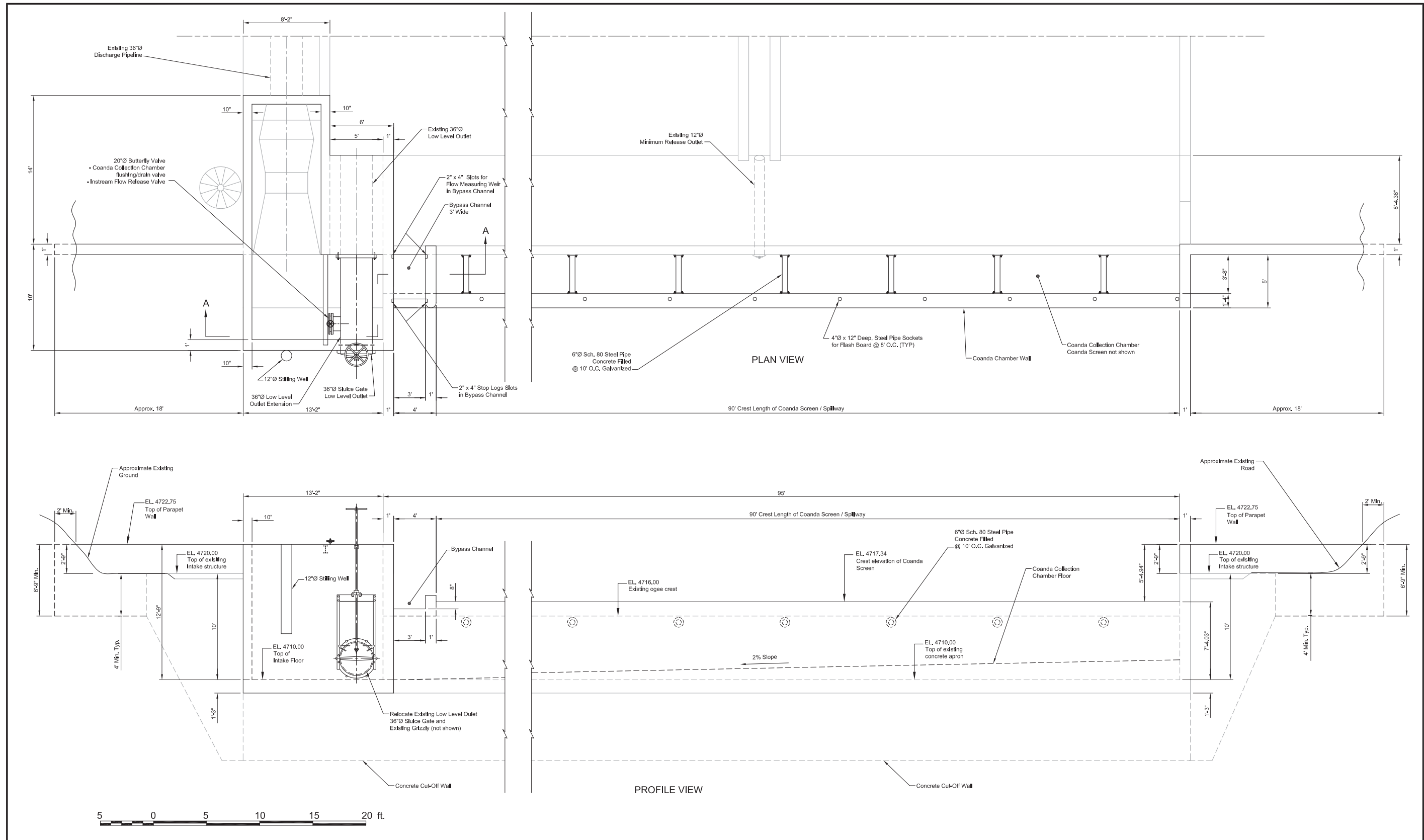
2107th Avenue
 Suite 200
 San Rafael, California 94903
 U.S.A.

MIDDLE FORK AMERICAN RIVER HYDROELECTRIC PROJECT
 INTAKE SEDIMENT CONTROL MEASURES

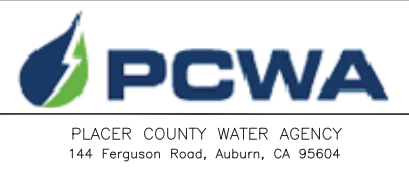
FIGURE NF-1
 NORTH FORK LONG CANYON DIVERSION SITE PLAN

DATE
 JULY 2010

DRAWING NUMBER



DESIGNED	P.O. Sjöman	CHECKED	J. Christensen		
DRAWN	N.A. Kozobolis	SUBMITTED			
REV	DATE	DESCRIPTION	SUB	APP'D	APPROVED

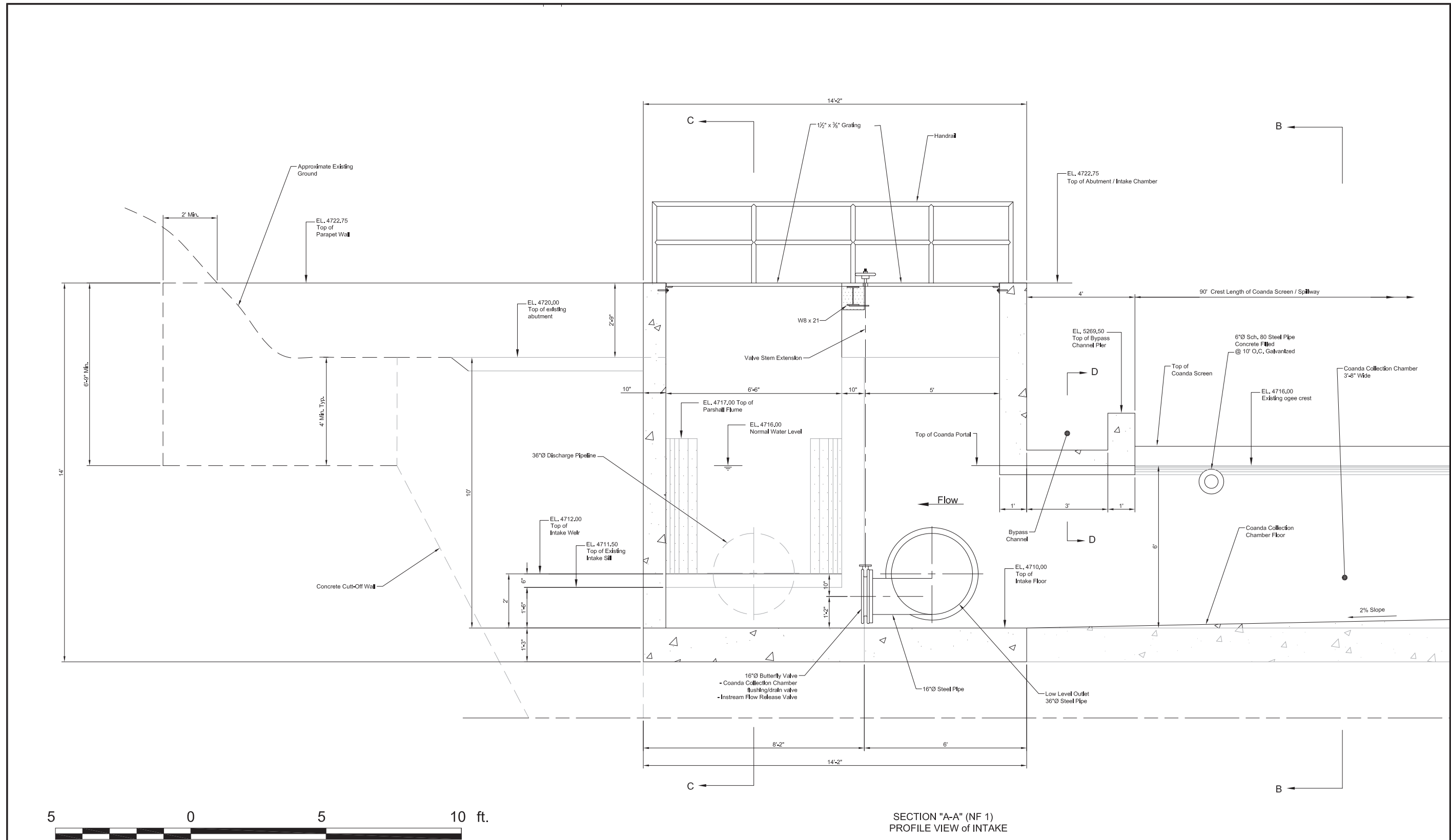


MIDDLE FORK AMERICAN RIVER PROJECT
INTAKE SEDIMENT CONTROL MEASURES

FIGURE NF-2
NORTH FORK LONG CANYON DIVERSION SITE PLAN
PLAN AND PROFILE VIEW OF INTAKE AND WEIR

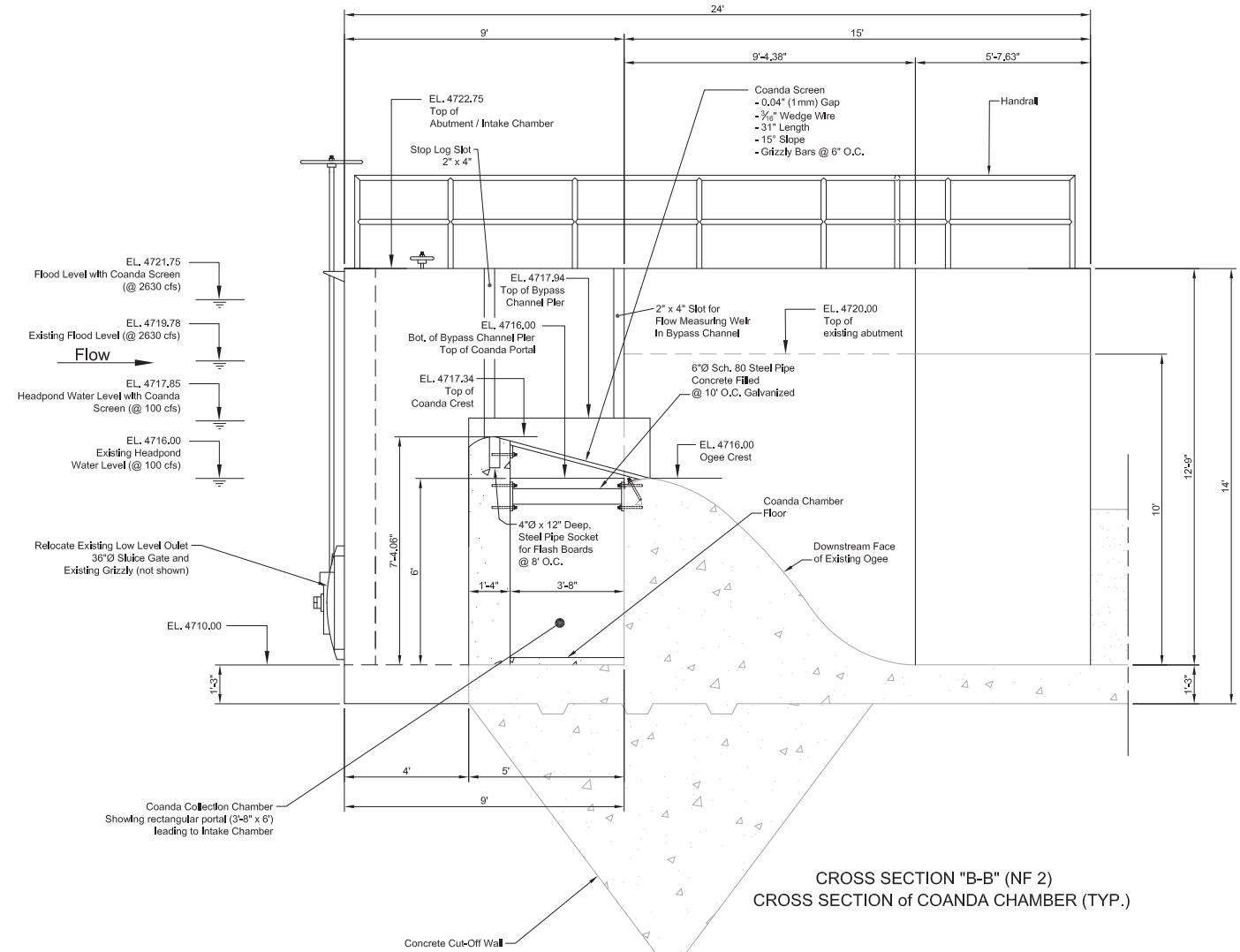
DATE
January, 2010

DRAWING NUMBER

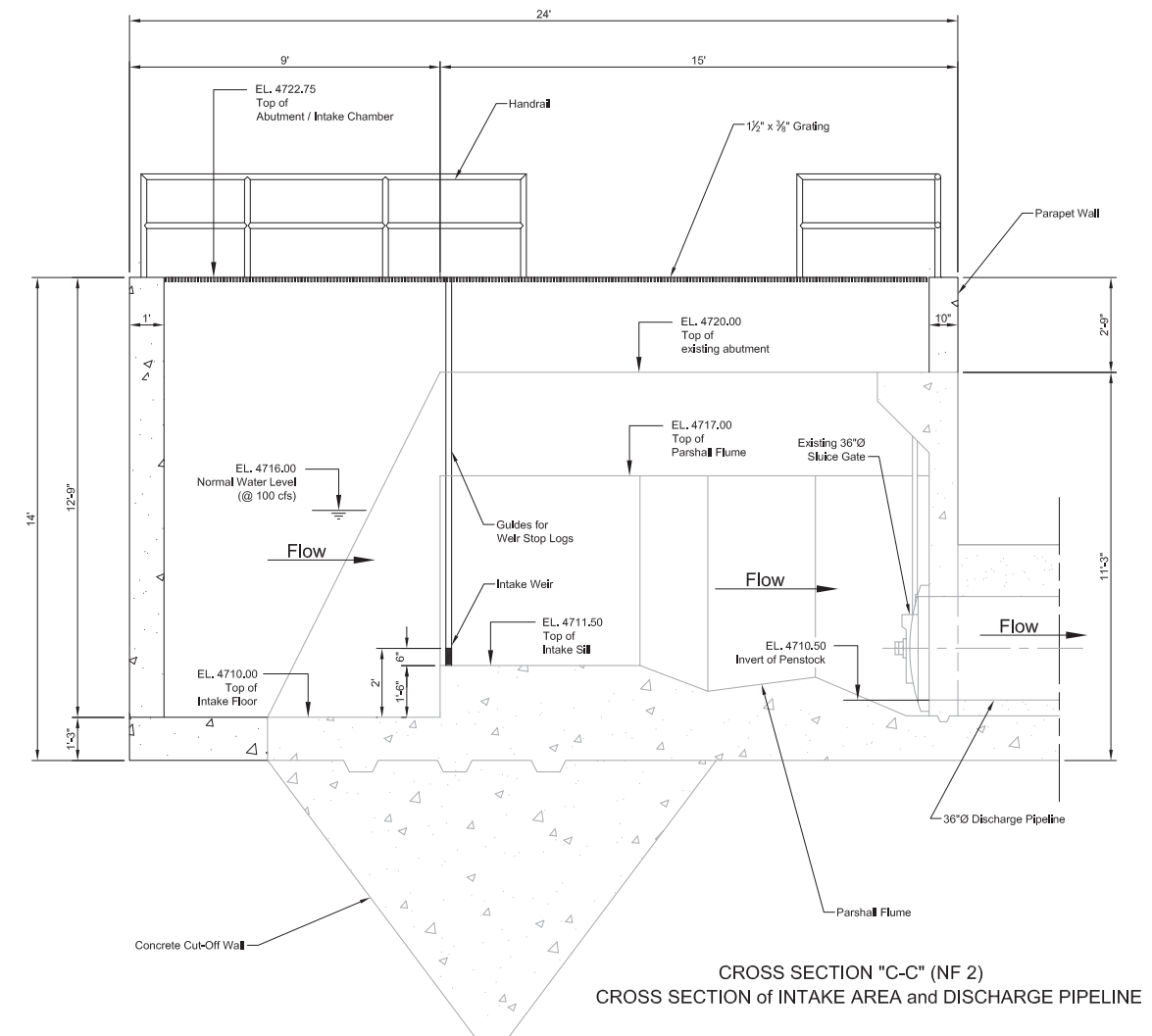


SECTION "A-A" (NF 1)
PROFILE VIEW OF INTAKE

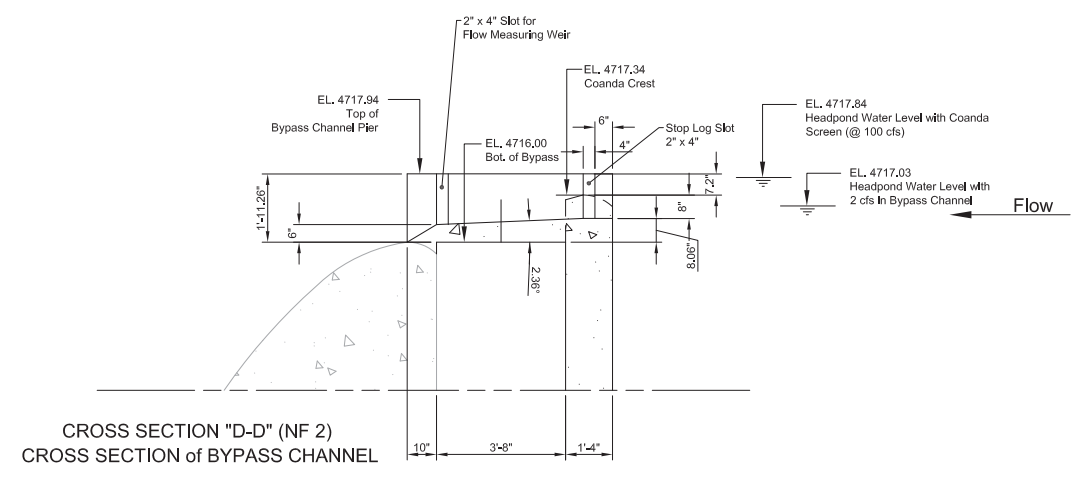
	DESIGNED <u>P.O. Sjöman</u> CHECKED <u>J. Christensen</u> DRAWN <u>N.A. Kozobolis</u> SUBMITTED _____	<p>PLACER COUNTY WATER AGENCY 144 Ferguson Road, Auburn, CA 95604</p>	<p>3107th Avenue Suite 200 San Rafael, California 94901 U.S.A.</p>	MIDDLE FORK AMERICAN RIVER PROJECT INTAKE SEDIMENT CONTROL MEASURES	DATE January, 2010									
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REV	DATE	DESCRIPTION	SUB	APP'D	APPROVED									



CROSS SECTION "B-B" (NF 2)
CROSS SECTION of COANDA CHAMBER (TYP.)



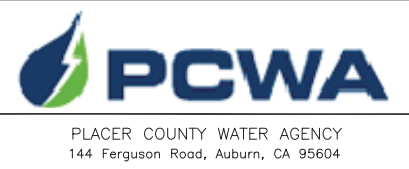
CROSS SECTION "C-C" (NF 2)
CROSS SECTION of INTAKE AREA and DISCHARGE PIPELINE



CROSS SECTION "D-D" (NF 2)
CROSS SECTION of BYPASS CHANNEL



DESIGNED	P.O. Sjoman	CHECKED	J. Christensen		
DRAWN	N.A. Kozobolis	SUBMITTED			
REV	DATE	DESCRIPTION	SUB	APP'D	APPROVED



MIDDLE FORK AMERICAN RIVER PROJECT
INTAKE SEDIMENT CONTROL MEASURES

FIGURE NF-4
NORTH FORK LONG CANYON DIVERSION SITE PLAN
INTAKE SECTIONS "B-B" & "C-C"

DATE	January, 2010
DRAWING NUMBER	

South Fork Long Canyon Diversion Dam Modification

Table SF-1. South Fork Long Canyon Diversion Dam Modification – Construction, Operation, and Maintenance.

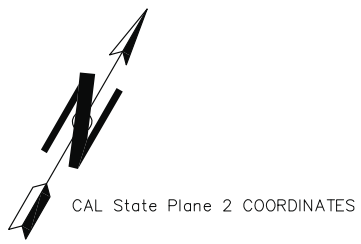
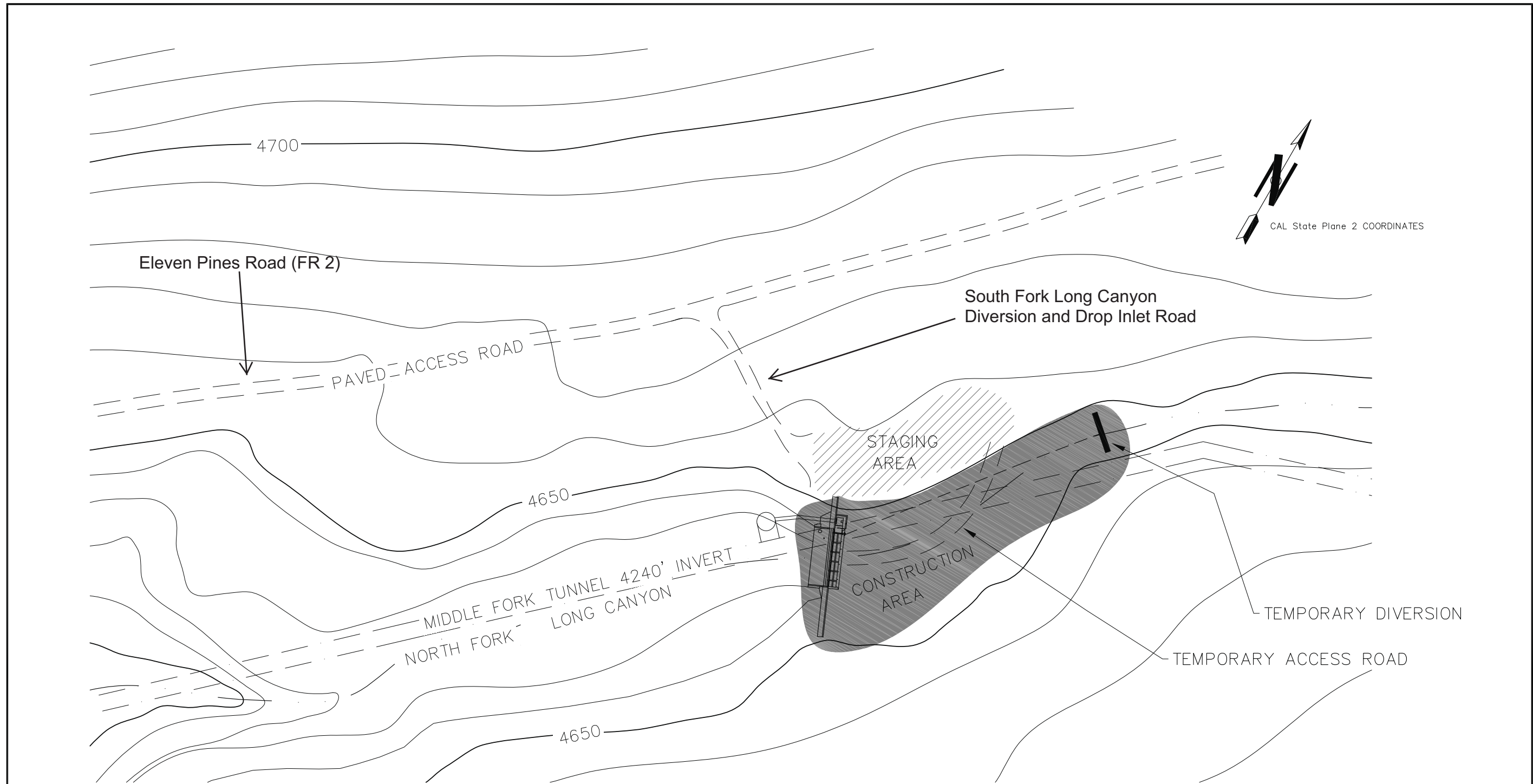
Activity	Description
Modifications to Existing Project Facilities	<p>Modifications to Existing Facilities</p> <ul style="list-style-type: none"> • Modify the existing South Fork Long Canyon Diversion Dam and intake structure into a self-cleaning, stream-bottom intake. • Construct a wedge-wire screen and collection channel immediately upstream of the existing diversion dam ogee spillway. • Raise the existing dam abutments by 3.5 feet. • Construct a concrete collection chamber on the upstream side of the north dam abutment connecting to the existing discharge pipeline. • Modify the existing low level outlet to extend to the upstream side of the new collection channel, to be used for instream flow discharge, and to dewater the impoundment, and the collection system (channel and chamber). • Construct a temporary access road on the north bank of the existing South Fork Long Canyon Diversion Pool. <p>Refer to Figures SF-1 through SF-4.</p>
FERC Project Boundary Revision	<ul style="list-style-type: none"> • None. All facilities will be constructed within the existing FERC Project boundary.
Construction Access Roads	<ul style="list-style-type: none"> • Construction equipment and materials will arrive at the site via Eleven Pines Road (FR 2) and South Fork Long Canyon Diversion and Drop Inlet Road. • A temporary access road will be constructed on the north bank of the existing South Fork Long Canyon Diversion Pool.
Construction Work and Staging Areas	<ul style="list-style-type: none"> • The construction work area will include the existing dam, tunnel intake, and surrounding unvegetated areas. • Construction staging will occur on the north side of South Fork Long Canyon Creek adjacent to the dam.
Disposal Areas	<ul style="list-style-type: none"> • Any excess excavated material will be disposed of at an agency-approved disposal area.
Construction Activities and Associated Equipment	<ul style="list-style-type: none"> • Construct a new temporary access road on the north bank of the South Fork Long Canyon Diversion Pool. • Construct small cofferdam upstream of the construction site and temporarily divert flows from South Fork Long Canyon Creek into a culvert connected to the existing 36-inch-diameter low-level outlet. • Excavate the streambed upstream of the South Fork Long Canyon Diversion Dam for installation of the new screen, collection channel, and collection chamber. • Excavated material and rock will be spread over the staging area and compacted. • Prepare existing diversion dam for new construction including concrete drilling, concrete cutting, and installing steel dowels. • Install reinforcing steel and forms for construction of new screen, collection system, and parapets on dam abutments. • Raise the abutments of the diversion by 3.5 feet. • Construct a 60-foot-long, 7.5-foot-wide concrete collection channel on the upstream side of the existing concrete diversion dam ogee spillway.

Table SF-1. South Fork Long Canyon Diversion Dam Modification – Construction, Operation, and Maintenance.

Activity	Description
	<ul style="list-style-type: none"> • Construct a 3-foot-thick concrete overflow weir on the upstream side of the concrete collection channel. • If necessary, install sockets for flashboards on top of the overflow weir to concentrate inflow to the wedge-wire screen. • Install a flat, self-cleaning screen made of 3/16-inch stainless steel wedge-wire with 0.04-inch-wide gaps, at a 15 degree slope in the downstream direction. • Construct a 3-foot-wide bypass channel with stoplogs to be used to bypass low flow during late summer when the intake is turned out. • Construct a 7.5-foot-wide, 13-foot-long concrete collection chamber at the north abutment of the South Fork Long Canyon Diversion Dam (uses the existing discharge pipeline and gate and connects to the Hell Hole - Middle Fork Tunnel). • Install a remote controlled slide gate to control inflow to the tunnel. • Replace the existing remote power supply with a self-contained solar/thermal electric power supply system to power flow monitoring and communication. • Modify the South Fork Long Canyon Gage at Diversion Tunnel (USGS Gage No. 11433060) to measure instream flow releases and flow diverted to Hell Hole - Middle Fork Tunnel. • Modify the low-level outlet to allow for dewatering the impoundment including the collection channel and collection chamber. • Construction equipment will include flat bed trucks, forklift, excavators bulldozer, pups, drills, compressors, 30kW size generators, mobile cranes, concrete transport trucks, concrete pumpers, lowboy trailers, and temporary sanitary facilities.
Construction Schedule and Hours of Operation	<ul style="list-style-type: none"> • Implement July through November within 3-4 years following license issuance. • Removal of riparian vegetation necessary for construction will take place in August through March the year prior to construction. • Construction personnel will work five, 10-hour days per week with additional weekend hours as needed.
Personnel Housing	<ul style="list-style-type: none"> • Construction will be completed by a crew of 6-10 personnel. The majority of the construction crew will commute to the site from Auburn or Foresthill. • Key personnel may be temporarily housed at the Hell Hole Dormitory Facility.
Short-Term Operational Changes	<ul style="list-style-type: none"> • Flows within South Fork Long Canyon Creek will be diverted around the construction site and discharged back to the Creek downstream of the work area.

Table SF-1. South Fork Long Canyon Diversion Dam Modification – Construction, Operation, and Maintenance.

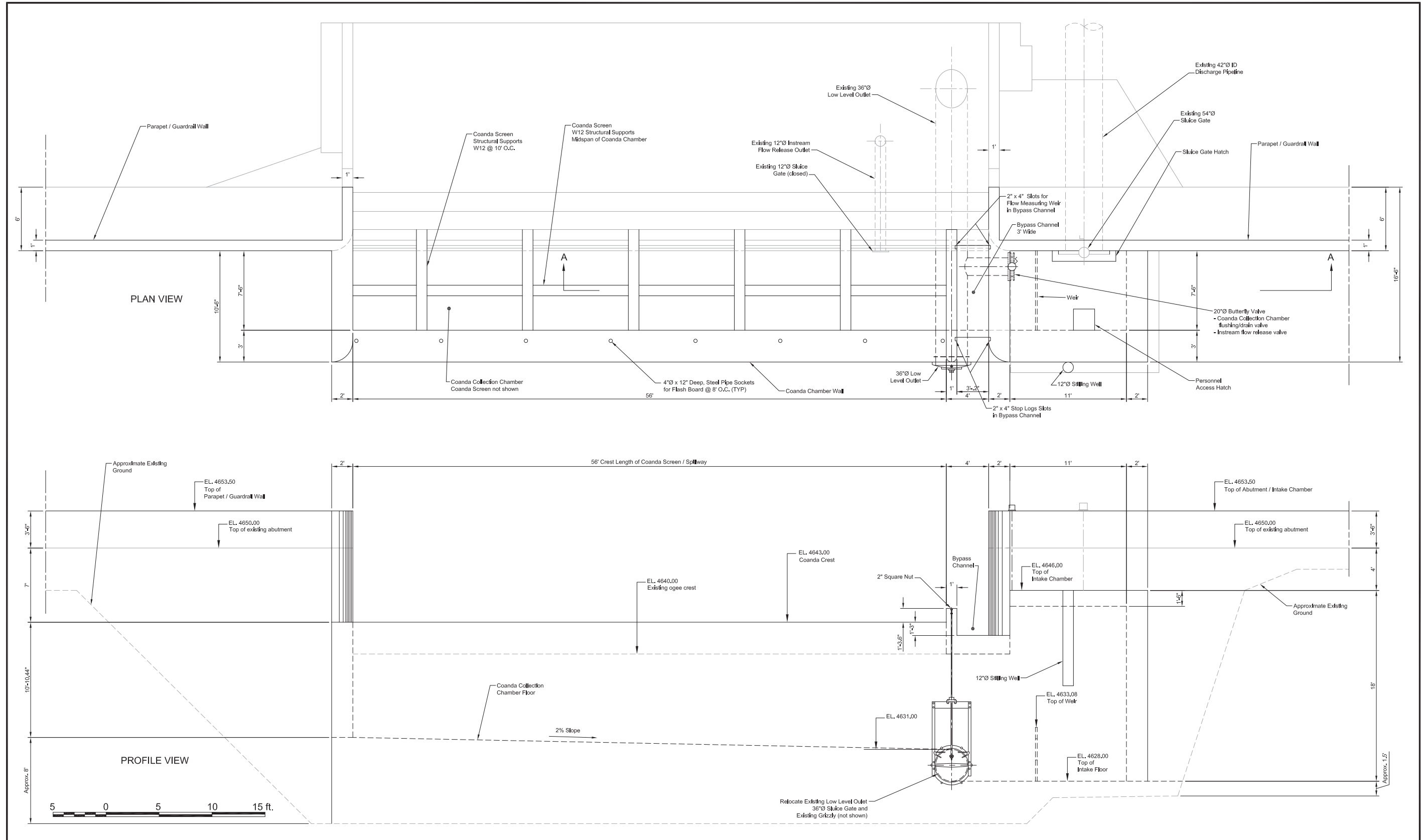
Activity	Description
Long-term Operational Changes	<ul style="list-style-type: none"> • Modifications will provide for meeting new minimum instream flow releases. • The minimum normal operating elevation of the diversion pool will increase from an elevation of 4,640 feet to 4,643 feet. • Debris and sediment diverted into the Hell Hole - Middle Fork Tunnel will be reduced substantially. • Periodic reductions in diverted flows (from blockages in the existing tunnel intake entrance) during storm events will be alleviated. • The wedge-wire screened diversion will typically not be in operation (turned out) between July 1 and September 30 allowing stream flow to bypass the intake. In wetter water years, when stream flow on July 1 exceeds the spawning flow for that year, some diversion may continue beyond July 1.
Project Maintenance Changes	<ul style="list-style-type: none"> • Trash rack cleaning will no longer be necessary. • Interim sediment management will no longer be required. • Sediment management will consist of occasional removal of large stranded debris after major storm events. • Monitoring and visual inspections of the intake during winter and spring, to verify proper facility function, will be substantially reduced. • The wedge-wire screen will be cleaned, as needed, to remove algae and other debris. • The remote controlled slide gates and associated control system will be tested annually. • The remote power supply will be periodically tested.
Acres of Habitat Loss	<ul style="list-style-type: none"> • Permanent loss of approximately 0.01 acre of willows and alders for the construction of modified diversion structure.
Potential Permit Requirements	<ul style="list-style-type: none"> • The following permits/agreements will be obtained, as necessary, prior to construction: <ul style="list-style-type: none"> ○ USACE Clean Water Act Section 404 Permit for fill of jurisdictional waters of the U.S. ○ USDA-FS Road Use Permit for use of forest roads during construction activities. ○ SWRCB 401 Certification will be obtained prior to FERC's issuance of the new license. This certification will include implementation of the Proposed Action (including this facility modification). ○ PCWA anticipates that preparation of a project-specific Water Quality Protection Plan (WQPP) will be a condition of the SWRCB 401 Certification. PCWA will develop a WQPP in consultation with SWRCB prior to commencement of any construction activities. ○ CDFG Fish and Game Code Section 1600 Streambed Alteration Agreement for activities within the streambed and bank.



**SOUTH FORK LONG CANYON CREEK DIVERSION
PLAN VIEW**

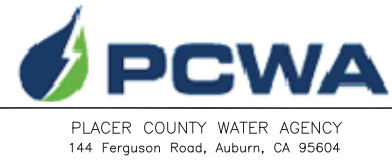
SCALE: 1" = 50'-0"
 0 25' 50' 100'
 12.5'

	DESIGNED _____ CHECKED _____ DRAWN T. STANDERS SUBMITTED _____	 144 Ferguson Street Auburn, CA 95604	 8107th Avenue Suite 200 San Rafael, California 94903 U.S.A.	MIDDLE FORK AMERICAN RIVER HYDROELECTRIC PROJECT INTAKE SEDIMENT CONTROL MEASURES	DATE JULY 2010									
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REV	DATE	DESCRIPTION	SUB	APP'D	APPROVED									



DESIGNED P.O. Sjöman CHECKED J. Christensen
 DRAWN N.A. Kozobolis SUBMITTED

REV	DATE	DESCRIPTION	SUB	APP'D	APPROVED

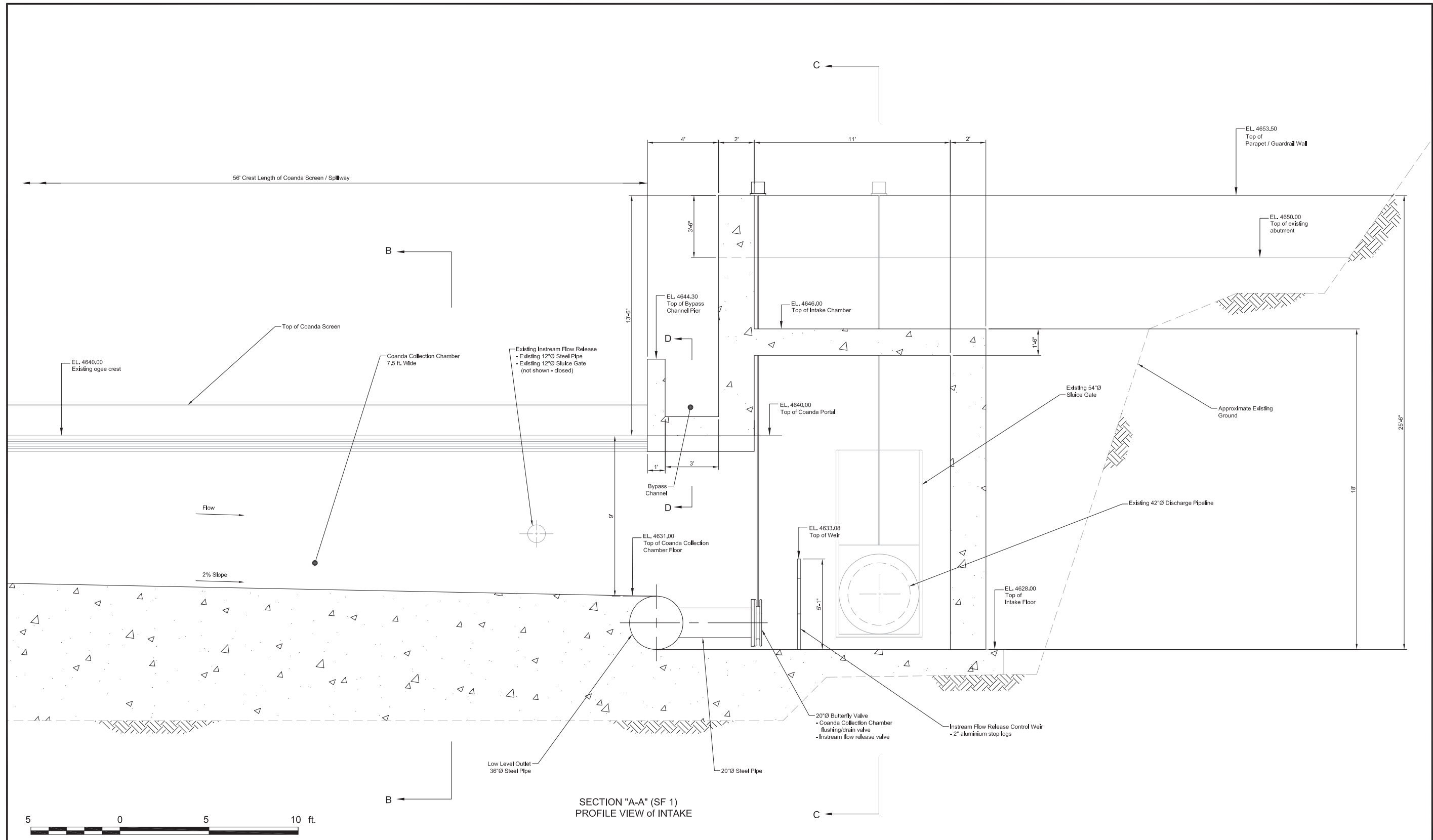


MIDDLE FORK AMERICAN RIVER PROJECT
 INTAKE SEDIMENT CONTROL MEASURES

FIGURE SF-2
 SOUTH FORK LONG CANYON DIVERSION SITE PLAN
 PLAN AND PROFILE VIEW OF INTAKE AND WEIR

DATE
 January, 2010

DRAWING NUMBER



SECTION "A-A" (SF 1)
PROFILE VIEW OF INTAKE



DESIGNED	P.O. Sjöman	CHECKED	J. Christensen		
DRAWN	N.A. Kozobolis	SUBMITTED			
REV	DATE	DESCRIPTION	SUB	APP'D	APPROVED

PLACER COUNTY WATER AGENCY
144 Ferguson Road, Auburn, CA 95604

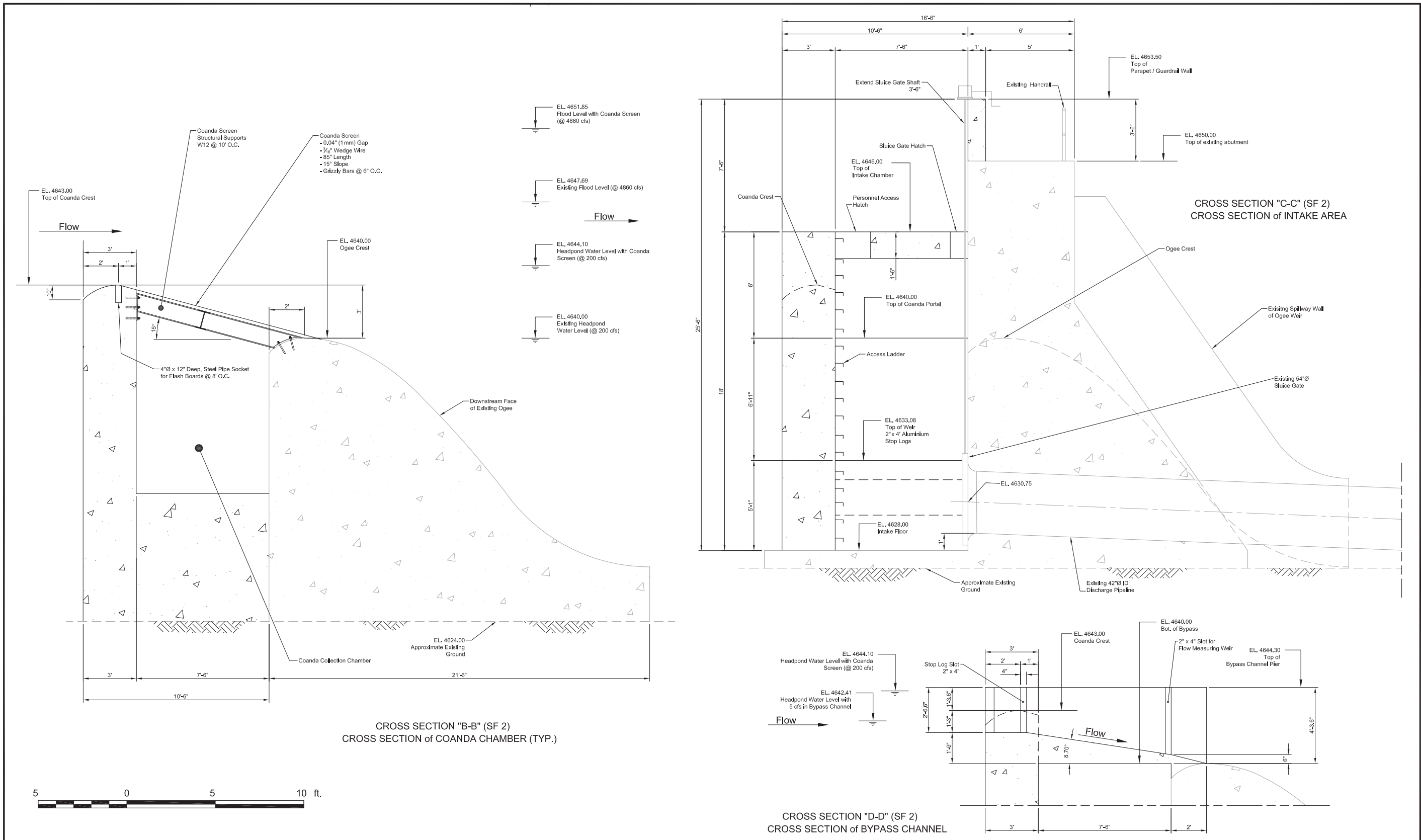
8107th Avenue
Suite 200
San Rafael, California 94903
U.S.A.

MIDDLE FORK AMERICAN RIVER PROJECT
INTAKE SEDIMENT CONTROL MEASURES

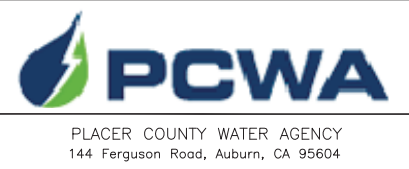
FIGURE SF-3
SOUTH FORK LONG CANYON DIVERSION SITE PLAN
PROFILE VIEW OF INTAKE "A-A"

DATE
January, 2010

DRAWING NUMBER



DESIGNED	P.O. Sjöman	CHECKED	J. Christensen		
DRAWN	N.A. Kozobolis	SUBMITTED			
REV	DATE	DESCRIPTION	SUB	APP'D	APPROVED



MIDDLE FORK AMERICAN RIVER PROJECT
 INTAKE SEDIMENT CONTROL MEASURES

FIGURE SF-4
 SOUTH FORK LONG CANYON DIVERSION SITE PLAN
 INTAKE SECTIONS "B-B" & "C-C"

DATE	January, 2010
DRAWING NUMBER	

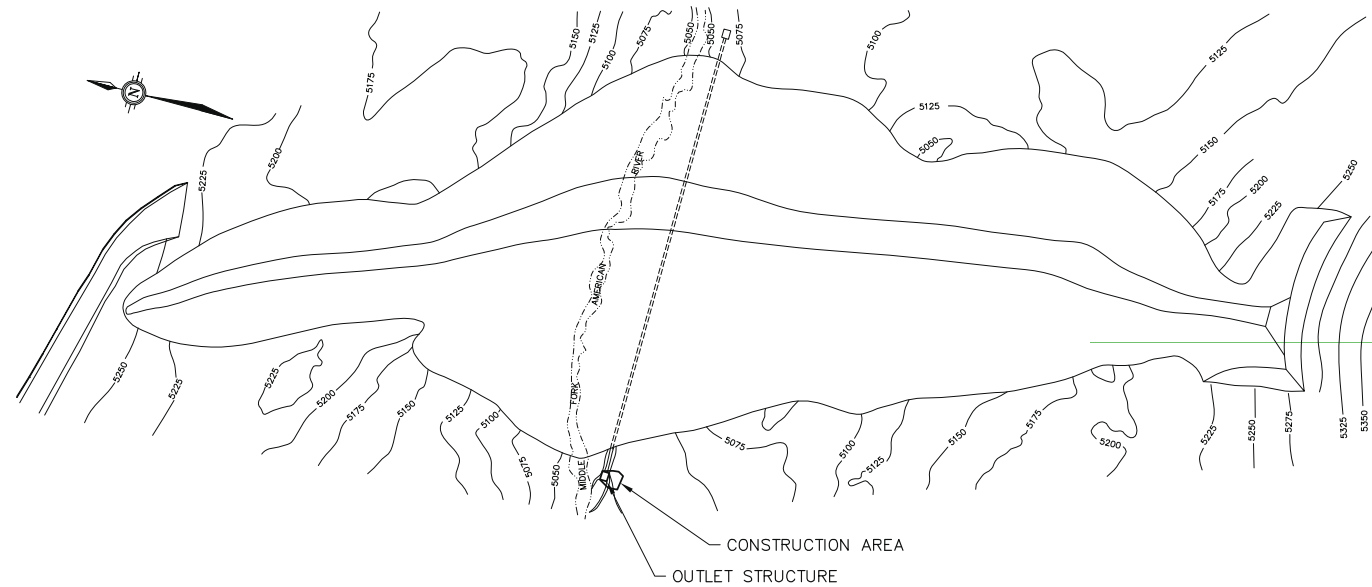
Outlet Works Modifications

Table FMO-1. French Meadows Reservoir Outlet Works Modification – Construction, Operation, and Maintenance.

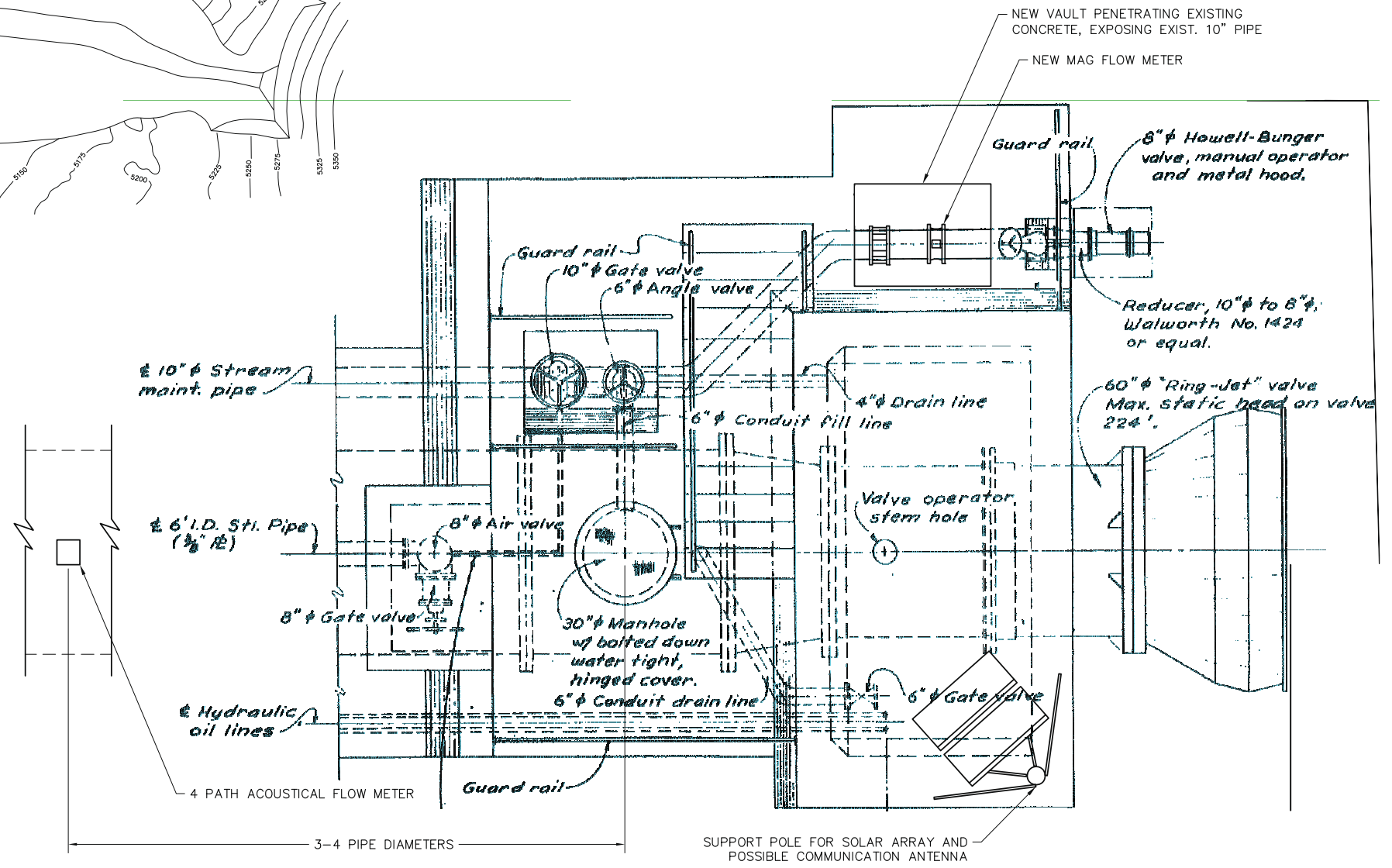
Activity	Description
Modifications to Existing Project Facilities	<p>Modifications to Existing Facilities</p> <ul style="list-style-type: none"> • Install an internal mount flowmeter in the 72-inch mainline. • Mount a magnetic style flowmeter on the smaller 10-inch stream maintenance line. • Install a cross-connection pipeline (less than 15 feet of 6-inch steel pipe) from the 72-inch to the 10-inch line. • Modify existing 10-inch line valve box for the addition of the flowmeter and cross-connection piping. <p>Refer to Figure FMO-1.</p>
FERC Project Boundary Revision	<ul style="list-style-type: none"> • None. All facilities will be constructed within the existing FERC Project boundary.
Construction Access Roads	<ul style="list-style-type: none"> • Construction equipment and materials will arrive at the site via Mosquito Ridge Road (FR 96). • No new roads or modifications to existing roads will be required.
Construction Work and Staging Areas	<ul style="list-style-type: none"> • The construction and staging area will be directly next to the existing discharge valvehouse.
Disposal Areas	<ul style="list-style-type: none"> • Any excess excavated material will be disposed of at an agency-approved disposal area.
Construction Activities and Associated Equipment	<ul style="list-style-type: none"> • Minor demolition of the existing smaller valve box. • Reform new valve box with concrete (Hand mixed or field supplied by using a ½ yard trailer mixer on-site using batch plant and delivered concrete). Quantity of finished concrete is expected to be less than one yard. • Spot reline interior of main 72-inch pipe (less than 200 feet) which includes minor grinding and application of coal tar patch. • Install 10-inch magnetic flowmeter which includes some minor welding, pipe fitting, grinding/welding. • Install solar panels, controls, and communication antenna(s). • Construction equipment to include a small backhoe with hoe ram, flat rack truck, electric jack hammer, small 5 kW generator (gas), Gen-set/welder, several light-duty pick-up trucks.
Construction Schedule and Hours of Operation	<ul style="list-style-type: none"> • Construction to begin in early summer and be finished by December 1 of any given year, within 1-2 years following license issuance. • Construction to last approximately 30 days. • Construction personnel to work five, 10-hour days per week with additional weekend hours as needed.

Table FMO-1. French Meadows Reservoir Outlet Works Modification – Construction, Operation, and Maintenance.

Activity	Description
Personnel Housing	<ul style="list-style-type: none"> • Construction will be completed by a crew of approximately 2-10 personnel. The majority of the construction crew will commute to the site from Auburn or Foresthill.
Short-Term Operational Changes	<ul style="list-style-type: none"> • During installation of the cross connection and smaller magnetic flowmeter, the required stream maintenance flows will be supplied by the larger 60-inch ring valve. • Short-term pulse flows will be required for testing of the modified valves, flowmeter(s), and other release facilities.
Long-term Operational Changes	<ul style="list-style-type: none"> • Modifications will allow the existing outlet works to make larger stream maintenance flow releases without using the larger outlet valve. • The larger fixed cone valve can be annually flow tested with relatively higher flows to maintain the ability of the facility to release large amounts of water as required. The exact flow can be more closely monitored, recorded, and communicated off-site. • The proposed larger stream maintenance flow can be made from the smaller outlet line with flow sometimes coming from the main 72-inch line through the proposed cross-connection pipe.
Project Maintenance Changes	<ul style="list-style-type: none"> • Maintenance of the main pipelines will be improved with relining effort. • Wetted valve and pulse flow testing should be resumed on an annual basis to prove and maintain the reliability of the larger outlet works and valving. • Testing to involve partial opening of ring valve and closure testing of upstream isolation gate under pressure.
Acres of Habitat Loss	<ul style="list-style-type: none"> • No temporary or permanent habitat loss.
Potential Permit Requirements	<ul style="list-style-type: none"> • The following permits/agreements will be obtained, as necessary, prior to construction: <ul style="list-style-type: none"> ○ USDA-FS Road Use Permit for use of forest roads during construction activities. ○ SWRCB 401 Certification will be obtained prior to FERC's issuance of the new license. This certification will include implementation of the Proposed Action (including this facility modification). ○ PCWA anticipates that preparation of a project-specific Water Quality Protection Plan (WQPP) will be a condition of the SWRCB 401 Certification. PCWA will develop a WQPP in consultation with SWRCB prior to commencement of any construction activities.



GENERAL SITE PLAN
APPROX SCALE: 1" = 200'



OUTLET STRUCTURE PLAN VIEW
APPROX SCALE: 1/2" = 1'-0"

REDUCED NOTE DRAWING

DESIGNED _____ CHECKED _____
DRAWN _____ SUBMITTED _____

REV	DATE	DESCRIPTION	SUB	APP'D

APPROVED



144 Ferguson Street
Auburn, CA 95604



40750 Avenue
Suite 200
San Rafael, California 94901
USA

FRENCH MEADOW OUTLET WORKS
PROPOSED MODIFICATIONS

DATE
AUG.9, 2010

Figure FMO-1
FRENCH MEADOWS RESERVOIR OUTLET WORKS MODIFICATION

DRAWING NUMBER

Table HHO-1. Hell Hole Reservoir Outlet Works Modification – Construction, Operation, and Maintenance.

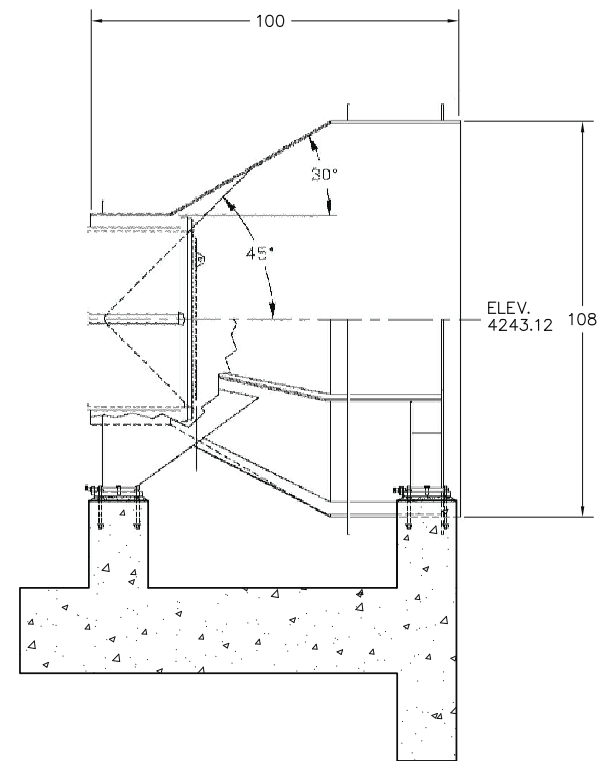
Activity	Description
Modifications to Existing Project Facilities or New Project Facilities	<p>Modification to Existing Facilities</p> <ul style="list-style-type: none"> • Install a 12-foot diameter, 20-foot long energy absorbing hood on the existing 48-inch fixed cone valve. • Modify the existing 48-inch fixed cone valve to be electrically operated. • Install an additional remote flow and pressure measuring devices on the two release pipes at the outlet works. • Replace and harden the high pressure control lines and hydraulic controls that can remotely close off the pipelines in the outlet works tunnel. <p>Modification to Stream Channel</p> <ul style="list-style-type: none"> • Recontour the discharge channel directly downstream of the 48-inch fixed cone valve to allow for the full discharge capacity for emergency releases without backwater effects and minor relocation of a Project road to allow for safe discharge of the proposed instream flow releases. <p>Refer to Figure HHO-1.</p>
FERC Project Boundary Revision	<ul style="list-style-type: none"> • None. All facilities will be constructed within the existing FERC Project boundary.
Construction Access Roads	<ul style="list-style-type: none"> • Construction equipment and materials will arrive at the site via Mosquito Ridge Road (FR 96), Ralston Ridge Road (FR 23 and 25), FR 2, the Hell Hole Dam and Powerline Road, and the existing spillway access road. • No new roads will be required.
Construction Work and Staging Areas	<ul style="list-style-type: none"> • Construction and staging will occur north of the Hell Hole Powerhouse and adjacent to the stream channel (above the ordinary high water mark) where the fixed cone valve currently discharges. • Some equipment may also be staged at the existing Hell Hole Staging Areas near the Hell Hole Dormitory.
Disposal Areas	<ul style="list-style-type: none"> • Any rock or gravel removed from the channel will be spread out in front of the existing Hell Hole Powerhouse. • Any excess excavated material will be disposed of at an agency-approved disposal area.
Construction Activities and Associated Equipment	<ul style="list-style-type: none"> • Extend the existing 16-inch pipe at the toe of the dam to divert Rubicon River flows around the construction site and allow for MIF to be maintained during construction activities. • Transport the fabricated and tested fixed cone valve hood to the site using a low-boy trailer. • Install anchors into the rock for the foundation of the valve hood with a drilling rig. • Modify existing 48-inch fixed cone valve by installing a free supported, energy absorbing cone valve hood. The hood will reduce the discharge energy and direct flow downstream at the toe of the dam. • Survey and grade the discharge channel (650 feet) directly downstream of valve to allow for full emergency discharge capacity without the potential

Table HHO-1. Hell Hole Reservoir Outlet Works Modification – Construction, Operation, and Maintenance.

Activity	Description
	<p>for backwater effects at the valve hood.</p> <ul style="list-style-type: none"> • Inspect existing 48-inch and smaller 16-inch diameter stream maintenance line to determine if recoating or replacement is necessary. • Recoat or replace stream maintenance line, if necessary. • Install new flow measurement equipment (Rubicon River Gage at Hell Hole Dam Outlet Works) in the outlet pipe. • Replace and harden the high pressure control lines and hydraulic controls that can remotely close off the pipelines in the outlet works tunnel. • Improve the existing monitoring and security features. • Construction equipment includes a backhoe, medium excavator with “ramhoe” attachment, mid-size front loader, 10-yard dump truck, 25-ton hydraulic crane, flat rack truck, concrete transit truck, fork lift, towable air compressor, backhoe with rock breaker (hoe ram), large truck and trailer (low-boy trailer), several light-duty pick-up trucks.
Construction Schedule and Hours of Operation	<ul style="list-style-type: none"> • Implement between July and November; 2-3 years following license issuance. • Removal of riparian vegetation necessary for construction will take place in August through March the year prior to construction. • Construction personnel will work five, 10-hour days per week with additional weekend hours as needed.
Personnel Housing	<ul style="list-style-type: none"> • Construction will be completed by a crew of approximately 6-20 personnel. The majority of the construction crew will commute to the site from Auburn or Foresthill.
Short-Term Operational Changes	<ul style="list-style-type: none"> • Flows from the outlet at the toe of the dam will be diverted around the construction site and discharged back to the river downstream of the work area. • The turbine generator at the toe of the dam will be temporarily removed from service during construction. • Pulse flows will be required for testing the modified valves after construction.
Long-term Operational Changes	<ul style="list-style-type: none"> • Modifications will provide for safer discharge capacity and allow for larger releases from the reservoir, if required, for an emergency drawdown. • The electrified fixed cone will allow the valve to be operated remotely. • The larger fixed cone valve will be annually flow tested with higher flows to maintain the ability to release large amounts of water, as required.
Project Maintenance Changes	<ul style="list-style-type: none"> • Maintenance of the outlet works will be improved with relining and pipe recoating efforts. • Operation and maintenance of the larger electrified fixed cone valve operator. • Valve testing includes partial opening testing of fixed cone valve and closure testing of upstream isolation valve under pressure.

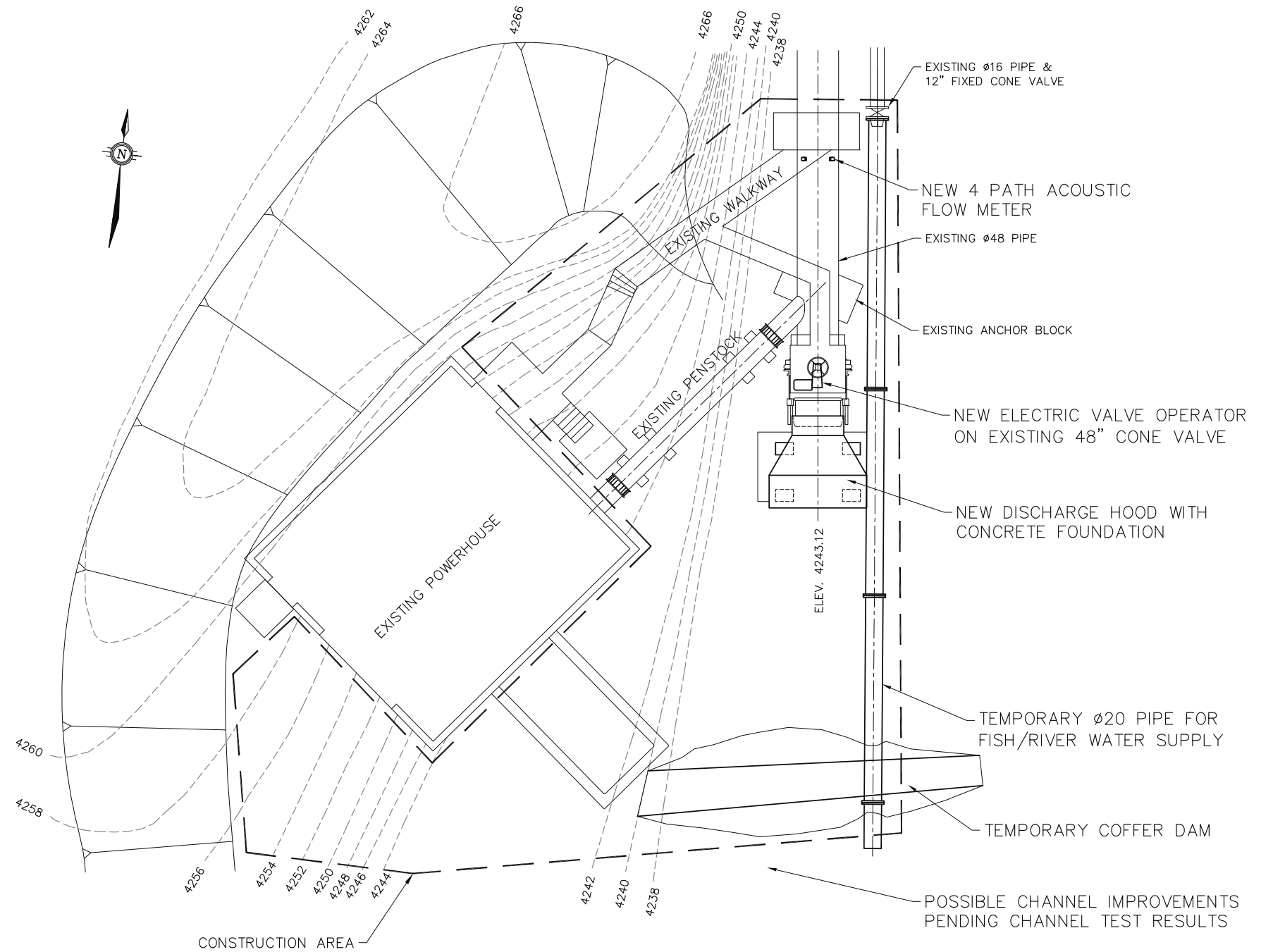
Table HHO-1. Hell Hole Reservoir Outlet Works Modification – Construction, Operation, and Maintenance.

Activity	Description
Acres of Habitat Loss	<ul style="list-style-type: none"> • Permanent loss of 0.24 acre of white alder riparian during recontouring of the discharge channel.
Potential Permit Requirements	<ul style="list-style-type: none"> • The following permits/agreements will be obtained, as necessary, prior to construction: <ul style="list-style-type: none"> ○ USACE Clean Water Act Section 404 Permit for fill of jurisdictional waters of the U.S. ○ USDA-FS Road Use Permit for use of forest roads during construction activities. ○ SWRCB 401 Certification will be obtained prior to FERC's issuance of the new license. This certification will include implementation of the Proposed Action (including this facility improvement). ○ PCWA anticipates that preparation of a project-specific Water Quality Protection Plan (WQPP) will be a condition of the SWRCB 401 Certification. PCWA will develop a WQPP in consultation with SWRCB prior to commencement of any construction activities. ○ CDFG Fish and Game Code Section 1600 Streambed Alteration Agreement for activities within the streambed and bank.



BASIC DISCHARGE HOOD & FOUNDATION ELEVATION

SCALE: 1/2" = 1'-0"



HELL HOLE OUTLET WORKS, PLAN VIEW

SCALE: 1" = 6'-0"



DESIGNED _____ CHECKED _____
 DRAWN _____ SUBMITTED _____

REV	DATE	DESCRIPTION	SUB	APP'D

APPROVED _____



144 Ferguson Street
 Auburn, CA 95604



410 Park Avenue
 Suite 210
 San Rafael, California 94901
 U.S.A.

HELL HOLE OUTLET WORKS
 IMPROVEMENTS

DATE
 AUG. 8, 2010

Figure HHO-1
 HELL HOLE RESERVOIR OUTLET WORKS MODIFICATION

DRAWING NUMBER

Table IBO-1. Middle Fork Interbay Outlet Works Modification – Construction, Operation, and Maintenance.

Activity	Description
Modifications to Existing Project Facilities	<p>Modifications to Existing Facilities</p> <ul style="list-style-type: none"> • Install a new or calibrate the existing 20-inch diameter main supply line flowmeter. • Install a new release valve and guard valve for release outlet works (isolation valve to be high performance low-loss biplane butterfly valve; outlet release valve to be fixed cone valve). • Install new stream gaging station below dam. <p>Refer to Figure IBO-1.</p>
FERC Project Boundary Revision	<ul style="list-style-type: none"> • None. All facilities will be constructed within the existing FERC Project boundary.
Construction Access Roads	<ul style="list-style-type: none"> • Construction equipment and materials will arrive to the site via Mosquito Ridge Road (FR 96) and Middle Fork Interbay Dam and Powerhouse Road. • No new roads or modifications to existing roads will be required.
Construction Work and Staging Areas	<ul style="list-style-type: none"> • The staging area will be directly next to the Middle Fork Powerhouse. • Construction of the replacement piping and valves to be located below the existing outlet works. • Construction area for new gaging station, if required, to be determined by study and discussion with USGS.
Disposal Areas	<ul style="list-style-type: none"> • Any excess excavated material will be disposed of at an agency-approved disposal area.
Construction Activities and Associated Equipment	<ul style="list-style-type: none"> • Minor demolition of existing piping system. • Reform new valve box with concrete (Hand mixed or field supplied by using a ½ yard trailer mixer on-site using batch plant and delivered concrete). Quantity of finished concrete is expected to be less than two yards. • Replace guard valve and installation of fixed cone valve. • Construction of the gaging station will require concrete blocks on both sides of the river with a cable tram system for moving across the river flows to take calibration data on flow and contour conditions. • Installation of local solar panels, controls, communication antenna(s) for and at the gaging site. • Construction equipment includes a hydraulic crane, concrete transport trucks, concrete pumper, compressor with rock drills, several light-duty pick-up trucks.
Construction Schedule and Hours of Operation	<ul style="list-style-type: none"> • Construction to begin early summer and be finished by December 1 of any given year within; 1-2 years following license issuance. • Construction to last less than 60 days. • Construction personnel to work five, 10-hour days per week with additional weekend hours as needed.

Table IBO-1. Middle Fork Interbay Outlet Works Modification – Construction, Operation, and Maintenance.

Activity	Description
Personnel Housing	<ul style="list-style-type: none"> • Construction will be completed by a crew of approximately 2-15 personnel. The majority of the construction crew will commute to the site from Auburn or Foresthill.
Short-Term Operational Changes	<ul style="list-style-type: none"> • During installation of the new isolation valves and/or flowmeter the required stream maintenance flows will be supplied by the lower dam outlet or by spilling the diversion over the spillway gates. • Short-term pulse flows required for testing of the modified and newly installed valves, flowmeter(s), and stream gaging station.
Long-term Operational Changes	<ul style="list-style-type: none"> • Modifications will allow stream release flows to be more closely monitored, recorded, and communicated off-site. • The larger stream maintenance flow can be made by either spilling over the existing gates, by lifting a gate section, or by using the dam's lower outlet.
Project Maintenance Changes	<ul style="list-style-type: none"> • Maintenance of the outlet works will be improved with the new valves and controls. • Pulse flow testing can be done, depending on the water year, to prove and maintain the reliability and accuracy of the proposed stream gaging station. • Testing to include matching spilled overdraft flows from Middle Fork Interbay with spill flows at the diversion.
Acres of Habitat Loss	<ul style="list-style-type: none"> • No temporary or permanent habitat loss.
Potential Permit Requirements	<ul style="list-style-type: none"> • The following permits/agreements will be obtained, as necessary, prior to construction: <ul style="list-style-type: none"> ○ USACE Clean Water Act Section 404 Permit for fill of jurisdictional waters of the U.S. ○ USDA-FS Road Use Permit for use of forest roads during construction activities. ○ SWRCB 401 Certification will be obtained prior to FERC's issuance of the new license. This certification will include implementation of the Proposed Action (including this facility modification). ○ PCWA anticipates that preparation of a project-specific Water Quality Protection Plan (WQPP) will be a condition of the SWRCB 401 Certification. PCWA will develop a WQPP in consultation with SWRCB prior to commencement of any construction activities. ○ CDFG Fish and Game Code Section 1600 Streambed Alteration Agreement for activities within the streambed and bank.

PROPOSED USGS RIVER GAGE LOCATION



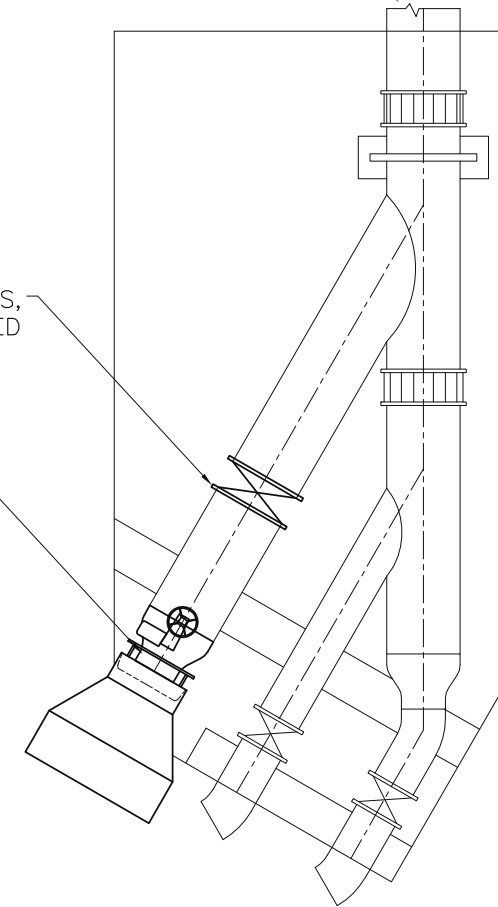
INTERBAY DAM & DOWNSTREAM VICINITY

SCALE: N.T.S.

CALIBRATE EXISTING FLOW METER OR
REPLACE WITH NEW FLOW METER
IN EXISTING LOCATION

NEW 20" BUTTERFLY VALVE WITH STEEL SEATS,
ELECTRICALLY OPERATED

NEW 16" FIXED CONE VALVE WITH DISCHARGE
HOOD MOUNTED TO VALVE



INTERBAY DAM OUTLET WORKS
PROPOSED MODIFICATION

SCALE: N.T.S.



DESIGNED _____ CHECKED _____
DRAWN _____ SUBMITTED _____

REV	DATE	DESCRIPTION	SUB	APP'D

APPROVED



144 Ferguson Street
Auburn, CA 95604



801 Fifth Avenue
Suite 200
San Rafael, California 94901
U.S.A.

INTERBAY DAM OUTLET WORKS
IMPROVEMENTS

DATE
AUG. 10, 2010

Figure IBO-1
MIDDLE FORK INTERBAY OUTLET WORKS MODIFICATION

DRAWING NUMBER

**Permits, Best Management Practices, and Avoidance/Protection Measures
to be Obtained/Implemented for Modification of
Existing Project Facilities or Construction of New Project Facilities**

Table A-2. Best Management Practices and Avoidance/Protection Measures to be Implemented for Modification of Existing or Construction of New Project Facilities.

Best Management Practice or Avoidance/Protection Measure	Modified/New Facility						
	Hell Hole Reservoir Seasonal Storage Increase Improvement	Small Diversion			Outlet Works		
		Duncan Creek Diversion Dam	North Fork Long Canyon Diversion Dam	South Fork Long Canyon Diversion Dam	French Meadows Dam Outlet Works	Hell Hole Dam Outlet Works	Middle Fork Interbay Dam Outlet Works
USDA-FS Water Quality Best Management Practices							
Road and Building Site Construction BMPs							
General Guidelines for the Location and Design of Roads (Practice 2-1): Includes consideration for the location and design of roads to minimize resource damage.	X						
Erosion Control Plan (Practice 2-2): Limits and mitigates erosion and sedimentation through effective planning prior to initiation of construction activities and through effective contract administration during construction.	X	X	X	X	X	X	X
Timing of Construction Activities (Practice 2-3): Minimizes erosion by conducting operations during periods of minimal runoff.	X	X	X	X	X	X	X
Stabilization of Road Slope Surfaces and Spoil Disposal Areas (Practice 2-4): Minimizes erosion from exposed cut slopes, fill slopes, and spoil disposal areas.	X	X	X	X	X	X	X
Road Slope Stabilization Construction Practices (Practice 2-5): Reduces sedimentation by minimizing erosion from road slopes and slope failure along roads.	X						
Dispersion of Subsurface Drainage From Cut and Fill Slopes (Practice 2-6): Minimizes the possibilities of cut or fill slope failure and the subsequent production of sediment.	X						
Control of Road Drainage (Practice 2-7): Minimizes the erosive effects of water concentrated by road drainage features; to disperse runoff from disturbances within the road clearing limits; to lessen the sediment yield from roaded areas; to minimize erosion of the road prism by runoff from road surfaces and from uphill areas.	X						
Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects (Practice 2-9): Minimizes erosion and sedimentation from disturbed ground on incomplete projects.	X	X	X	X	X	X	X
Control of Side cast Material During Construction and Maintenance (Practice 2-11): Minimizes sediment production originating from sidecast material during road construction or maintenance.	X						
Servicing and Refueling of Equipment (Practice 2-12): Prevents pollutants (e.g., fuels, lubricants, or other hazardous materials) from being discharged into river, streams, or impoundments.	X	X	X	X	X	X	X
Control of Construction and Maintenance Activities Adjacent to SMZs (Practice 2-13): Protects water quality by controlling construction and maintenance actions within and adjacent to any streamside management zone (SMZs).	X	X	X	X	X	X	X
Controlling In-Channel Excavation (Practice 2-14): Minimizes stream channel disturbances and related sediment production.	X	X	X	X	X	X	X
Diversion of Flows around Construction Sites (Practice 2-15): Ensures that all stream diversions are carefully planned to minimize downstream sedimentation, and to restore stream channels to their natural grade, condition, and alignment as soon as possible.	X	X	X	X	X	X	X
Stream Crossings on Temporary Roads (Practice 2-16): Ensures that temporary roads do not unduly damage stream channels and to ensure that fish passage is unimpeded by stream crossing structures.			X	X			
Disposal of Right-of-Way and Roadside Debris (Practice 2-19): Ensures that debris generated during road construction is kept out of streams and that debris dams are not formed.	X	X	X	X	X	X	X
Specifying Riprap Composition (Practice 2-20): Minimizes sediment production associated with the installation and utilization of riprap material.	X	X	X	X	X	X	X
Road Surface Treatment to Prevent Loss of Materials (Practice 2-23): Minimizes the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas.	X	X	X	X	X	X	X
Traffic Control During Wet Periods (Practice 2-24): Reduces road surface disturbance and rutting of roads, and minimize sediment washing from disturbed road surfaces.	X	X	X	X	X	X	X
Obliteration or Decommissioning of Roads (Practice 2-26): Reduces sediment generated from unneeded system roads by obliterating or decommissioning them at the completion of their intended use.			X	X			
Surface Erosion Control at Facility Sites (Practice 2-28): Reduces the amount of surface erosion at developed sites and the amount of soil entering streams.	X	X	X	X	X	X	X

Table A-2. Best Management Practices and Avoidance/Protection Measures to be Implemented for Modification of Existing or Construction of New Project Facilities (continued).

Best Management Practice or Avoidance/Protection Measure	Modified/New Facility						
	Hell Hole Reservoir Seasonal Storage Increase Improvement	Small Diversion			Outlet Works		
		Duncan Creek Diversion Dam	North Fork Long Canyon Diversion Dam	South Fork Long Canyon Diversion Dam	French Meadows Dam Outlet Works	Hell Hole Dam Outlet Works	Middle Fork Interbay Dam Outlet Works
USDA-FS Water Quality Best Management Practices (continued)							
Recreation Best Management Practices							
Protection of Water Quality Within Developed and Dispersed Recreation Areas (Practice 4-9): Protects water quality by regulating the discharge and disposal of potential pollutants.		X					
Vegetative Manipulation Best Management Practices							
Slope Limitations for Mechanical Equipment Operation (Practice 5-2): Reduces gully and sheet erosion and associated sediment production by limiting tractor use.	X	X	X	X	X	X	X
Revegetation of Surface Disturbed Areas (Practice 5-4): Requires minimization of soil erosion through establishment and vegetation foliage and root networks.	X	X	X	X	X	X	X
Soil Moisture Limitations for Mechanical Equipment Operations (Practice 5-6): Prevents compaction, rutting, and gulying, with resultant sediment production and turbidity.	X	X	X	X	X	X	X
Watershed Best Management Practices							
Forest and Hazardous Substance Spill Prevention Control and Counter Measure Plan (Practice 7-4): Prevents contamination of waters from accidental spills.	X	X	X	X	X	X	X
Avoidance and Protection Measure							
Fire Prevention and Suppression							
The contractor, its employees, and subcontractors and their employees, will make all reasonable efforts to prevent and suppress wild fires, and will exercise diligence in protecting from damage the land and property of the United States.	X	X	X	X	X	X	X
No burning of any kind will occur as part of the construction activities.	X	X	X	X	X	X	X
The following fire equipment will be on site at all times:							
One shovel, one axe and one fire extinguisher UL rated at 4 BC or more on each truck, personnel vehicle, tractor, grader, and any other heavy equipment used.	X	X	X	X	X	X	X
One shovel and on back-pack five gallon water filled tank with pump with each welder.	X	X	X	X	X	X	X
One shovel and one chemical pressurized fire extinguisher (fully charged) located at a point no greater than a distance of 25-feet from the work site, for each gasoline powered tool, including but not limited to chain saws, rock drills, etc.	X	X	X	X	X	X	X
Air Quality							
Fugitive Dust Reduction Measures							
Require contractors to comply with provisions of the Placer County Air Pollution Control District Rule 228 - Fugitive Dust, including Section 300 limits on visible emissions, PM ₁₀ concentrations, track-out onto paved public roadways, and other applicable requirements.	X	X	X	X	X	X	X
Stabilize unpaved areas subject to vehicle traffic by watering, treating with a non-toxic chemical dust suppressant, or covering.	X	X	X	X	X	X	X
Limit the speed of any vehicles and equipment traveling across unpaved areas no more than 15 miles per hour unless the road surface and surrounding area is sufficiently stabilized.	X	X	X	X	X	X	X
Stabilize storage piles and disturbed areas not subject to vehicular traffic by keeping wet, treating with a non-toxic chemical dust suppressant, or covering when material is not being added to, or removed from, the pile.	X	X	X	X	X	X	X
Prior to any ground disturbance, including grading, excavating, and land clearing, apply sufficient water to the area to be disturbed to limit dust and minimize emissions from crossing the boundary line.	X	X	X	X	X	X	X
Clean construction vehicles leaving the site to prevent dust, silt, mid, and dirt, from being released or tracked offsite.	X	X	X	X	X	X	X
Remove significant accumulations of mud or dirt from paved, public streets at the end of each work day using wet sweeping or a HEPA filter equipped vacuum device. Do not use blower devices.	X	X	X	X	X	X	X
Suspend grading and earthmoving operations if wind speeds are high enough to result in dust emissions crossing the boundary line, despite the application of dust mitigation measures.	X	X	X	X	X	X	X

Table A-2. Best Management Practices and Avoidance/Protection Measures to be Implemented for Modification of Existing or Construction of New Project Facilities (continued).

Best Management Practice or Avoidance/Protection Measure	Modified/New Facility						
	Hell Hole Reservoir Seasonal Storage Increase Improvement	Small Diversion			Outlet Works		
		Duncan Creek Diversion Dam	North Fork Long Canyon Diversion Dam	South Fork Long Canyon Diversion Dam	French Meadows Dam Outlet Works	Hell Hole Dam Outlet Works	Middle Fork Interbay Dam Outlet Works
Air Quality (continued)							
Fugitive Dust Reduction Measures (continued)							
Prevent spillage from materials transported off-site by either covering with tarps, or wetting loads such that the material does not touch the front, back, or sides of the cargo compartment at any point less than six inches from the top and that no point of the load extends above the top of the cargo compartment.	X	X	X	X	X	X	X
If any naturally occurring asbestos, ultramafic rock, or serpentine is disturbed: (1) wash all equipment before moving from the property onto a paved public road, and (2) upon completion of the project, stabilize disturbed surfaces using one or more of the following methods: (a) establishment of a vegetative cover; (b) placement of at least one foot of non-asbestos-containing material, or (c) paving.	X	X	X	X	X	X	X
Diesel Emissions Reduction Measures							
Depending on equipment availability, require that all diesel construction engines with a rating of 50 horsepower or greater meet, at a minimum, the Tier 2 California emission standards for off-road engines (13 CCR 2423 per 40 CFR 89.112).	X	X	X	X	X	X	X
Require contractors to limit idling of construction vehicles and equipment on site to 15 minutes or less, unless idling is necessary for effective work progress or equipment operation.	X	X	X	X	X	X	X
Require contractors to maintain construction equipment in proper working order, and in accordance with manufacturer specifications.	X	X	X	X	X	X	X
Fuel Emissions Measures							
Comply with the use of ultra-low sulfur diesel fuel for all construction equipment, as required by the state of California, to minimize diesel particular matter emissions.	X	X	X	X	X	X	X
Biological Resources							
Noxious Weed Measures							
Revegetation and seeding will be implemented consistent with measures outlined in the Vegetation and Integrated Pest Management Plan (VIPMP).	X	X	X	X	X	X	X
The Licensee will implement measures to prevent the introduction or spread of noxious weeds as defined in the VIPMP.	X	X	X	X	X	X	X
Riparian Measures							
Riparian vegetation will not be removed or destroyed, with the exception of planned removals necessary for modification/construction activities including 0.01 acres at South Fork Long Canyon Diversion Pool, 0.03 acres at Duncan Creek Diversion Pool, and 0.24 acres at the Hell Hole Dam Outlet Works.		X		X		X	
One-time removal of riparian vegetation at South Fork Long Canyon Diversion Pool, Duncan Creek Diversion Pool, and Hell Hole Dam Outlet Works will be conducted between August and March one year prior to construction to avoid impacts to riparian nesting songbirds.		X		X		X	
The Licensee will use existing ramps to access reservoirs and diversion pools whenever possible. When it is not possible to use existing ramps, an access route will be selected in an area that does not support riparian vegetation.	X	X	X	X	X	X	X

Table A-2. Best Management Practices and Avoidance/Protection Measures to be Implemented for Modification of Existing or Construction of New Project Facilities (continued).

Best Management Practice or Avoidance/Protection Measure	Modified/New Facility						
	Hell Hole Reservoir Seasonal Storage Increase Improvement	Small Diversion			Outlet Works		
		Duncan Creek Diversion Dam	North Fork Long Canyon Diversion Dam	South Fork Long Canyon Diversion Dam	French Meadows Dam Outlet Works	Hell Hole Dam Outlet Works	Middle Fork Interbay Dam Outlet Works
Biological Resources (continued)							
Special-Status Plant Measures							
If a new special-status plant population that could be affected by sediment management activities is detected prior to implementation of facility modifications or new facility construction, the Licensee will consult with USDA-FS, USFWS, and CDFG, as appropriate, to determine a site-specific protective buffer around the population considering the special-status plant species, location of the population, and topography of the site.	X	X	X	X	X	X	X
Aquatic Measures							
Check reservoirs during dewatering, transport stranded species. Prior to diverting or bypassing flows, all fish inhabiting the affected reach shall be captured and rescued to a downstream location.		X	X	X		X	
If fish are present within the small diversion pools during dewatering, fish will be rescued and transported downstream of the diversion. A record will be maintained of all fish rescued. This will include survey personnel names, date captured and relocated, and method of capture. The complete record will be provided to resources agencies following completion of sediment management.		X	X	X		X	
If fish are present within Middle Fork Interbay during dewatering, fish will be rescued and transported downstream of the sediment augmentation site and associated silt fence. In addition, fish present at the sediment augmentation site will be rescued and transported downstream of the silt fence. A record will be maintained of all fish rescued. This will include survey personnel names, date captured and relocated, and method of capture. The complete record will be provided to resources agencies following completion of sediment management.		X	X	X		X	
Raptor Measures							
All new power poles and powerlines will be constructed using APLIC raptor-safe design configurations.	X	X	X	X	X	X	X
Ground disturbing and construction activities will be not conducted within 500 feet of an active raptor nest during the raptor breeding season (February 15 through September 15). – If ground disturbing and construction activities must occur during the breeding season, a pre-construction survey shall be conducted by a qualified biologist to determine if there are active nests present. The survey shall be conducted no more than 30 days prior to implementation of the activity. – If the biologist determines that the area surveyed does not contain any active nests, then activities may be implemented. – If active raptor nests are found, activities shall not occur within 500 feet of an active nest until the end of the breeding season or until the Licensee receives written authorization from resource agencies to proceed.	X	X	X	X	X	X	X
Cultural Resources							
Licensee will implement measures for the protection of cultural resources consistent with the Historic Properties Management Plan (HPMP).	X	X	X	X	X	X	X
Public and Worker Safety							
Material Safety Data Sheets for all substances used on the job site will be on file at the job headquarters in the Rock Creek Yard at Auburn, as required by the Hazard Communication Law, General Industry Safety Orders, Sec 5194, and will be available as necessary.	X	X	X	X	X	X	X
Normal construction safety procedures, road signage, employee training and tailboards, and good housekeeping will be implemented to assure that no unseen safety hazards exist.	X	X	X	X	X	X	X
Traffic control will consist of temporary construction signs, trucks entering roadway signs, and flaggers as needed.	X	X	X	X	X	X	X
Road closures will be implemented as necessary during construction activities.	X	X	X	X	X	X	X